

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1	BAG-5101	FUNDAMENTALS OF HORTICULTURE	2016	Unit 1: Importance and scope of HorticultureUnit-2 Principles of orchard establishment; Principles and methods ofUnit 3: Knowledge about medicinal and aromatic plants cultivationUnit 4:Importance of plant bio-regulators in horticultureUnit 5: Importance of fertilizers and fdescribe fertilizer application methods
2	BAG-5102	Fundamentals of Plant Biochemistry and Biotechnology	2016	Unit1: Agriculture Biochemistry focuses mainly on the subject of biochemistry that makes it applicable to agricultural scientists specifically. Agriculture Biochemistry deals with the chemistry of animals and plants metabolism. Enzymes are specifically used in processing and production of different items of food at industrial level.Maximum percentage of enzymes are used in the industry of food.Unit:2 Biotechnology is used especially in plant and animal-based agriculture, the pharmaceutical industry, and medicine to produce strains suitable for survival. Recently, scientists have started working on the genes found in organisms to make biotechnology in agriculture (plants and animals) more useful.Unit:3 Integrating biotechnology into the agricultural system is essential to better use limited resources, increase agricultural yields, and decrease the detrimental effects of the use of chemical pesticides and fertilizers.
3	BAG-5103	Fundamentals of Soil Science	2016	Unit:1 Information about different types of soil, rocks, minerals and branches of soil scienceUnit:2 Knowledge about of rocks Weathering type, Soil formation , Soil profile and Soil physical propertiesUnit:3 Soil structure, soil aggregates, soil structure, Bulk density, particle density, Soil colour and Soil consistency.Unit:4 soil crusting, Soil temperature and Soil air compositionUnit: 5 Soil physical properties as well as Soil survey, Soil classification and Soil taxonomy
4	BAG-5105	Comprehension & Communication Skills in English	2016	Unit:1 Importance of Spoken EnglishUnit:2 Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations.Unit:3 Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect NarrationUnit:4 Written Skills: Paragraph writing, Precise writing, Report writing and Proposal writingUnit:5Preparation of Curriculum Vitae and Job applications
5	BAG-5106	Fundamentals of Agronomy	2016	Unit:1 Agronomy and its scope, seeds and sowing methods Unit:2 Knowledge of manures and fertilizers and its application methods Unit:3 water resources and different irrigation methodsUnit:4 Classification of weeds , crop weed competition, concepts of weed management principles and methodsUnit:5 Crop management technologies, growth and development of crops
6	BAG-5109	Rural Sociology & Educational Psychology	2016	Unit:1 Rural sociology encourages the students or agri raguates to development of various plans for any rural development programme. The work must be carried out according to these plans for the progress in rural society. Rural Sociology Development Relationships of Village with Industry.Unit:2Social Ecology, Rural society. Social Groups Social StratificationUnit: 3 Culture concept, Social Institution. Social Change & DevelopmentUnit:4 Behaviour: Cognitive, affectiveUnit:5 This subject knowledge provides exposure to agricultural students to the natural setting of the village situations, work with the farm families, identify their problems and make use of various extension tools for transferring the latest agricultural technologies.
7	BAG- 5201	Fundamentals of Genetics	2016	Unit 1: Chromosome Cell biology , Probability and Chi-square. Dominance relationships, Epistatic interactionsUnit 2: Blood group genetics, Linkage , chromosome mapping.Unit 3: Mutation for breeding and inducing mutagenic agentsUnit 4: Genetic disorders. Protein synthesis, Transcription and translational
8	BAG-5202	Agricultural Microbiology	2016	Unit 1: chemoautotrophy, photo autotrophyUnit 2: Bacterial geneticsUnit 3: microbes in soil fertility and crop productionUnit 4: Azolla, blue green algae and mycorrhiza, Rhisphere, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste
9	BAG- 5203	Soil and Water Conservation Engineering	2016	Unit 1: Soil and Water ConservationUnit 2: Soil loss measurement techniques.Unit 3: Contour bund. Graded bund and bench terracing.Unit 4: Water harvesting and its techniques.Unit 5: wind erosion control
10	BAG-5204	Principle of Crop Physiology	2016	Unit 1: Crop physiology in AgricultureUnit 2: Plant cell, Mineral nutrition of PlantsUnit 3: Plant growth regulators
11	BAG- 5205	Fundamentals of Agricultural Economics	2016	Unit 1:Approaches to economic analysisUnit 2: Agricultural planning and development in the country, consumer surplusUnit 3: Cost, Stock v/s supplyUnit 4: Market structure, Price determination under perfect competitionUnit 5: National income, Agricultural and public finance
12	BAG- 5206	Fundamentals of Plant Pathology	2016	Unit 1: Plant diseases, disease triangleUnit 2: Types of parasitism and variability in plant pathogens., Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.

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13	BAG- 5207	Fundamentals of Entomology	2016	Unit 1: Body segmentation, Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Unit 2: Effect of abiotic and biotic factors Unit 3: Integrated Pest Management
14	BAG-5208	Fundamentals of Agricultural Extension Education	2016	Unit 1: Extension Education Unit 2: Sriniketan, Marthandam, Firka Development Scheme; Etawah Pilot Project, Nilokheri Experiment, extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP) Unit 3: New trends in agriculture extension: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems Unit 4: Extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies Unit 5: Agriculture journalism
15	BAG- 5209	Communication Skills and Personality Development	2016	Unit 1: Communication Skills Unit 2: writing skills Unit 3: Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting Unit 4: impromptu presentation, public speaking; Group discussion, Organizing seminars and conferences.
16	BAG-5301	Crop Production Technology – I (Kharif Crops)	2016	Unit:1 Cultivation technology of rice, pigeonpea, soybean Unit:2 Cultivation technology of maize, mungbean and groundnut Unit:3 Cultivation technology of sorghum, urdbean,cowpea, cotton Unit:4 Cultivation technology of pearl millet, forage crops-sorghum Unit:5 Cultivation technology of finger millet, cluster bean and napier
17	BAG-5302	Fundamentals of Plant Breeding	2016	Unit:1 Major achievements and future prospects. Domestication, Acclimatization and Introduction. Unit:2 Concepts of population genetics and Hardy-Weinberg Law. Unit:3 Genetic basis and breeding methods in self pollinated crops- mass selection and pure line selection, hybridization techniques and handling of segregating population Unit:4 Genetic basis and methods of breeding for cross pollinated crops, modes of selection. Unit:5 Breeding for important biotic and abiotic stresses.Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights.
18	BAG-5303	Agricultural Finance and Co-Operation	2016	Unit:1 Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture Unit:2 Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks Unit:3 Balance Sheet and Income Statement Unit :4 Agricultural Cooperation – Meaning, brief history of cooperative development in India Unit:5 Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing
19	BAG-5304	Agri-Informatics	2016	Unit:1 Introduction to Computers, Operating Systems, definition and types, Applications of MSOffice for document creation & Editing, Data presentation Unit:2 Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations. Unit:3 Concepts and applications, Use of ICT in Agriculture Unit:4 IT application for computation of water and nutrient requirementof crops, Computer-controlled devices (automated systems) for Agri-input management Unit:5 Decision support systems,concepts, components and applications in Agriculture, Agriculture Expert System, SoilInformation Systems etcfor supporting Farm decisions
20	BAG-5305	Farm Machinery and Power	2016	Unit:1 Sources of Farm Power Unit:2 Comparison of two stroke and four stroke cycle engines. Study of different components of I.C. engines. Unit:3 Familiarization with different systems of I.C. engines Unit:4 Familiarization with Power transmission system: clutch, gear box, differential and final drive of a tractor , Tractor types Unit:5 Familiarization with Primary and Secondary Tillage implement. Implement for intercultural operations, Familiarization with sowing and planting equipment

  
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21	BAG-5306	Production Technology for Vegetables and Spices	2016	Unit:1 Acquiring knowledge of cultivation technology VegetablesUnit:2 Acquiring knowledge of cultivation technology of cruciferi vegetablesUnit:3 Acquiring knowledge of cultivation technology of Winter VegetablesUnit:4 Acquiring knowledge of cultivation technology of lefy Vegetables
22	BAG-5307	Environmental Studies and Disaster Management	2016	Unit:1 Natural Resources: Renewable and non-renewable resources, water resources, food resources etc.Unit:2 Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazardsUnit:3 Social Issues of EnvironmentUnit:4 Natural and man made disaster
23	BAG-5308	Statistical Methods	2016	Unit:1 Introduction to Statistics and its Applications in AgricultureUnit:2 Definition of Probability, Addition and MultiplicationUnit:3 Definition of Correlation, Scatter Diagram.Karl Pearson's Coefficient of Correlation.Linear Regression Equations.Unit:4 Introduction to Test of Significance, One sample & two sample test t for MeansUnit:5 Introductions to Analysis of Variance, Analysis of One Way Classification.
24	BAG-5309	Livestock & Poultry Management	2016	Unit:1 Knowledge of Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultryUnit:2 Classification of cattle, buffalo, sheep, goat etc.Unit:3 Knowledge of diseases and insects of animals.Unit:4 Feed ingredients for ration for livestock and poultry
25	BAG-5401	Crop Production Technology –II (Rabi Crops)	2016	Unit:1 Acquiring knowledge of cultivation technology of cereal cropsUnit:2 Acquiring knowledge of cultivation technology of pulse cropsUnit:3 Acquiring knowledge of cultivation technology of oil seed cropsUnit:4 Acquiring knowledge of cultivation technology of cash cropsUnit:5 Acquiring knowledge of cultivation technology of fodder crops
26	BAG-5402	Production Technology for Ornamental Crops, MAPs	2016	Unit:1 Acquiring knowledge of Ornamental crops & LandscapingUnit:2 Acquiring knowledge of cultivation technology of cut flowersUnit:3 Acquiring knowledge of cultivation technology of loose flowersUnit:4 Acquiring knowledge of cultivation technology of important medicinal plantsUnit:5 Acquiring knowledge of cultivation technology of important Aromatic plants and processing as well as value addition in ornamental crops & MAPs produce
27	BAG-5403	Renewable Energy and Green Technology	2016	Unit:1 Classification of energy sources, contribution of these of sources in agricultural sectorUnit:2 Knowledge about biomass utilization for biofuel production. Types of biogas plants and gasifiersUnit:3 Introduction of solar energyUnit:4 Information of solar energy gadgetsUnit:5 Introduction of wind energy and their application.
28	BAG-5404	Problematic Soils and their Management	2016	Unit:1 Soil quality and health, Distribution of Waste land and problem soils in India.Unit:2 Irrigation water – quality and standards, utilization of saline water in agricultureUnit:3 Information about different soilUnit:4 Information about Remote sensing and GIS in diagnosis and management of problem soilsUnit:5 land capability and classification, land suitability classification.
29	BAG-5405	Production Technology for Fruit and Plantation Crops	2016	Unit:1 Cultivation of major fruits-mango, bananaUnit:2 Cultivation of citrus, grape, guava, litchi, papayaUnit:3 Cultivation of sapota, apple, pear, peach, walnut, almondUnit:4 Cultivation of minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberryUnit:5 Cultivation of plantation crops- coconut, arecanut, cashew, tea, coffee & rubber
30	BAG-5406	Principles of Seed Technology	2016	Unit 1: Quality seed in Agriculture, Seed technology in agricultural production.Seed improvement programmes in India and Madhya Pradesh. Generation of seed productionUnit 2: Reproduction in crop plants.Seed replacement and multiplication rates. Seed demand forecasting.Unit 3: Nucleus and Breeder seed production o Foundation and Certified seed production, Hybrid seed productionUnit 4: Seed Certification. Seed certification agencies.Field and seed inspection ;Seed Control Orders, Seed Policies, Seed Bills, WTO, IPRUnit 5: Seed testing; Seed marketing, organizations, seed pricing, promotion of quality seeds and seed marketing strategies etc.
31	BAG-5407	Farming System & Sustainable Agriculture	2016	Unit:1 Knowledge about farming systems and its componentUnit:2 Information of allied component of farming systemsUnit:3 Problems in agriculture sectorUnit:4 Different models of Integrate Farming Systems in different zone

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32	BAG-5408	Agricultural Marketing Trade & Prices	2016	Unit:1 Concept of marketing and their classificationUnit:2 Information about marketing, advertising and publicityUnit:3 functions – storage, transport and processingUnit:4 marketing channels for different farm productsUnit:5 cooperative marketing in India: Risk in marketing
33	BAG-5409	Introductory Agro-meteorology & Climate Change	2016	Unit:1 Composition and structure of atmosphereUnit:2 Effect of climate change on horticulture. Past and future changes in greenhouse gasesUnit:4 The mechanisms of ozone and UV damage and tolerance in plants
34	BAG-5410	Weed Management (Elective Course)	2016	Unit:1 Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystemUnit:2 Herbicide classificationUnit:3 herbicides and their application in agricultureUnit:4 Concept of herbicide mixture and utility in agricultureUnit:5 Herbicide Resistance and its management
35	BAG- 5501	Principles of Integrated Pest and Disease Management	2016	Unit 1: Tools of IPMUnit 2: Economic importance of insect pests, diseases and pest risk analysisUnit 3: Calculation and dynamics of economic injury level and importance of Economic threshold level.Unit 4: cultural, mechanical, physical, legislative, biological and chemical controlUnit 5: Survey surveillance and forecasting of Insect pest and diseases
36	BAG- 5502	Manures, Fertilizers and Soil Fertility Management	2016	Unit 1: organic manures, Green manuring, Integrated nutrient management.Unit 2: Chemical fertilizersUnit 3: plant nutrition; factors affecting nutrient availability to plants.Unit 4: Soil testingUnit 5: plant analysis, rapid plant tissue tests; nutrient use efficiency
37	BAG- 5503	Pests of Crops and Stored Grains and their Management	2016	Unit 1: nature and type of damage by different arthropods pestsUnit 2: Management of major pests in vegetable, field cropUnit 3: Management of major pests in ornamental, plantation cropUnit 4: physical, biological, mechanical and chemical factors in deterioration of grainUnit 5: Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management
38	BAG- 5504	Diseases of Field and Horticultural Crops and their Management -I	2016	Unit 1-5: Various Horticultural crop disease management
39	BAG-5505	Crop Improvement Kharif I	2016	Unit 1: Plant genetic resources and conservation; in situ ex situ conservationUnit 2: Emasculation, pollination, of different cereals and pulses of kharif and Rabiseason.Unit 3: Emasculation, pollination of different oilseeds, fibres, fodders and cash crops, vegetable and horticultural crops of kharif and Rabiseason..Unit 4: Conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and qualityUnit 5: Hybrid seed production technology.Ideotypefor future planning
40	BAG-5506	Entrepreneurship Development and Business Communication	2016	Unit 1: Entrepreneur, Entrepreneurship DevelopmentUnit 2: Government policy and programs and institutions for entrepreneurship developmentUnit 3: Business Leadership Skills; Developing organizational skillUnit 4: Supply chain management and Total quality managementUnit 5: Financing of enterprise, Opportunities for agripreneurship and rural enterprise
41	BAG-5507	Geoinformatics and Nano-technology and Precision Farming	2016	Unit 1: Precision agriculture; Geo-informaticsUnit 2: soil mappingUnit 3: Remote sensing concepts in agricultureUnit 4: STCR approach for precision agricultureUnit 5: Nanotechnology Use in seed, water, fertilizer, plant protection for scaling-up farm productivity.
42	BAG-5508	Practical Crop Production-I (Kharif Crops)	2016	Prac.1: Crop planning, raising field crops in multiple cropping systemsPrac.2: seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologiesPrac.3: balance sheet including cost of cultivation, net returns
43	BAG-5509	Intellectual Property Right	2016	Unit 1: Intellectual property; GATT, WTO, TRIPS and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treatyUnit 2: legislations covering IPR in India:- Patents, Copyrights,Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.Unit 3: Patent system in India, infringement, Compulsory licensing, Patent Cooperation TreatyUnit 4: Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights.Unit 5: Traditional knowledge, Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA).
44	BAG-5510	Agrochemicals(Elective Course)	2016	Unit 1: Agrochemical and management of agrochemicals for sustainable agriculture.Unit2: Information about HerbicidesUnit 3: Information about FungicidesUnit 4: Information about insecticidesUnit 5: Knowledge of Phosphatic fertilizers

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45	BAG-5601	Rainfed Agriculture and Watershed Management	2016	Unit 1: Rainfed agriculture, Problems and prospects of rainfed agriculture in India Unit 2: Soil and climatic conditions prevalent in rainfed areas Unit 3: Soil and water conservation techniques Unit 4: Water harvesting and techniques Unit 5: Practice efficient utilization of water through soil and crop management
46	BAG-5602	Protected Cultivation and Secondary Agriculture	2016	Unit 1: Green house technology Unit 2: Design criteria of green house for cooling and heating purposes construction for traditional and low cost green houses Unit 3: construction for traditional and low cost green houses Unit 4: Irrigation systems Unit 5: Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed
47	BAG-5603	Diseases of Field and Horticultural Crops and their Management-II	2016	Various Field and horticulture crop diseases management
48	BAG-5604	Post-harvest Management and Value Addition of Fruits and Vegetables	2016	Unit 1: Post-harvest processing of fruits and vegetables Unit 2: Harvesting and Storage Unit 3: Jam, jelly, marmalade, preserve, candy, Fermented and non-fermented beverages. Unit 4: Drying/ Dehydration of fruits and vegetables Unit 5: Canning
49	BAG-5605	Management of Beneficial Insects	2016	beneficial insect management and uses of it like bee keeping, silk worm
50	BAG- 5606	Crop Improvement rabi -II	2016	Unit 1: Plant genetic resources and conservation. Unit 2: Emasculation, pollination, of different cereals and pulses of Rabi season. Unit 3: Emasculation, pollination of different oilseeds, fibres, fodders and cash crops, vegetable and horticultural crops of Rabi season. Unit 4: Conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality Unit 5: Hybrid seed production technology. Ideotype for future planning
51	BAG-5607	Practical Crop Production -II (Rabi crops)	2016	Unit 1: Crop planning, raising field crops in multiple cropping systems Unit 2: integrated nutrient, insect-pest and disease management technologies. Unit 3: balance sheet including cost of cultivation
52	BAG-5608	Principles of Organic Farming	2016	Unit 1: Organic farming Unit 2: Restrictions to nutrient use in organic farming Unit 3: weed management under organic mode of production Unit 4: Certification process and standards of organic farming Unit 5: Processing, leveling, economic considerations and viability, marketing and export potential of organic products.
53	BAG-5609	Farm Management, Production & Resource Economics	2016	Unit 1: farm management, factor-product, factor-factor and product relationship Unit 2: managing farm business Unit 3: Importance of farm records and accounts in managing a farm Unit 4: risk and uncertainty occurs in agriculture Unit 5: Positive and negative externalities in agriculture
54	BAG-5610	Principles of Food Science and Nutrition	2016	Unit 1: Food Science and technology Unit 4: food processing and preservation Unit 5: Malnutrition Balanced/modified diets
55	BAG-5611	Bio pesticides & Bio fertilizers	2016	Unit 1: biopesticide Unit 2: Biofertilizers Unit 3: Impediments and limitation in production and use of biopesticide.
56	RAWE AND AIA	RURAL AGRICULTURAL WORK EXPERIENCE AND AGRO-INDUSTRIAL ATTACHMENT	2016	The Student READY (Rural Entrepreneurship Awareness Development Yojana) programme aims to provide rural entrepreneurship awareness, practical experience in real-life situation in rural agriculture and creating awareness to undergraduate students about practical agriculture and allied sciences. The programme will help in building confidence, skill and acquire Indigenous Technical Knowledge (ITK) of the locality and thereby preparing the pass-out for self-employment. It also aims to provide opportunities to acquire hands-on-experience and entrepreneurial skills.
57	MODULES	Modules for Skill Development and Entrepreneurship	2016	Unit:1 Mushroom Cultivation Technology. The skill development process helps students think beyond grades. It helps them tap into their capabilities, develop real-life skills, and prepare themselves to be successful in the careers of their choice. Unit:2 Organic Production Technology. Skill-based learning helps students develop problem-solving strategies and effective communication techniques.
58	BTA-5104	Principles of Soil Science	2016	the important of clay minerals & their role in nutrient transformation in soil, role of plant nutrients, deficiency symptoms, important fertilizer and their reaction in soil,
59	BTA-5203	Entrepreneurship Development & Business Management	2016	Unit 4: Importance of planning, budgeting, monitoring evaluation and follow-up managing competition, Morals and ethics in enterprise management- SWOT analysis- Government schemes and incentives for promotion of entrepreneurship. Unit 5: Government policy on small and medium enterprises (SMEs)/SSIs/MSME sectors- Venture capital (VC), contract farming (CF) and joint ventures (JV), public-private partnerships (PPP)- Overview of agricultural engineering industry, characteristics of Indian farm machinery industry

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60	BTA-5204	Fluid Mechanics & Open Channel Hydraulics	2016	principles of fluid mechanics to design simple fluid mechanical systems in engineering
61	BTA-5205	Strength of Materials	2016	techniques to calculate unknown forces in 2D structures
62	BTA-5206	Workshop Technology and Practice	2016	basic manufacturing process involved for production of different machine elements.
63	BTA-5207	Theory of Machines	2016	designing the various parts of the machine, Constructional details and analysis of Watt, Porter, Proell governors.
64	BTA-5208	Web Designing and Internet Applications	2016	Basic principles in developing a web designing, Planning process, creation of a web site, Web Standards, Working with <u>alert, confirm and prompt, Connectivity of Web pages with databases</u>
65	BTA-5301	Principles of Horticultural Crops and Plant Protection	2016	Unit 2: Criteria for site selection, layout and planting methods nursery raising, commercial varieties/hybrids, sowing and planting times and methods, seed rate and seed treatment for vegetable cropsUnit 4: Fertilizer application, fertigation, irrigation methods harvesting, grading and packaging, post harvest practices Garden tools, management of orchard, Extraction and storage of vegetables seeds.Unit 5: Major pests and diseases and their management in <u>horticulture crops.</u>
66	BTA-5302	Principles of Agronomy	2016	Unit 2: Crop seasons. Methods, time and depth of sowing of major field crops.Unit 3: Methods and time of application of manures and fertilizers. Organic farming-Sustainable agricultureUnit 4: water requirement of crops and critical stages for irrigation.Unit 5: Weeds and their control, crop rotation, cropping systems, Relay cropping and mixed cropping
67	BTA-5305	Soil Mechanics	2016	Knowledge of basic properties of soil, analysis of <u>stresses, bearing capacity of soil, different engineering properties and soil consistencies</u>
68	BTA-5306	Design of Structures	2016	Unit 2: Design of structural steel members in tension, compression and bendingUnit 3: Design of steel roof trussUnit 4: design of singly and doubly reinforced sections, Shear, Bond and TorsionUnit 5: Design of Flanged Beams, Slabs, <u>Columns, Foundations, Retaining walls and Silos</u>
69	BTA-5307	Machine Design	2016	Unit 2: Design of welded subjected to static loadsUnit 3: Design of threaded fasteners subjected to direct static loads, bolted jointsUnit 4: Design of shafts under torsion and combined bending and torsion. Design of keys. Design of muffUnit 5: Design of helical and leaf springs. Design of flat belt and V-belt drives and pulleys.Design of gears
70	BTA-5308	Thermodynamics, Refrigeration and Air Conditioning	2016	duct design methods, fundamentals of design of complete air conditioning systems,
71	BTA-5309	Electrical Machines and Power Utilization Conditioning	2016	Principle of working, construction of single phase transformer, Principle operation and performance of dc machine, <u>Construction, operation and equivalent circuit. Phasor diagram of poly-phase induction motor</u>
72	BTA-5401	Building Construction and Cost Estimation	2016	Unit 1: Different types of floors, Finishing: Damp Proofing and water proofingUnit 2: Building design, Design procedures, Technology, building constructionUnit 3: Detailed Estimates of Buildings source of cost information, use of cost analyses for controlling designUnit 4: Cost evaluation of design and planning alternatives for building and estate developmentUnit 5: cost-in-use, benefit-to-costs and savings-to-investment ratios, rate of return, net benefits, payback.
73	BTA-5402	Auto CAD Applications	2016	Practice on draw and dimension tool barPractice on trim, extend, chamfer and fillet commandDrawing of hexagonal, nut and bolt and other machine partsPractice on creating boundary, region, hatch and gradient commandsPractice on <u>3-D commands-on sweep and press pull</u>
74	BTA-5403	Applied Electronics and Instrumentation	2016	Unit 1:operating principle of various electronics deviceUnit 2: analysis of differential amplifier using transistorUnit 3: Application of OPAMP in various purposesUnit 4: Application of diode as clipper and clamper circuitUnit 5: measurement of displacement. temperature. velocity, force and pressure using potentiometer
75	BTA-5404	Tractor and Automotive Engines	2016	Unit 1: operating principles and functions of engineUnit 2: Information about valve and fuel system of tractorUnit 3: Information about fuel injection and ignition systemUnit 4: information about lubrication and cooling systemUnit 5: <u>Familiarization with the basics of engine testing</u>
76	BTA-5405	Engineering Properties of Agricultural Produce	2016	various engineering properties like physical, frictional, thermal, aerodynamic, rheological and mechanical for <u>appication in handling processing machinery and storage structure.</u>



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77	BTA-5406	Watershed Hydrology	2016	Unit 1: rainfall measurement and estimation of mean rainfall Unit 2: Runoff - Factors affecting, measurement Unit 3: Hydrologic processes-Interception, infiltration -factors influencing, measurement and indices, Evaporation estimation and measurement. Unit 4: Geomorphology of watersheds Unit 5: design flood and computation of probable flood, <u>drought management strategy.</u>
78	BTA-5407	Irrigation Engineering	2016	Unit 1: Major and medium irrigation schemes of India Unit 2: Measurement of irrigation water Unit 3: Design and lining of irrigation field channels, on farm structures for water conveyance, control & distribution Unit 4: measurement of soil moisture, moisture stress and plant response Unit 5: Water requirement of crops: concept of evapotranspiration (ET), measurement and estimation of ET, water and irrigation requirement of crops,
79	BTA-5408	Sprinkler and Micro irrigation Systems	2016	Unit 1: design of sprinkler irrigation system Unit 2: Layout selection, hydraulic design of lateral, sub-main and main pipe line, design steps Unit 3: Micro Irrigation Systems: types-drip, spray, & bubbler systems, merits and demerits, different components; Design of drip irrigation system Unit 4: necessary steps for proper operation of a drip irrigation system; maintenance of micro irrigation system Unit 5: advantages and limitations of fertigation, fertilizers solubility <u>and their compatibility</u>
80	BTA-5409	Fundamentals of Renewable Energy Sources	2016	Unit 1: Concept and limitation of Renewable Energy Sources Unit 2: Solar Photo voltaic: p-n junctions. Solar cells, PV systems, Stand alone and grid connected solar power station, Calculation of energy through photovoltaic power generation and cost economics. Unit 3: Determination of torque coefficient, Induction type generators, working principle of wind power plant Unit 4: Biomass gasification, Types of gasifier, various types of biomass cook stoves for rural energy needs Unit 5: types of biogas plants, biogas generation, factors affecting biogas generation and usages, <u>design consideration</u>
81	BTA-5501	Tractor Systems and Controls	2016	Unit 1: function, construction and working principle of transmission system and clutch of tractor Unit 2: need, functional components, construction and working principle of gear box and differential of tractor Unit 3: types, principle of operation, construction of brake, steering, hydrolic and power outlet system of tractor Unit 4: wheels and tyres – Solid tyres and pneumatic tyres, tyre construction and tyre specifications Unit 5: Ergonomic considerations and operational safety of tractor, tractor testing. Deciphering the engine test codes
82	BTA-5502	Farm Machinery and Equipment-I	2016	Unit 1: Identification and selection of machines for various operations on the farm. Hitching systems and controls of farm machinery Unit 2: Familiarization with land reclamation and earth moving equipment, Comparison of ownership with hiring of machines. Unit 3: Introduction to sowing, planting & transplanting equipment. Introduction to seed drills, no-till drills, and strip-till drills Unit 4: Introduction to planters, bed-planters and other planting equipment. Unit 5: Identification of heat treatment processes specially for the agricultural machinery components.
83	BTA-5503	Agricultural Structures and Environmental Control	2016	Unit 1: Planning and layout of farmstead Unit 2: Design, construction and cost estimation of farm structures Unit 3: Traditional storage structures and their improvements, Improved storage structures of food grain Unit 4: Rural living and development, rural roads, their construction cost and repair and maintenance Unit 5: Estimation of domestic power requirement, source of power supply and electrification of rural housing.
84	BTA-5504	Post Harvest Engineering of Cereals, Pulses & Oil Seeds	2016	Unit 1: Principle, construction and working of cleaner, grader and separator of agricultural produce. Unit 2: Principle, construction and working of size reduction machinery and material handling equipment. Unit 3: measurement of moisture content, design of different types of dryer and mixing equipment. Unit 4: machinery and methods of milling of paddy, wheat and pulses Unit 5: milling of corn, Extrusion cooking, By-products utilization,
85	BTA-5505	Soil and Water Conservation Engineering	2016	Unit 1: Soil erosion - Introduction, causes and types, Water erosion - Mechanics and forms Unit 2: Gullies and soil loss estimation Unit 3: Soil erosion and agronomical measures Unit 4: principles of gully control - vegetative measures, temporary structures and diversion drains. Grassed waterways and design Unit 5: Land capability classification. Rate of sedimentation, silt monitoring and storage loss in tanks.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
86	BTA-5506	Watershed Planning and Management	2016	Unit 1: Watershed development - problems and prospects, investigation, topographical survey, soil characteristics Unit 2: watershed planning based on land capability classes, hydrologic data for watershed planning Unit 3: Water budgeting in a watershed. Management measures - rainwater conservation technologies Unit 4: Integrated watershed management - concept, components, arable lands - agriculture and horticulture Unit 5: Planning and formulation of project proposal for watershed management programme including cost-benefit analysis
87	BTA-5507	Drainage Engineering	2016	Unit 1: familiarization with the drainage problems of the state Unit 2: Design of surface drains; sub-surface drainage Unit 3: Derivation of Hooghoudt's and Ernst's drain spacing equations Unit 4: Layout, construction and installation of drains Unit 5: conjunctive use of fresh & saline water
88	BTA-5508	Renewable Power Sources	2016	Unit 1: Energy consumption pattern & energy resources in India Unit 2: Biogas technology and mechanisms, generation of power from biogas Unit 3: Design & use of different commercial sized biogas plant Unit 4: Wind power generation system. Power generation from biomass Unit 5: Use of animal energy for different agricultural operation
89	BTA-5509	Skill Development Training-I	2016	In this training, students will have to study a problem in industrial perspective
90	BTA-5601	Computer Programming and Data Structures	2016	Unit 1: Introduction to high level languages, Primary data types and user defined data types Unit 2: Decision making, Branching, Looping, Arrays Unit 3: Standard library functions Unit 4: Structures and union, Pointers Unit 5: Insertion and deletion operations, Linked lists
91	BTA-5602	Farm Machinery and Equipment-II	2016	Unit 1: Calculations for calibration of sprayers and chemical application rates Unit 2: Familiarization of fertilizer application equipment. Study of harvesting operation Unit 3: Study of reapers, binders and windrowers - principle of operation and constructional details Unit 4: Types of threshers- tangential and axial, their constructional details and cleaning systems. Study of factors affecting thresher performance Unit 5: Study of root crop diggers, Study of Cotton harvesting, Study of maize harvesting combines. Introduction to vegetables and fruit harvesting equipment and tools
92	BTA-5603	Post-Harvest Engineering of Horticultural Crops	2016	Unit 1: Importance of processing of fruits and vegetables, spices, condiments and flowers Unit 2: Application of refrigeration in different perishable food products, calculations and cold storage design Unit 3: Dryers for fruits and vegetables, Different types of packaging materials commonly used for raw and processed fruits and vegetables Unit 4: Preservation Technology, General methods of preservation of fruits and vegetables Unit 5: preparation of different finished products, , Quality control in Fruit and vegetable processing industry
93	BTA-5604	Water Harvesting and Soil Conservation Structures	2016	Unit 1: Water harvesting -principles, importance and issues, Runoff harvesting – short-term and long-term techniques Unit 2: Farm pond - components, site selection, design criteria, capacity, embankment, mechanical and emergency spillways, cost estimation and construction Unit 3: Percolation pond - site selection, design and construction details. Unit 4: Drop spillway - applicability, types - straight drop, box-type inlet spillways - description, functional use Unit 5: Drop inlet spillway - description, functional use and design criteria.
94	BTA-5605	Groundwater, Wells and Pumps	2016	Unit 1: Occurrence and movement of ground water; aquifer and its types Unit 2: Design of open wells, design of tubewell Unit 3: estimation of ground water potential, quality of ground water; artificial groundwater recharge techniques Unit 4: water lifting devices; different types of pumps, classification of pumps, component parts of centrifugal pumps, priming, pump selection, installation and trouble shooting Unit 5: pumps and their performance characteristics
95	BTA-5606	Tractor and Farm Machinery Operation and Maintenance	2016	Unit 1: Familiarization with different makes and models of agricultural tractors, Study of maintenance points to be checked before starting a tractor Unit 2: Familiarization with controls on a tractor. Safety rules and precautions to be observed while driving a tractor. Driving practice with a trail type trolley – forward and in reverse direction. Unit 3: Introduction to tractor maintenance – precautionary and break-down maintenance. Familiarization with tools for general and special maintenance. Unit 4: Safety hints. Top end overhauling. Fuel saving tips. Preparing the tractor for storage. Unit 5: Setting of agricultural machinery workshop



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
96	BTA-5607	Dairy and Food Engineering	2016	Unit 1: Deterioration in food products and their controls, Nanotechnology, regulation of nanotechnology Unit 2: Process flow charts for product manufacture from milk Unit 3: Unit operation of various dairy and food processing systems Unit 4: Dairy plant design and layout, Plant utilities Unit 5: Non-thermal and other alternate thermal processing in Food processing.
97	BTA-5608	Bio-Energy Systems: Design and Applications	2016	Unit 1: aerobic and anaerobic fermentation processes and their industrial application Unit 2: methods of field preparation & transplanting. Harvesting of biomass & coppicing characteristics. Unit 3: Biomass preparation techniques for harnessing Unit 4: shaft power generation, thermal application and economics Unit 5: Environmental aspect of bio-energy, assessment of greenhouse gas mitigation potential.
98	BTA-5701	10- weeks Industrial Attachment /Internship	2016	In-plant Trainings will provide an industrial exposure to the students as well as to develop their career in the high tech industrial requirement
99	BTA-5702	10- weeks Experiential Learning On campus	2016	learning and development are achieved through personally determined experience and involvem
100	BTA-5703	Skill Development Training-II	2016	understand the scope, functions and job responsibility-ties in various departments of an organization
101	BTA-5704	Educational Tour	2016	understand the psychology of the workers, and approach to problems along with the practices followed at factory
102	BTA-5801	Development of Processed Products	2016	Unit 1: Unit operations and equipments for processing. Unit 2: New product development, Technology for value added products from cereal, pulses and oil seeds. Unit 3: Extruded products, oil extraction and refining. Unit 4: Technology for value added products from fruits, vegetables and spices Unit 5: Technology for animal produce processing
103	BTA-5802	Tractor Design and Testing	2016	Unit 1: Procedure for design and development of agricultural tractor, tractor testing Unit 2: Study of parameters for balanced design of tractor for stability & weight distribution Unit 3: Design of mechanical power transmission in agricultural tractors Unit 4: Design of Ackerman steering & tractor hydraulic steering Unit 5: Design of seat and controls of an agricultural tractor
104	BTA-5803	Wasteland Development	2016	Unit 1: planning of wastelands development - constraints, agro-climatic conditions, development options, contingency plans. Unit 2: water harvesting and recycling methods. Unit 3: Afforestation - agro-horti-forestry-silvipasture methods Unit 4: reclamation of waterlogged and salt-affected lands Unit 5: Government policies. Participatory approach. Preparation of proposal for wasteland development and benefit-cost analysis
105	BTA-5804	Project Planning and Report Writing	2016	Student Project is essential for students interested in higher education. Through this component, they will know how to identify research problem, create experimental set up and to write report
106	CP101	Management Concepts and Practices	2012	Unit-I Management- Objective, Overview Process, Functions, Scope and Roles, Nature and Significance of Management. Unit-II Evolution of Management thought, Taylor, Fayol, Elton Mayo, FC Bemard, Likert and Webber (Theories of Management): Recent trends and Future Challenges of Management. Unit - III Planning- Concept, Importance, Types and Process, Strategic Management Overview and Process; MBO, MBE: Decision Making Concept, Process, Types, Techniques and Importance. Unit-IV Organizing- Principles, Structure, Process, Importance: Organizational design: Departmentation: Span of Control; Delegation; Decentralization Staffing- Meaning, Scope, Features, Steps and Process Unit-V Directing and Controlling- Motivation, Morale and Productivity, Leadership, Communication (Organizational): Controlling- Nature: Process and Techniques ,Coordination

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
107	CP102	Quantitative Methods	2012	Unit-I Statistical basic of management decision: Frequency distribution and graphic representation of frequency distribution, Measures of Central Tendency- Mean, Median, Mode, Requisite of ideal measures of Central techniques, Merits, Demerits of Mean, Median Mode and their managerial application. Unit-II Dispersion Measures of dispersion range, Q.D., M.D., S.D., coefficient of variation, skewness, kurtosis. Unit-III Theory of Probability and probability distribution- Mathematical probability, Trial and event, sample space, Simple problem based on sample space, Binomial, Poisson, Normal distribution and their application in business decision making. Unit-IV Correlation and regression analysis- Karl Pearson's coefficient of correlation, rank correlation, repeated ranks, Spearman's rank correlation, regression equation, Regression coefficient, Time Series analysis and forecasting. Unit-V Sampling and Sample Tests- Purposive sampling, Random Sampling, Null- hypothesis, Alternative hypothesis, Chi-square test of goodness of fit and t- test for difference of Means and Application of these tests in management.
108	CP103	Managerial Economics	2012	Unit-I Concepts and Techniques- Nature and Scope of managerial Economics, Application of Economics in Managerial Decision Making- Marginal Analysis; Theory of Demand- demand functions, income and substitution effects, demand forecasting. Unit-II Production and Cost- returns to scale, cost curves, break even analysis; economics of Scale, Theory of firm- profit maximization, sales maximization. Unit-III Market Structure- Price and output decision under different market structures, price discrimination, non-price competition. Unit-IV Macro Economics- Aggregates and Concepts GNP and GDP, Concept and Measurement of National Income: Determination of National Income. Unit-V Money Supply and Monetary Policy, Fiscal Policy: Aggregate Consumption- Gross Domestic Savings, Gross Domestic Capital Formation- WPI, CPI and Inflation. Consumption Function.
109	CP104	Communication Skills	2012	Unit-I Meaning, nature, needs, types of communication: Oral Written & non verbal, Upward, Downward & Lateral, Theories of Communication, Process of Communication, Barriers to Effective Communication. Unit-II Writing Strategies: Letter Writing, types of business letter, Do's and Don'ts of business letter, Business Memos, resume writing, Essentials of resume writing, Importance of resume and covering letter. Unit-III Communication for employment: Strategies to develop effective communication skills, Speeches, public Speaking, Interviews, Group Discussion, Conference, Effective Listening, and Grapevine Communication. Unit-IV Types of Non Verbal Communication: meaning and importance Kinesics, Proxemics, Chronemics, Paralanguage and Artifacts, Business etiquettes: Dressing & Grooming, Business Meals, Table Manners. Unit-V Report Writing: Types and structure of reports, Drafting of reports, Introduction to electronic communication, designing and delivering business presentation.
110	CP105	International Business Environment	2012	Unit-I International Business: An Overview- Types of International Business: The External Environment. The Economic and Political Environment, The Human Cultural Environment. Unit-II Balance of Payments, WTO and its importance for Indian Business, International Monetary Fund (IMF), World Bank (IBRD). Unit-III Exchange rate determination, Fixed and Flexible exchange rate, Convertibility of Rupee and its implication, foreign Institutional Investors (FII), Foreign Direct Investment (FDI), Euro Currency. Unit-IV Regional Blocks: Internationalization of Service Firms, Export Management; Joint Ventures and Global Competitiveness. Unit-V Globalization and Human Resource Development; Globalization with Social Responsibility.
111	CP106	Accounting for Managers	2012	Unit-I Financial Accounting- Concept, Importance and Scope, Principles, Double Entry, Ledger Accounting, Preparation of Trial Balance. Unit-II Preparation of Financial Statements- Profit and Loss Account and Balance Sheet; Depreciation Accounting. Unit-III Financial Statement analysis- Comparative Statement; Common Size Statements; Ratio analysis, Cash flow and fund flow analysis. Unit-IV Management Accounting- concept; Needs, Importance; Cost Accounting- Records and Processes, Inventory Valuation, Reconciliation between Financial and Cost Accounts. Unit-V Costing for Decision- Making, Marginal Costing and Absorption Costing;

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
112	CP 201	Organizational Behavior	2012	Unit-I Understanding Organizational behavior: Levels of analysis within OB- individual, group and organization; challenges and opportunities for OB; relationship of OB with other fields. Unit-II Foundation of individual behavior; learning theories; Perception: factors influencing Perception; Personality, Attitudes, Job satisfaction and Values. Unit-III Motivation: concept and process; Motivation theories; Maslow, McGregor, Herzberg, Alderfor's, Vroom, Porter & Lawler and Equity theory; Motivating employee techniques; Group: nature, functions & development. Unit-IV Organizational Change: Forces for change; Resistance to change; Managing change; Stress; Concept, Sources of Stress, Consequences, Management of Stress; Burnout: Causes and Handling of Burnout; Managing diversity in organization. Unit-V Organization structure - Formation - Groups in organizations - Influence - Group dynamics - Emergence of informal leaders and working norms - Group decision making techniques - Team building - Interpersonal relations - Communication - Control.
113	CP 202	Human Resource Management	2012	Unit-I Concepts and Perspectives on Human Resource Management; Human Resource Management in a changing Environment; Corporate Objective and Human Resource Planning; Unit-II Career and Succession Planning; Job Analysis and Role Description; Methods of Manpower Search; Attracting and Selecting Human Resources. Unit-III Induction and Socialization; Manpower Training and Development. Unit-IV Performance Appraisal and Potential Evaluation; Job Evaluation & Wage Determination. Unit-V Overview of Industrial Relation, Trade Union, Collective Bargaining, Industrial dispute Act 1947
114	CP 203	Financial Management	2012	Unit-I Aims and Objectives of Financial Management; Du Pont Analysis, Economic Value Added, Cost Volume Profit Analysis. Unit-II Instruments of Long Term Finance, Share Capital, Debentures/ Bonds, Hybrid Instruments, Venture Capital, Time Value of Money, Operating Leverage Financial Leverage & Combined Leverage. Unit-III Cost of Different sources of Raising Capital, Weighted Average cost of Capital; Capital Structure, Theories and Optimum Capital Structure. Unit-IV Capital Budgeting, Methods of Capital Budgeting- Traditional Methods, Pay Back Period, ARR, Discounted Cash Flows, NPV, IRR, Profitability Index. Unit-V Management of Working Capital- Cash Receivables and Inventory management. Internal Financing and dividend Policy.
115	CP 204	Marketing Management	2012	Unit-I Nature and scope of marketing, Corporate orientations towards the marketplace. The Marketing Environment and Environment Scanning; Unit-II Marketing information system and Marketing research, Understanding consumer and Industrial markets, market segmentation, Targeting and positioning; Unit-III Product decisions, product mix, product life cycle, new product development, branding and packaging decisions, Pricing methods and strategies, Promotion decision- promotion mix, advertising, sales promotion, publicity and personal selling; Unit-IV Channel management- selection, co-operation and conflict management, vertical marketing implementation and systems, Organizing and implementing Marketing in the organization; Unit-V Evaluation and control of marketing efforts; New issues in marketing- Globalization, Consumerism, Green marketing, Legal issues.
116	CP 205	Research Methodology	2012	Unit-I Introduction to Research Methodology- Meaning, Objectives, Significance of Research in Management; Importance and scope of Research Methodology. Unit-II Research Process- Defining Research Problem; Setting of Hypothesis; Research Design Exploratory, Descriptive and Experimental Research Designs; Unit-III Sampling Design- Steps in Sampling Design; Criteria of Selecting a Sampling Procedure, Characteristics of Good Sample Design; Types of Sample Design; Unit-IV Data Collection- Primary and Secondary data; Observational and Survey Methods; Questionnaire Design; Processing of Data- Editing, Coding, Classification, Field Work and Tabulation of Data. Unit-V Analysis and Report Writing- Selection of Appropriate Statistical Techniques; Parametric Test for hypothesis testing- t- test, Chi- Square test; Characteristics of Non Parametric Test; Oneway ANOVA; Report Writing.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
117	CP 301	Business Policy and Strategic Management	2012	UNIT-I Business Policy as a field of study: Genesis and importance of Business Policy; Vision, Mission, Objectives and policies; General Management point of view: Strategic Decision making and Role of Strategist in Strategic Management. UNIT-II Environmental Analysis and Internal Analysis; SWOT Analysis; Industry Analysis; Concept of value chain, Strategic profile of a firm: case study method. UNIT-III Competitive Analysis: Framework for analyzing competition, competitive advantage of a firm; Strategic Planning: Formulation of Strategies, UNIT-IV Strategic Choice and Implementation: Tools and techniques for Strategic Analysis; Impact Matrix, The experience Curve, BCG Matrix, GEC Model. UNIT-V Industrial Analysis Concept of Value Chain, Strategic Profile of a firm, Framework for Analyzing competition, competitive Advantage of a firm.
118	MSM01	Consumer Behavior	2012	UNIT-I Introduction to Consumer Behaviour: Consumer Behaviour & Marketing Strategies. (Segmentation promotion and Positioning Strategies). UNIT-II Consumer Perception: Purchase search, information processing and Consumer Involvement theory; Evaluative criteria & Decision Rules; Consumer attitude & attitude Change. UNIT-III Influence of Personality: and self-concept on Buying Behaviours; Psychographics & life style; Consumer Behaviour Audits & Consumer Behaviour Studies in India. UNIT-IV Reference Groups & Family Influence: Selected groups' and celebrities' influence And family Decision Making; Diffusion of Innovation & Opinion leadership, Industrial buying Behaviour. UNIT-V Consumer Decision Making: Simple Model of Consumer decision making Models of Consumers.
119	MSM 02	Advertising Management	2012	UNIT-I Advertising's Role in the Marketing Process: Legal Ethical and Social Aspects of Advertising; Process of Communication- Wilbur Schramm's Model. UNIT-II Dagmar Approach- Determination of Target Audience; Building of Advertising Programme-Message, Headlines, Copy, Logo, Appeal, Layout. UNIT-III Campaign Planning; Media Planning; Budgeting Evaluation-Rationale of Testing Opinion and Aptitude Tests, Recognition, Recall, Experimental Designs; Advertising Organisation- Selection Compensation and Appraisal of an Agency; Electronic Media Buying. UNIT-IV Advertising campaign-Advertising V/s Consumer behaviour; Sales promotion- Role of Creative strategies; Advertising- Retail, National, Cooperative, Political International, Public Service Advertising. UNIT-V Two Step Flow of Communication Theory of Cognitive Dissonance and Clues for Advertising Strategists: Stimulation of Primary and Selective Demand- Objective Setting and Market Positioning.
120	FSM01	Security Analysis and Investment Management	2012	UNIT-I Investment- Return and Risk; Operations of Indian Stock Market; New Issue Market; Listing of Securities; Cost of Investing in Securities; Mechanics of Investing; Markets and Brokers. UNIT-II Investment Companies; Market Indices and Return; Security Credit Ratings; Objectives of Security Analysis; Investment Alternatives; Valuation Theories of Fixed and Variable Income Security. UNIT-III The Return to Risk and the Investment Decision; Government Securities; Non Security Forms of Investment; Real Estate Investment; Instruments of the Money Market. UNIT-IV Stock Market Analysis- Fundamental and Technical Approach, Efficient Market Theory, Recent Developments in the Indian Stock Market. UNIT-V Meaning of Investment, nature scope and types of investment.
121	FSM 2	Working Capital Management	2012	Unit-1 Concept of Working Capital Management, Importance of Working Capital, Kinds of Working Capital, Factors Determining Working Capital, Estimating Working Capital Requirements; Unit-2 Management of Cash -Motives for Holding Cash and marketable securities; Cash System, Managing the Cash Flows. Cash Concentration Strategies, Disbursement tools, Unit-3 Investment in Marketable Securities; Forecasting Cash Flows; Managing Corporate Liquidity and Financial Flexibility; Measures of Liquidity, Determining the Optimum Level of Cash. Unit-4 Receivable Management- Determining the appropriate Receivable Policy, Marginal Analysis, Credit Analysis and Decision, Sequential Decision of analysis, Inventory Management-kinds of Inventories, Benefits and Costs of Holding Inventories, Inventory Unit-5 Management and Valuation. Inventory Control Models, Short-term financing; Programming Working Capital Management; Integrating Working Capital and Capital Investment Processes.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
122	HRSM 1	Management of Industrial Relations	2012	UNIT-I \Industrial Relations Perspectives; Industrial Relations and The Emerging Socio-economic Scenario; Industrial Relations and the state; Legal Framework of Industrial RelationsUNIT-IIRole and Future of Trade Unions; Trade Union and the Employee; Trade Union and the Management ; Discipline and grievance Management; Negotiation and Collective Settlements; Participative Management and Co-ownership; Productive Bargaining and Gain Sharing; Employee Empowerment and Quality Management; Industrial Relations and Technological Change.UNIT-IIIConceptual and Theoretical Understanding of Economic Theory Related to Reward Management; Competitive Imperatives; Productivity, Quality , Service, Speed , Learning; Planning for improved Competitiveness; Diagnosis and Bench marking, Obtaining Commitment; Determination of Inter and Intra-industry Compensation Differentials; Internal and External Equity in Compensation SystemsUNIT-IVUnderstanding tools Used in Designing, Improving and Implementing Compensation Packages; Compensation Designs for Specific type of Human Resources like Compensation of Chief Executives, Senior Managers, R&D Staff, etc; Understanding different components of Compensation Packages like Fringe Benefits, Incentives and RetirementUNIT-VCompensation Practices of MNC's and
123	HRSM 2	Management of Training and Development	2012	UNIT-ITraining process- an overview; role, responsibilities and challenges to training manager; organization and management of training function; training needs assessment and action research; instructional objectives and lesson planning; learning process.UNIT-IITraining climate and pedagogy; developing training modules; training methods and techniques; facilities planning and training aids; training communication; training evaluation; training and development in India .Unit III-Training and Development Methodologies : Overview of Training Methodologies- Logic and Process of Learning; Principles of Learning; Individual differences in learning, learning process, learning curve, learning management system; Criteria for Method Selection; Skills of an Effective Trainer; Use of Audio-Visual Aids in training; Computer Aided InstructionsDistance Learning, Open Learning, E- Learning; Technologies Convergence and Multimedia Environment.Unit IV-Designing Training and Development Programs: Organization of Training and Development programs, Training design, kinds of training and development programs- competence based and role based training; orientation and socialization; diversity training, choice of training and development methods.Unit V-Evaluation of Training and Development: Reasons for evaluating Training and development programs. Problems in
124	HSM 1	LEGAL AND ETHICAL ISSUES FOR HOSPITALS	2018	UNIT IEstablishment, Registration and Regulation of Health Care Organization: Registration and Regulation of Healthcare organization under Andhra Pradesh Private Medical Care Establishment Act 2002; Formation of Health care Organization under Partnerships and Corporate basis (private and public) and compliance with Medical Council of India Act.UNIT IIHospitals and Labour Enactments: Hospital as an Industry – Unrest in Hospitals – Dispute Settlement Mechanism, Arbitration, Conciliations and Adjudication of Disputes; Role of Trade Unions, Unfair Labour Practices and Victimization – Disciplinary Actions – Requisitions of a valid disciplinary enquiry – Service Conditions – Retrial benefits – Social Security and Insurance.UNIT IIIHospital Services and Law: Contractual obligations in Hospital Services – Requisites of a valid contract – Hospital as a ‘bailee’ – Physicians – Patient relations – duties towards patients by medical and Para-medical staff – medical ethics and code of conduct to be observed in rendering hospital services, MCI Guidelines, OATHS.UNIT IVMedico Legal Issues: Police Investigation – Giving evidence – Court deliberations organ transplantation – Euthanasia (mercy killing) – Diaenosis, prescriptions and administration of
125	HSM-2	Management of Health Care Services	2018	Unit-IHealth and Disease: Concept, Definitions & Dimensions of health, Wellbeing, Determinants of health, Evolution of medicine, Public Health, Health indicators, Health service philosophies, Disease & causation, Natural history of disease, Disease control & prevention, Changing patterns of disease, Disease classification and International Health (WHO, WB, UN).Unit-IIPublic and Private Health Care Services in India: Evolution of public health systems in India (ancient, colonial & post independence), Health Planning in India (Committees, Planning commission, Five year plans, National Health Policies), Public health systems in India (Center, State, District & Village level), Rural development, Corporate philosophy, Evolution and organization of private health systems in India and Current trends in private health care in India.Unit-IIIGlobal Health Service Systems: Introduction to the global health scenario, Health System Models: Full State provision and funding model, NHS Model, Social health insurance model.Unit-IVPopulation Health: Introduction to population studies, Issues of Indian society & culture, Nuptiality & Fertility, Reproductive health, Population and Development (policies, programs & evaluation), introduction to epidemiology (concept, terms, aims & uses)

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
126	RTSM 1	Retail Concepts and Practices	2018	UNIT – I Introduction to retail management, the concept of retailing, Nature and Scope, Functions of Retailers, Planning and Forecasting in retailing.UNIT – II Indian and Global Retail Environment. The evolution of retail in India, the rise of the retailer, challenges and changes impacting retail development in India.UNIT – IIITypes of Retail Stores, Retail Models and theories of retail development, the future of retailing.UNIT – IVOrganization design and structure in Retail, Retail formats, HR Management in Retail.UNIT – VSpace Management, Factors, Affecting Store Location, Layout and Design.
127	RTSM 2	MARKETING CONCEPTS IN RETAIL MANAGEMENT	2019	UNIT – ISegmentation, Targeting, Positioning and consumer behavior in retail marketing, pricing policies and techniques.UNIT – IIMerchandise Management, Retail Merchandising, Mercantile, Planning and its process, buying systems, tools used for mercantile functions, evaluating mercantile performance.UNIT – IIISupply chain management in retailing, management of service and quality in retailing.UNIT – IVRetail Marketing mix, Retail communication mix, Role of advertising, Sales promotion, Public relations and Personal selling in retailing.UNIT – VCustomer relationship 'management in retailing, building and sustaining Relationships in retailing, Servicing the retail customer.
128	RSM 01	RURAL INDUSTRIALIZATION	2018	UNIT-IRural – Urban Organizational and industrial patterns; Decentralized Industries. Small and Medium Scale Industries.UNIT-IIChoice of Rural, Agro based industries: issues in the size and Location of Industries: Appropriate technology and Issues in the transfer of technology.UNIT-III Rural labour employment and rural industries, Policy and Development of Cottage industries.UNIT-IVOrganization and administration of KVIC; Promotional measures; Subsidies, incentives and financial inputs; Issues in product development, Pricing, Quality marketing and supporting Organizations.UNIT-VRole of Co-operatives, Financial institutions, Central, State and Local Government; Socioeconomic impacts of Rural industrialization; Sectoral Systems Approach to Rural Industrialization
129	RSM 2	RURAL MARKETING	2018	UNIT-INature, characteristics and the potential of rural market in India, Socio-cultural economic & other environmental factors affecting rural marketing.UNIT-IIAttitudes and behavior of the rural consumers and farmers; Marketing of consumer durables and non-durable goods and services in the rural markets with special reference to product planning, Media Planning, planning of distribution channels and organizing personal selling in rural markets in India.UNIT-III Marketing of agricultural inputs with special reference to fertilizers, seeds and tractors; Organization and functions of agricultural marketing in India.UNIT-IVMarketing structure and performance processing facilities for different agricultural products. Role of warehousing; Determination of agricultural prices and marketing margins. Role of agricultural price commission. Role of central and state governments. Institutions and organizations. In agricultural marketing.UNIT-VUnique features of commodity markets in India. Problems of agricultural marketing; Nature, scope and role of cooperatives marketing in India.
130	BCM-102	Financial Accounting	2012	Unit-1: Concept of Double Entry SystemUnit-2:Concept of DepreciationUnit-3:Branch AccountsUnit-4:RoyaltyUnit-5:Partnership Firm
131	BSM 2	BANKING SERVICE MANAGEMENT	2018	UNIT-IBanking Services – Meaning and Importance – Economic and Monetary implications of Banking Operations – Tangible Services – Deposits, WithdrawalsUNIT-II Banking Services – Loans and Advances – Forms of Advances – General Loans, Overdrafts, Clean advances, Term advances, Consumer Loans, Foreign bills purchases, Advances against Hire purchase advances,UNIT-III Regulations for Banking Services – Banking Regulation Act 1949 – RBI Act 1934 – Negotiable Instrument Act 1881- Endorsement, Crossing of Cheques, Payment of Cheques, Collection of Cheques, Bills of ExchangeUNIT-IVE – Banking Services – Internet Banking – Phone Banking – Mobile Banking – ATM's - Debit Card – Credit Cards.UNIT-VBanking sector reforms – Basle Norms – Capital Adequacy - Globalised Challenges in Banking Services – New Trends in Banking Services – Measurement of Service Quality



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
132	DSM 1	Disaster Preparedness and Decision making	2018	UNIT-I Global Disaster: Science and Policy, Institutional framework for disaster preparedness and mitigation- Global and Indian scenario. UNIT-II Hazard monitoring, Tracking and modeling, Early warning systems, Warning protocols, India Disaster Resource Network, Environmental Hazards, Public health aspects of disaster management and emergency services systems. UNIT-III Conceptual and Applied Issues in Emergency Management: Operational decision making, Introduction to Emergency Management and planning, Organization and structure for Emergency Management, Emergency management. UNIT-IV Principles of natural hazard reduction, Toxicology and Biohazards in Emergency Management, Terrorism Preparedness: Critical Infrastructure and Emergency Management, Emergency Preparedness, Response, and Planning for Hazardous Materials, Terrorism, WMD, and other contemporary Issues. UNIT-V Disaster Planning, Public Administration/Policy and Emergency Management, Incident Command Centre, Training Need Analysis and Human Resource Development Plan, Corporate/public agency coordination
133	DSM 2	Environment Law and Protection	2018	UNIT-I Historical Background: Overview of provisions of Indian Constitution, Laws relating to environment and industrial self regulation. UNIT-II The Pollution Control Boards of India: Central Level, State Level, Implementation, Level of Compliance. UNIT-III Long term Implications of Disasters with regard to Law: Crisis Morphology, Long term consequences for the victims, Revising the models of Disaster Management, Policy Implications. UNIT-IV Environment Jurisprudence: Case Law, The Public Liability Insurance Act of 1991, Role of Human Rights in Disasters, Public Activism and Role of PIL. UNIT-V International provisions and effects in India, Various Indian acts with regard to environment protection.
134	PSOM 1	Manufacturing systems management	2018	UNIT - I Introduction: Operations strategy, system concept of production, types of production system, process planning - make or buy decisions - specific equipment selection - process plans, process reengineering. UNIT - II Facilities location: Facility location factors, location analysis techniques - location factor rating- center of gravity technique - load distance technique. UNIT - III Aggregate planning: Aggregate planning strategies - heuristic method and transportation model for aggregate planning. Materials requirement planning: Objectives - master production schedule - bill of materials - MRP calculations - lot sizing in MRP and manufacturing resource planning. UNIT - IV Inventory analysis and control: Definitions - inventory control systems - ABC inventory System -- EOQ models for purchased parts and manufactured parts - quantity discounts - reorder point - Inventory models under uncertainty. UNIT - V Facility layout: Classification of layout, layout design procedures - ALDEP, CORELAP and CRAFT. Line balancing: Rank positional weight method - COMSOAL algorithm.
135	PSOM 2	Computer Aided Design in Manufacturing	2018	UNIT - I Overview of CAD systems: Conventional and computer aided design processes - advantages and disadvantage - CAD hardware and software - analytical and graphics packages - networking of CAD systems. UNIT - II Computer graphics and graphics transformation: Image processing - transport of graphics data - graphic standards - display and viewing - transformations - customizing graphics software's. UNIT - III Geometric modeling: Wire frame, surface and solid modeling - applications and advantages - Boolean operations - half-spaces - filleting of edges of solids - boundary representations - constructive solid geometry - sweep representation. UNIT - IV Parametric design and object representation: Object-oriented representation - types of coordinate system - parametric design - definition and advantages - parametric representation of analytic and synthetic curves - parametric representation of surfaces and solids - manipulations. Mechanical assembly - mass property calculation. UNIT - V Introduction to finite element analysis: Basic steps in finite element problems formulation - element type and characteristics - element shapes - coordinate systems - 1D link elements and beam elements - shape functions - stiffness matrices - direct stiffness method - 2D elements - axisymmetric elements - plane stress problem - higher order elements.
136	HHM 1	Food production & bakery	2018	UNIT - 1 IMPORTANCE OF KITCHEN KNOWLEDGE OF INDIAN REGIONAL STAPLE FOOD, INGREDIENTS AND SPICES. A STUDY OF VARIOUS REGIONAL CUISINES: Punjabi - Bengali, Gujarati - Maharashtra, Kashmiri - Mughlai, South Indian - Rajasthani Goan. Unit-2-A STUDY OF INDIAN BREADS. BREAD ROLLS. A STUDY OF INDIAN SWEETMEATS. A STUDY OF INDIAN ACCOMPANIMENTS Pickles, Chutneys, Murabbas, Papads etc. Mouth fresheners. Unit -3-COMPARATIVE STUDY OF TRADITIONAL AND MODERN INDIAN COOKERY. METHODS OF MIXING FOOD. Unit- 4-PATISSERIE (BAKERY SCIENCE) BREAD DISEASES. BREAD VARIETIES. Unit-5-FUNCTION OF INGREDIENTS IN CAKE MAKING. CAKE MAKING METHODS: Sugar batter method. - Boiled method, Flour batter method - Sugar water method. Blending method. - All in process.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
137	HHM 2	Food and beverage service	2018	Unit-1ANCILLARY DEPARTMENTS: Pantry, Still room, Platter room, Hotplate, Wash up, Linen Store, Kitchen Stewarding- a brief description.Unit-2ROOM SERVICE: Types of room service Centralized / Decentralized / Decentralized Mobile. List of equipments. Trolley and tray setup. House rules of room service waiter. Room Service menu.Unit-3BEER: History (A brief description of how beer came into being).Ingredients. Brewing process: Bottom fermentation; Top fermentation. Storage of beer. types of beer (Ale, Lager, Draught, Wheat beers). Characteristics. Service of beer.Unit-4WINES: Introduction to wines. Definition of wines. Viticulture – Seasons, soil & area of growth. Composition of grape and its effect on the nature of wine. Wine makers calendar. Wine categories: RED, WHITE, and ROSE. Characteristics of wines - Still, natural, sweet, dry, vintage & non – vintage. Principal wine producing countries: France, Italy, Germany, Spain, \ Portugal, America, Australia.Unit-5WINES OF OTHER COUNTRIES: Italy. Germany. Wine of Spain with special reference to Sherry (in details).Wine of Portugal with special reference to port and Madeira. Australian wines. American wines.
138	ISB 1	Export Import Procedures, Documentation & Logistics	2018	Unit-IDocumentation Framework-Exim Documentation; International Business Contracts; Types , formation, Elements, Legal Dimensions, Dispute Settlement.Unit-IIInstruments and methods of Financing Exports including credit and collections, Uniform custom and practices (UCP); Business Risk Coverage-Cargo, Credit and Foreign Exchange Risk Coverage, Cargo Insurance.Unit-IIIForeign Exchange Regulations and Formalities; Quality Control and Pre-shipment; Inspection Concept Scheme and Procedures ; Role of Clearing and Forward Agents'; Excise clearance of cargo; Shipment of Export Cargo; Custom Clearance of Export Cargo; Custom Clearance of Import Cargo. Unit-IV Negotiations of Documents with Banks; Procedures and documentation for availing export incentives-Duty draw backs, Import Licensing and other incentives; Processing of an Export Order.Unit-VWorld Shipping: Structure, Liners, and Tramps, Conference System; Freight and structure. Indian Shipping: Trends, Structure, Concepts of Dry Port, Containerization, Machinery for Consultation; Air Transport: International set-up, Freight rate structure.
139	ISB 2	International Economic Organizations & Regional Blocks	2018	Unit-International Economic Organizations and Development Diplomacy: Regimes and regimes theory.Unit-IIInternational Organizations as international institutions; International Monetary Fund (IMF) : World Bank Group-International Bank for Reconstruction and Development (IBRD), International Development Agency (IDA), International Finance Corporation (IFC), Multilateral Investment Guarantee Agency (MIGA).Unit-IIIGeneral Agreement on Tariffs and Trade (GATT); World Trade Organization (WTO), United Nations Conference on Trade and Development (UNCTAD); International Labour Organization (ILO).Unit-IV Economic Integration and endogenous growth.Unit-VSelected Regional Blocks-NAFTA, EU, ASEAN, SAARC, Globalization vs. Regionalization.
140	PSEM-1	Power Generation, Transmission & Distribution	2018	Unit-1Electrical Energy Generation, concepts, various types of generating stations and their locations. Study of Thermal, Hydel, Nuclear and Non Conventional energy generation schemes .Block diagram of various power stations-schemes and sub systems.Unit-2Steam Power Plants: Types of power plants , steam power plant: Design Operation & Thermodynamic Analysis, steam turbine power output, Power Plant Performance Monitoring & Testing, Heat Rate, Efficiency, Optimization of PerformanceUnit-3SteamGenerators: Boiler and steam Generator construction types, Energy Balance and efficiency of steam Generator, Furnace & burners, steam Generators with fluidized based Combustion (FBC): fluidized bed types; emissions reduction in Fluidized bed furnaces, Steam turbines, Condensers, feed Water Heaters and Cooling Water systems Gas Turbine Power Plants: Air standard joule Cycle, Actual efficiency of the Gas Turbine Power Plant, Enhancing the Gas Turbine Plant Performance: increasing the compression Pressure Ratio and Turbine inlet TemperatureUnit-4Hydro Power Generation, Hydro Turbine, Large medium and small hydro power station, Micro Hydel Nuclear power generation and peaceful uses of nuclear energy. Generation :synchronous generator operation power angle characteristics and the infinite bus concept dynamic analysis and modeling of

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
141	PSEM 2	Renewable Energy Systems	2018	Unit-1Solar Power: Introduction, Solar Photovoltaic, History and projection ,Advantage& disadvantage of Photovoltaic Systems, Application ofPhotovoltaic Systems, Overview of SPV programme in India ,Solar potential, solar mission of GoI, Role of MNRE ,IREDA etc. ,Energy from Sun ,Insolation available on earth; Global Radiation distribution on an inclined plane. Solar Photo voltaics: Basic principle of power generation in a PV cell; Band gapand efficiency of PV cells ;Component of PV System, Solar Cells; Types; Working; I-V characteristics; losses. Solar PV panel ;Balance of Systems; Fabrications of Modules; Economics of PVS systems; Future prospects; Applications of Photovoltaic: Domestic lighting Systems; Remote Applications; Hybrid; Grid linked PV Systems. Designing of Solar Photovoltaic Systems: Designing of PV systems, Need for different cell design, The technology route for making solar cells, costing of PV systems, Operation & Maintenance of PV Systems; Battery Storage: Types and Properties of mono crystalline, polycrystalline and multi crystalline cells ,Amorphous silicon thin film cells; Photovoltaic materials.Unit-2CSP technologies: Parabolic trough collector technology, Linear Fresnel collector technology, solar tower technology and Stirling dish technology :the solar resource CSP plant design and performance: Solar field sizing latest trends in design of Mega Solar Power
142	TSM 1	STRATEGIC AND QUALITY MANAGEMENT IN TOURISM	2018	UNIT- IDefining ethics and its significance in tourism. Principles and practices in business ethics. Business compulsions, motivation and ethical parameters.UNIT- IILaws relating to accommodation, travels agencies land tour operation sector, Law landUNIT-IIIConcept of Product in Tourism and special issues related to marketing of Tourism products. Principle Middlemen relationship in Tourism and their respective role in marketing various tourism products. Components of marketing mix with special reference to Tourism. Promotional Techniques.UNIT- IVLinkage in Tourism Marketing: Linkages in Travel and Tourism marketing between Accommodation, Transport, Travel and Tour sectors and Governments. Market segmentation & product positioning. Role of Public Sector Tourism Institutions in Tourism marketing.UNIT- VCommunication mix: Component of communication mix: Communication- mix in Tourism & Travel marketing. Public relations: significance of PR, Methods and Techniques of PR: Advertising Decisions: Meaning and Advertising process, role of advertising in Tourism, Advertising objectives and budgets. Media alternatives and Media selection, and measurement of advertising effectiveness. Personal selling: meaning and its role in tourism promotion
143	TSM 2	TOURISM BUSINESS ENVIRONMENT	2018	Unit -IHistory of Tourism both International and National, Definition, nature, importance, components and typology of tourism.Unit -IIConcepts of domestic and international tourism, recent trends. Organization of both national and international in world in promotion and development – WTO, IATA, UPTAA, AI, IATO, etc.Unit -IIIGrowth and development of tourism in India, National Action Plan 1992. Unit -IVImpacts of tourism economics, social, physical and environmental, Tourism trends world over and its futuristic study.Unit -VEmerging trends in tourism health tourism, adventure tourism, ecotourism.
144	ITSM 1	Management of Technology Innovation And Change	2018	Unit I :-Technology Management: Understanding Technology and its Relationship with Wealth of Nations and Firms Specific Knowledge Unit-II:- Technology Life Cycles, Technology Acquisition and Absorption; Technology Exports / Joint venture Abroad. Technological Intelligence and Forecasting, Global Trends in Technology Management.Unit III:- Change Management: Understanding the Nature, Importance, Forces, Types of Change; Diagnosing Organizational Capability to Change-strategy, Structure, Systems and People; Building Culture and Climate for Change: Role of Leadership; Managing Transformations.Unit IV:-Innovations Management: Invention vs. Innovation; Innovation Strategies and Models; Concurrent Engineering; Process Innovation, Product Innovation, Innovation Management.Unit V:-Creative and Lateral Thinking Management: Thinking, Creative Thinking, Problem Solving, Managing Lateral Thinking.
145	ITSM 2	Information System Management	2018	Unit I:-Meaning and Role of Information Systems, Types of Information Systems: Operations Support Systems, Management Support Systems, Expert Systems, and Knowledge Management Systems. Unit-II:-Information Systems for Strategic Management: Competitive Strategy Concepts, Strategic Role of Information Systems.Unit III:-Planning for Information Systems: Identification of Applications, Business Planning Systems and Critical Success Factors, Method of Identifying Applications, Risks in Information Systems.Unit IV:-Managing Information Systems: Enterprise Management, Information Resource Management, Strategic Management, Operational Management, Resource Management Technology Management ,Distributed Management.Unit V:-Introduction to BPR: Concept, Need for Reengineering, Benefits, guiding principles, BPR and performance Improvement, Pitfalls in BPR, Myths of BPR, BPR implementation methodology, BPR implementation methodology.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
146	LSCM 1	Principles and Practice of Logistics Management	2018	Unit – I:-Concepts of Logistics – Evolution – Nature and Importance – Components of Logistics Management – Competitive Advantages of Logistics – Functions of Logistics management – principles – Logistics Network – Integrated Logistics system.Unit – II:-Elements of Logistics and Inventory carrying – Ware housing – Material handling – Order processing – Transportation – Demand Forecasting – Impact of Forecasts on Logistics and Performance measurements.Unit – III:-Transportation – participants in Transportation Decisions – Modes of Transportation – Factors influencing Transport economics – documents in Transport Decision Making Warehousing / Distribution – Functions of Warehouse – benefits of Warehouse – Service – Warehousing Alternatives – Warehouse site selection – Factors while initiating Warehouse Operations – WarehouseUnit-IV:-Management Systems Packing and Materials Handling – Functions of packaging – Communication – Packaging cost – Types of Packaging Material – Unitization – Containerization – Designing a package factors affecting choice of packaging materials.Unit – V:-Organisation for effective logistics performance – centralised and decentralised structures – stages of functional aggregation in organisation financial issues in logistics performance – Measures – Steps in ABC costing – Financial Gap Analysis
147	LSCM 2	Supply Chain Management	2018	UNIT 1 :-Introduction to Supply Chain Historical perspective Understanding Supply Chain :key issues in supply chain management Objectives, importance, Decision phases -Examples of supply chains Supply chain strategies, The supply chain becomes value chain Supply chain as a competitive weaponUNIT II:-Supply chain synergies Collaborate with supply chain partners Supply Chain Drivers and Design Drivers of supply chain performance: Framework for structuring Facilities, including warehouse, Inventory, Transportation, Information, Sourcing, and Pricing – Yield management /Revenue managementUNIT III:- Sales and Operations Planning Demand management Demand forecasting, Aggregate Planning and Managing Supply, Demand and Inventory Aggregate Planning in a Supply Chain: role, aggregate planning problems, strategies, role of IT, Implementation Responding to predictable variability in supply chain – Types of supply chains-creating responsive supply chains lean and agile supply chain their characteristics.UNIT IV:-Customer value and supply chain management Dimensions of customer value-value added services –customer value measures Push-pull boundary –mass customization and supply chain management outsource - Third and Fourth - Party Logistics providers –managing risk in supply chains Creating a sustainable supply
148	PHSM1	Pharma Logistics Management	2018	Unit I: -Importance of Logistics & Purchase / Supply in Pharma Management Objectives & Policies.Unit II: -Electronic Data Interchange; Bar Coding, Purchasing Transportation ServicesUnit III: -Purchase Description; Specification; Standardization, Warehousing DecisionsUnit IV: -Outsourcing – Make or Buy Decision; Global Servicing, Legal Aspects of PurchasingUnit V: -Pricing & Cost Analysis, Inventory Management
149	PHSM2	Pharmaceutical Marketing	2018	Unit I: -Introduction to Pharmaceutical Marketing: Identification of pharmaceutical market; market behaviour; physician prescribing habits; patient motivation; market analysis.Unit II: -The Pharmaceutical Products: Drug Development and the Marketing Research Interface; Diversification and Specialisation; Marketing Generic Drugs; Non-prescription drugs.Unit III: -Distribution Channels: Manufacturer; Wholesaler; Retailer; Hospital and Government Agencies.Unit IV: -Competitive Practices: Economic and Competitive Aspects of the Pharmaceutical Industry; Advertising; Detailing and other forms of Promotion; Retail Competition – The Community Level; International Marketing.Unit V: -Controls: Internal & External Controls
150	ABSM-1	Agribusiness Environment and Policy	2018	UNIT I :-Role of agriculture in Indian economy; problems and policy changes relating to farm supplies, farm production, agro processing, agricultural marketing, agricultural finance etc. in the country.UNIT II :-Structure of Agriculture - Linkages among sub-sectors of the Agribusiness sector; economic reforms and Indian agriculture; impact of liberalization, privatization and globalization on Agri business sector.UNIT III:-Emerging trends in production, processing, marketing and exports; policy controls and regulations relating to the industrial sector with specific reference to agro-industries.UNIT IV:-Agribusiness policies- concept and formulation; and new dimensions in Agri business environment and policy.UNIT V:-Agricultural price and marketing policies; public distribution system and other policies.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
151	ABSM 2	Agricultural Marketing Management	2018	UNIT I :-Meaning and scope, agricultural marketing and economic development; Agricultural market structure – meaning, components and dynamics of market structure; marketing strategy – meaning & significance, formulation of marketing strategy; agribusiness marketing environment, design of marketing mix, market segmentation and targeting, determinants of consumer’s behaviour.UNIT II:-Product management - product management process and decisions, new product development – significance and classification of new product, stages and estimation of demand of new product; product life cycle.UNIT III:-Pricing policies and practice for agribusiness - determinants of price, objectives of pricing policies and pricing methods.UNIT IV:-Promotional management - advertising planning and execution; sales promotion; grading and standardization.UNIT V:-Distribution management - storage and warehousing and transportation management for agricultural products; marketing agencies/intermediaries – roles and functions; distribution channels involved in agribusiness.
152	CP 401	Business legislation	2012	UNIT-IThe Indian Contract Act. 1872: Essentials of a Valid Contract. Void Agreements. Performance of Contracts. Breach of Contract and its Remedies. Quasi-Contracts. The Sale of Goods Act, 1930: Formation of a Contract. Rights of an Unpaid Seller.UNIT-IIThe Negotiable Instruments Act, 1881: Nature and Types Negotiation and Assignment . Holder-in-Due Course, Dishonour and Discharge of a Negotiable Instrument Arbitration.UNIT-IIIThe Companies Act. 1956; Nature and Types of Companies. Formation. Memorandum and Articles of Associations Prospectus Allotment of Shares, Shares and Capital. Membership. Borrowing Powers.UNIT-IVManagement and Meetings, Accounts and Audit. Compromise Arrangements and Reconstruction. Prevention of Oppression and Mismanagement. Winding Up.; Consumer Protection Act and Cyber Laws.UNIT-VBasic provisions of pollution control, environment protection and intellectual property rights. Laws related to mergers & acquisitions in view of the multinational companies operating in India
153	CP 402	Management Information System & Decision Support System	2012	Unit-IIInformation System in Business Introduction to Information System; System Concepts; System & Sub System; System Feed back; Types of Information System; Applications; System Development Life Cycle (SDLC).Unit-IIManaging Data Resources Introduction; Organizing Data in a Traditional File Environment; Data Base Management System; Data Base Environment; The range of Data Base Applications; Integration of Information; Role of Enterprise Resource Planning (ERP); Customer Relationship Management; Work Group Integration; Integration of Different Systems; Information System Organizations & Business Processes.Unit-IIIManagement of Information Systems, Technology, and Strategy The Technology: Computer and Computer Processing; Role of Information Technology in Organization; Information SystemUnit-IVElectronic Communication System Electronic Conference; Electronic Meeting Systems; Electronic Discussions; Electronic Publishing; INTRODUCTION to Networks; Network Basics; LAN Basics; Internet Working; ISDN Basics; Network Management.Unit-VBusiness Telecommunications Telecommunication and Network; The Internet and World Wide Web (WWW); E Business; Applications on E-Business; Transaction Process System (TPS); Operational Information Systems
154	MSM 3	Sales and Distribution Management	2012	UNIT-IIntroduction: definition, objectives, Functions and Classification of Sales Management. The Sales Organization: Purpose, Principles and Policies of Sales Organization, Setting up of the Sales Organization, Typical Sales Organization Structure.UNIT-IIManagement of Sales Force: Recruiting and Selecting Sales Personnel, Developing and Conducting Sales Training Programmes, Designing and Administering Compensation Plans, Supervision of Salesman, Motivating Sales Personnel, Sales meetings and contests.UNIT-IIISales Forecasting, Methods, Designing Territories and allocating Sales efforts, objectives and quotas for Sales Personnel, Developing and managing Sales evaluation programme.UNIT-IVDistribution: Overview of Marketing Channels, their Structure, Functions and Relationships; Channel Intermediaries-Wholesaling and Retailing; Logistics of Distribution; Channel Planning.UNIT-VOrganizational Patterns in Marketing Channels; Managing Marketing Channels; Marketing Channel Policies and Legal issues; Information System and Channel Management; Assessing Performance of Marketing Channels; International Marketing Channel.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
155	MSM 4	Service Marketing	2012	UNIT-I-Market Situation Analysis: Analysis of Competitor"s Strategies and Estimating their Reaction Pattern and Competitive Position; Market Leader Strategies- Expanding the Total Market, Protecting Market Share, Expanding Market Share, Market Challenger Strategies- Choosing and Attack Strategy, Market Follower Strategies.UNIT-II-Competitive Market Strategy for Emerging Industries, Declining Industries and Fragmented Industries; Balancing Customer and Competitor Orientations,.UNIT-III-The Emergence of Service Economy; Nature of Services; Goods and Services Marketing; Marketing Challenges in Service Businesses; Marketing Framework for Service Businesses; The Service Classification; Service Product Development; The Service Encounter;.UNIT-IVQuality Issues and Quality Models; Demand – Supply Management; Advertising, Branding and Packaging of Services; Recovery Management and Relationship Marketing; Service Marketing: origin and Growth- Classification of Services- Marketing of financial servicesThe Indian scene- Designing of service strategyUNIT-VIndustry Segmentation and Competitive Advantage; Product Differentiation and Brand positioning, Competitive Pricing, Competitive Advertising, Role of Sales Promotion in Competitive MarketingThe Service Consumer Behaviors: Service Management Trinity: Service Vision and Service
156	FSM03	Management of Financial Services	2012	UNIT-IIntroduction to Indian financial system: Role/ functions, component, constituents,/ development, role in economic development, weaknesses of Indian financial system. Financial Services: Concept, Nature & Scope of Financial Services.UNIT-IIFundamentals of Mutual Funds, Merchant Banking, underwriting Securitization of debt, leasing, hire purchase, venture capital, factoring & forfeiting, Discounting, Credit rating & Credit CardUNIT-IIIFinancial Institutions: Fundamentals & Basic Concept Role & important of Financial institutions, Banking financial institute, non Banking Financial institutions.UNIT-IVWorking and organization of Different Financial institutions in India: RBI, IFCL, ICICI, IDBI, UTI, LICUNIT-VHire purchase, venture capital, factoring & forfeiting, Discounting, Credit rating & Credit Card.
157	FSM04	Strategic Corporate Finance	2012	UNIT-I-Basic Concepts of Income Tax: Computation of Income under Different Heads of Income, Deductions and Exemptions in Additional Tax on Undistributed Profits.UNIT-II-Meaning and Scope of Tax Planning: Tax Planning, regarding, Dividends Policy, Issue of Bonus, Shares, Amalgamation & Merger of Companies, Tax Planning in respect of Managerial Remuneration, Collaborations, Joint VenturesUNIT-III-Management Control- An overview Nature, Scope and Concept of Management Control System. Organization Goals, Strategic Planning and implementations, Organization Structure,.UNIT-IVManagement control Process: Programming, Budgeting, Planning and Procedures. Budgetary Control. Analysis of Variances, Flexible Budgeting Zero-bases Budgeting Performance Budgeting.UNIT-VManagement Control Structure, Behavioural Aspects of Management Control. Contingency Theory, Organizational Climate, Position of Controller in the Organization Structure of an Organization
158	HRSM-3	Human Resource Planning and Development	2012	UNIT-I-Macro level manpower planning and labor market analysis; 14organizational human resources planning; stock taking; work force flow mapping; Age and grade distribution mapping; models and techniques of manpower demand and supply forecasting; behavioral factors in human resources planning- wastage analysis; retention; redeployment and exit strategies.UNIT-II-Career management and career planning; performance planning; potentials appraisal and career development; HRD climate; culture; QWL and management of change UNIT-III-TQM and HRD strategies; HRD in strategic organizations; human resources information system; human resources valuation and accounting.Unit IV:Macro Level manpower Planning and Labour market Analysis - Organisational Human Resource Planning -- Stock Taking -- Work Force Flow mapping -- Age and Grade Distribution mapping.Unit V:Models and Techniques of manpower demand and supply forecasting-- Behavioural Factors in HRD -- Wastage Analysis ñ Retention -- Redeployment and Exit Strategies. Career Management, Career Planning and Career Development. Module IV: Performance Planning – Potentials Appraisal -- HRD Climate. Module V: Human Resource Information System – Human Resource Accounting



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
159	HRSM-4	Compensation Management	2012	UNIT-I Conceptual and Theoretical understanding of Economic theory related to reward management; Competitive Imperatives; Productivity, Quality, Service, Speed, Learning, Planning for Improved Competitiveness; Diagnosis and Benchmarking- Determination of Inter and Intraindustry Compensation differentials; Internal and external Equity in compensation system. UNIT-II Understanding tools used in Designing, Improving and Implementing Compensation packages; Compensation designs for Specific Type of Human Resources like Compensation of Chief Executives, Senior managers, R & D Staff. UNIT-III Understanding different components of compensation packages like fringe benefits, incentives and Retirement Plans; Compensation Practices of Multinational Corporations and Strategic Compensation Systems. UNIT-IV Statutory Provisions governing Different Components of Reward systems. Working of different Institutions Related to Reward System Like Wage Boards, pay Commissions etc. UNIT-V Compensation Practices of MNC's and Strategic Compensation Systems; Statutory Provisions governing different Components of Reward System; Working of different Institutions related to Reward System like Wage boards, Pay Commissions.
160	HSM-3	Hospital Waste Management	2018	UNIT-I Hospital Hazards: Meaning – Types – Physical–Biological Mechanical – Psychological – Its Impact on Employees – Preventive measures. UNIT-II Hospital Hazards Management: Meaning – Need – Principles – Purpose. UNIT-III Control of Hospital Acquired Infection: Types of Infection – Common Nosocomial Infection and their Causative Agents – Prevention of Hospital Acquired Infection – Role of Central Sterile Supply Department – Infection Control Committee – Monitoring and Control or Cross-Infection – Staff Health. UNIT-IV Biomedical Waste Management: Meaning – Categories of Biomedical wastes – Disposal of biomedical waste products – Incineration and its importance – Standards for Waste Autoclaving, Micro Waving and Deep Burial – Segregation – Packaging – Transportation – Storage. UNIT-V Human Waste Disposal and Sewage Disposal: Diseases carried from excreta – Sanitation barrier – Methods of Excreta disposal – Sewage wastes: Meaning – Composition – Aims of Sewage disposal – Decomposition of Organic Matter – Modern Sewage Treatment – Drawbacks of improper disposal of wastes – Solid and liquid.
161	HSM-4	Health care economics	2018	UNIT-I Analyzing Medical care Markets the Medical Care Market Place, The competitive Market Model, Market Failure in Medical Markets, Government Intervention in Medical Markets. UNIT-II Healthcare system: Indian Healthcare system - Health Policies - Expenditure and Allocations under Five year Plans Role of Private Sector and PPP. UNIT-III Market for Healthcare Professionals Application of the Theory of Labor Markets in the case of Health Care Professionals, The Market for Physicians Services, Models of Physician Behavior, The Market for Nursing Services, The Market for Dental Services. UNIT-IV Public – Government's role in different socioeconomic systems, Budgets – Allocation of Medical field – central – state governments – structure – five year plans. UNIT-V Medical Tourism: Role of Medical Tourism, Methods to attract Foreign Medical Tourists, Facilities available for foreign patients, Role of travel Agencies, Govt. Policy on Medical Tourism
162	RTSM-3	Marketing Concepts in Retail Management	2018	UNIT – I Retail stores operations. Mall management, setting objectives for retailers', performance, Management of retail brand. UNIT – II Retail strategies, Retail marketing strategy, Finance and location strategies for retailing. UNIT – III Market research for retail management, trading area analysis Research before and after setting up a retail store. UNIT – IV Retail management information system, Information gathering and processing, Application of I.T. to retail management. UNIT – V Financial aspects of retail, Retail audit and measures of performance evaluation.
163	RTSM-4	Retail and Brand Management	2018	UNIT-I Introduction to Brands: Products v/s Retail Brands, Anatomy of a Brand, Overview of brand building process in Retail organization. UNIT-II The Growth of Retail Power and the Brand-building Challenge Investing in Store Brands Customers and Brands. UNIT-III Understanding Retail brands from the customer's perspective Brand Positioning Brand Identity: Brand Essence, Brand Personality, Brand Customer Relationships etc. UNIT-IV Articulating the Brand Identity: Logos, Mascots, Taglines, and Packaging etc. Executing the UNIT-V Executing the Brand Identity through Promotion" Brand Extensions Brand Product Portfolio Brand Equity: Development and Measurement Managing the Brand Portfolio over time

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
164	RSM 3	Co-operative Management	2018	UNIT-I Co-operative Administration: A Global perspective: Ecology of Co-operative Administration; the Co-operative Sector & Economic Development. UNIT-II Co-operative Management; Nature & Functions; Professionalized Management for co-operatives; Role of Leadership in Co-operative Management; Placement and the Role of the Board of Directors in Co-operative Management. UNIT-III The State and the Co-operative Movement; Effects of Co-operative Law on Management; Long Range Planning for Co-operative Expansion; Policy Making; Executive Direction. UNIT-IV Human Resource Management; Organizational Structure; Project Formulation, Implementation and Evaluation; Financial Management; Marketing Management. UNIT-V Procuring Management; Distribution Management: Co-ordination between Trading Co-operatives & Public Sector Trading Agencies: Problems & Prospects.
165	RSM-4	Rural Development Issues	2018	Unit I Rural Business and its critical features; Identification of needs of rural producer organization, enterprises, projects and its people; the rural social and political scenario. Unit II Overview of the rural resources-land, soil, climate, water and forests; Overview of the production system containing agriculture, horticulture, sericulture, forestry, animal husbandry and dairying, fisheries, non-farm activities. Unit III Managing co-operatives, emergence, endurance and growth of co-operatives; Leadership issues in cooperatives, evolution of co-operative technologies; Co-operative principles; Issues in establishing agricultural co-operatives, democratic governance in co-operatives; co-operative principles and economic rationality. Unit IV Economic Theory of co-operatives, agency theory, theory of contracts, transaction cost economics, game theory and their reciprocity, welfare economics and their co-operatives. Unit V Concept, measures and determinants of rural development; Critique of major rural development approach and strategies; growth vs equity oriented approach; area vs group based approach; top down vs participatory and people oriented approach to development planning
166	BSM-3	Insurance and Risk Management	2018	UNIT - I Introduction and Scope of Insurance- Historical perspective, Conceptual Framework, Meaning, Nature and Scope of Insurance, Classification of Insurance Business viz., Life Insurance and General Insurance. UNIT - II Financial Aspects of Insurance Management- Role of Financial Institutions, Insurance Companies. Important Life Insurance Products and General Insurance Products Determination of Premiums and Bonuses Various Distribution Channels Unit - III Risk Management and Underwriting Role of Actuaries- Product framing, Underwriting guidelines, Re-insurance Preparation of Insurance Documents Policy Conditions UNIT - IV Settlement of Claims Insurance Laws and Regulations with respect to following Acts. Insurance Act 1938, Life Insurance Corporation Act 1956, IRDA Act 1999, Consumer Protection Act 1986, Ombudsman Scheme, Income Tax Act, Wealth Tax Act 1957, Married Women's Property Act 1874. UNIT - V Code of Conduct in Advertisement, Financial Planning and Taxation, Bank Deposit Schemes, Unit Trust and Mutual Funds, Shares, Tax Benefits under Life Insurance Policies.
167	BSM 4	Banking Law and Practice	2018	UNIT-I Banker – Customer Relationship: Definition and Meaning of “Banker” and “Customer” – Permitted activities of Commercial Banks in India – General and Special Features of their relationship, Their rights and duties. UNIT-II Deposit Accounts: Opening Operations and Closure, Fixed Deposit Account, Recurring Account, Savings Account, Current Account, Deposit Schemes for NRIs. UNIT-III Banking Instruments: Definitions of Negotiable Instrument [NI] – Different Types of NIs and other Instruments – parties to NIs – Crossing – Endorsements – Payment and Collection of Cheques – Forged instruments – Bouncing of Cheques and their implications – Various laws affecting bankers. UNIT-IV Banking Services: Remittances – Safe Custody – Safe Deposit Vaults – Collection Facility – MICR Clearing ATMs – Credit cards and Debit Cards – Travellers’ Cheques – Gift Cheques – Ombudsman and Customer Services – Fraud Detection and Control UNIT-V Accounting conventions, basic accounting principles, bank reconciliation statements, procedure leading to preparation of final accounts, self-balancing ledgers, Accounting in banking companies.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
168	DSM-3	Environmental Impact Assessment (EIA) and Disaster Management	2018	UNIT-1Introduction to EIA: Purpose of EIA, Environmental components, projects and its environmental impacts, Environmental impact statement; Projects screening and scoping, Environmental baseline study.UNIT-IIIImpact Assessment Procedure: Applications of matrices, Networks and overlay maps, Environmental evaluation system, Transnational effects of projects; Impact identification; Impact prediction.UNIT-IIIGIS in Disaster Management: GIS as effective tool in Disaster management and planning, response requirement study, alternate route for sending relief and shortest evacuation routes. Display and identification of damaged and unsafe structures. Map creation for action plan identification of risk and planning needs.UNIT-IVCase Studies: River valley projects; Opencast mining projects; Urbanization and high way project. Display and identification of damaged and unsafe structures. Map creation for action plan identification of risk and planning needsUNIT-VEvaluation and mitigation, Monitoring and environmental auditing, Regional and strategic EIA, Environmental management plan, Cost benefit analysis and its dimensions, Problems of EIA in developing countries, Public participation in environmental decision making, presentation and review. <u>EIA report and its contents</u>
169	DSM 4	Disaster Management Policy	2018	UNIT-IDisaster Management: Meaning, Approaches and Scope, Elements of disaster management, Essential components of disaster management policy, Formulation and execution of disaster management policy, Command and coordination in disaster managementUNIT-IIDisaster Management Policy: Significance of disaster management policy, Principles of disaster management policy, Policy options and approaches in disaster management,UNIT-IIIInsurance Policies for Disaster Management: Evaluation of risk funding and risk transfer policies; catastrophe insurance pool; Reserve funds and contingent credit policies;UNIT-IVRole of Government and market participants; Insurance policy design; Fiscal cost of relief and reconstruction; Grants and low interest loan for reconstruction; Case Studies and review of Disaster insurance modelsUNIT-VCASE study I: Disaster Management Policy in United States of America, Disaster Management Policy in Bangladesh. Case Study II: Disaster Management Policy in South Africa, Disaster Management Policy in India
170	PSOM 3	Supply chain management	2018	UNIT-IIntroduction to supply chain management: Supply chain basics, decision phases in supply chain, supply chain flows, supply chain efficiency and responsiveness, supply chain integration, process view of a supply chain.UNIT-IIDemand forecasting in supply chain: Role of forecasting in supply chain, components of a forecast, forecasting methods, estimating level, trend and seasonal factors, Holt"s model, Winter"s model, measures of forecast error.UNIT-IIIRole of aggregate planning in supply chain: Aggregate planning strategies, managing supply and demand in supply chain.UNIT-IVSupply chain inventory: Role of cycle inventory in supply chain, economies of scale, lot sizing for a single product, lot sizing for multiple products, quantity discounts, trade promotions, price discrimination.UNIT-VSourcing decisions in supply chain: Supplier selection and contracts, design collaboration, making sourcing decisions in practice. Transportation decisions: Role of transportation in supply chain, factors affecting transportation decisions. Routing and scheduling in transportation
171	PSOM-4	Inventory Management and material requirement planning	2018	UNIT-IInventory Management: Inventory concept; need for inventory; types of inventory, functions, use; Dependent and Independent Demand, Responsibility for inventory management.UNIT-IIStrategic Inventory Management: Objectives and Importance of the inventory management function in reference to Profitability, Strategy, customer satisfaction and Competitive Advantage.UNIT-IIInventory Control Techniques: Inventory classification and its use in controlling inventory, Setup time and inventory control, safety stock determination considering service level.UNIT-IVInventory Models: Inventory models – Fixed Order Versus Fixed Interval systems – Developing Special Quantity Discount Models – Inventory Model for Manufactured Items.UNIT-VMaterial Requirement Planning Systems (MRP): Meaning, purpose and advantage of MRP, Data Requirements and Management – Files and Database – Updating Inventory Records – Bill of Materials, types of BOM, Modular BOM,

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
172	HHM 3	Accommodation Operation & Management	2018	UNIT-1CHECK IN PROCEDURES & HANDLING GROUP ARRIVALS: Greeting the guest. Registration: Types of registration, Importance of registration, Legal aspects of Registration. Allotment of rooms. Handing over keys Work flow chart. Types of groups. Rooming list. Pre arrival list. Welcoming & Handling of Check-in at the time of actual check - impost arrival activities with reference to grouptypes.UNIT-2LINEN ROOM :Location. Equipment. Storage & Inspection: Stock taking. Marketing & Monogramming. Functioning.UNIT-3UNIFORM ROOM: Purpose of uniform. No of sets, issuing process & exchange of uniform. Designing a uniform. Layout & planning of the uniform room.UNIT-4LAUNDRY: Duties and responsibilities of laundry staff. Importance and principles. Flow process in Industrial Laundering. Stages in wash cycle. Equipment, Layout, Planning of Laundry. Laundry agents. Dry cleaning.UNIT-5FIBRES AND FABRICS: Definition. Origin and classification. Characteristics of different fibers – Cotton, Linen, Silk, Polyester, Nylon
173	HHM 4	Hotel Housekeeping	2018	Unit-1HOUSEKEEPING AS A DEPARTMENT: In the hotel, In other institutions: to be applied in a slight different set of circumstances. . Interdepartmental co- operation& co- ordination of Housekeeping. Different sections of housekeeping department.Unit-2ORGANISATION STRUCTURE OF HOUSEKEEPING DEPARTMENT. Small hotels, Medium hotels, Large Hotels. Duties & Responsibilities of Executive Housekeeper. Duties & Responsibilities of Housekeeping Staff.Unit-3FUNCTIONS OF HOUSEKEEPING DEPARTMENT . Area of cleaning. Security. . Dealing with guests. . Brief note on lost & found. Baby sitting. Services and facilities offered by various hotels.Unit-4CLEANING EQUIPMENT . General considerations and selection. . Classification & Types of equipment. Method of use & mechanism for each type. Care & maintenance. CLEANING AGENTS . General criteria for selection. . Classification.Unit-5-STANDARD SUPPLIES PROVIDED IN THE GUEST ROOMS AND BATHROOMS. LOST AND FOUND PROCEDURE IN A HOTEL. PEST CONTROL
174	ISB 3	International Financial Management	2018	UNIT-IMultinational Financial Management –An overview, Evolution of the international Monetary and Finance System,UNIT-II Multinational Capital budgeting Application and interpretation, Cost of Capital Structure of the multinational Firm, Dividend Policy of the Multinational FirmUNIT-III Types of Foreign Exchange Market Organization of the Foreign Exchange MarketUNIT-IV Corporate Exposure Management Parameters and Constraints On Exposure Management UNIT-V Managing short-term assets and liabilities, long-run Investment Decision, The foreign Investment Decision
175	ISB 4	International Marketing Management	2018	UNIT-I International Marketing –definition ,concept and setting; Distinction between international Trade ,Marketing and Business ;Economic environment of international Marketing ;International Institutions –World Bank, IMF, WTO, UNCTAD, Common Markets, Free Trade Zones, Economic Communities. UNIT-II Constraints on International Marketing –Fiscal and non Fiscal Barriers ,Non Tariff Barriers; Trading Partners - Bilateral Trade Agreements, Commodity Agreements and GSP; India and World Trade ,Import and Export Policy , UNIT-III Public Sector Trading Agencies, ECGC, Commodity Boards etc. Procedure and Documents – Registration of exporters, Export Quotations, Production and clearance of goods for export , UNIT-IV International Marketing mix-Identification of markets ,Product policy , International product life cycle, promotion strategy, pricing strategy and distribution strategy; various forms of international business ; marketing of joint ventures and turnkey projects UNIT-V Direction and Quantum of India"s Exports; Institutional Infrastructure for Export Promotion; Export Promotion councils. Shipping and Transportation ,Insurance ,Negotiation of Documents; Instruments of Payments-Open Account , Bills of Exchange ; Letter of credit Export finance

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
176	PSEM 3	Clean Coal and Green Power Technology	2018	Unit-1 Clean Coal Technologies- Super Critical Power cycles, Integrated Gasification Combined Cycles, Circulating fluidized bed combustion and gasification, Gas cleaning systems and environmental issues, Principles of Waste Heat Recovery and Co-Generation, Analysis of Heat Recovery Systems, Regenerators & Recuperates for waste Heat Recovery, Condensate and Back Pressure Steam Turbines, Design of Waste Heat Recovery Boilers, Combined Cycle Power Plants based on waste Heat Recovery Unit-2 Carbon Capture & Sequestration Zero Emission Technology CO2 Capture-Flue Gas Approach, Oxygen combustion Approach, Hydrogen/Syn gas Approach. Unit-3 Green Productivity: New Power cycles, Dry Ice co-generation, Biological CO2 fixation with Algae, Zero Emission Technologies, Recycling of CO2., Carbon Credits. CO2 Transportation, CO2 Utilization & Storage:- Deep Saline Aquifers, Cost Considerations, CO2 Capture, CO2 Transportation, CO2 Storage, Legal Issues, Environmental Health & Safety. Unit-4 Advanced Energy Systems, Fluidized Bed Combustion, Atmospheric Fluidized Bed Combustion (AFBC), Pressurized Fluidized Bed Combustion (PFBC) and Circulating Fluidized Bed Combustion (CFBC), Clean Coal Technologies- <del>Supercritical Cycles Integrated Gasification Combined Cycle (IGCC) IGCC Power Plants Flue Gas De-Sulfurization and</del>
177	PSEM-4	Energy Conservation Management & Audit	2018	commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change, Energy Conservation Act- 2001 and its features. Unit-2 Electrical Billing, Power Factor & Capacitors, Load Management, Energy Conservation in Motors & Transformers (Types, Characteristics), Pumps, Compressors, Blowers, Fans, Cooling Towers. Unit-3 Energy Conservation Opportunities in Compressed Air Distribution System, Lighting System, Energy Conservation through: Variable Speed Drives. Unit-4 Energy Audit, Need, Types of Energy Audit, Energy Management Audit Approach, Understanding Energy Costs, Matching Energy Use to Requirement, Maximizing System Efficiencies, Optimizing the Input Energy Requirements, Energy Audit Instruments. Unit-5 Investment Need, Appraisal and Criteria, Financial Analysis Techniques- Simple Payback Period, Return on Investment, Net Present Value, Internal Rate of Return, Cash Flows, Risk and Sensitivity Analysis, Financing Options, Energy Performance Contracts and Role of ESCOs
178	TSM 3	Tourism concepts and impacts	2018	Unit - I Tourism: Concepts: Definitions and Historical development of tourism; Types of tourist-Visitor-Excursionist, Types and Forms of Tourism; Tourism system: Nature, characteristic Model of tourism system- Leiper's Model, Components of tourism and its characteristics and classification of tourist. Unit - II Domestic and International tourism: Domestic tourism; features, pattern of growth, profile. International tourism; Generating and Destination regions. Pattern of growth and Profile. Analysis of pattern of growth and profile of famous domestic tourism in the state of Himachal Pradesh, Madhya Pradesh, Gujrat, Goa & Kerala and analysis of International destination of USA, UK, France, China & Malaysia. Unit - III Travel statistics & Motivation Tourism Statistics, type and method of measurement. Classification on elements of tourism. Types of tourist motivation and classification. Unit - IV Tourism Impacts: Impacts: Positive and Negative Impacts of Tourism; Socio Cultural, Economic, Environmental and Political- Impact Assessment: Social Impact Assessment, Environmental Impact Assessment and Environmental Impact Assessment. - Environmental and Social Accounting and Auditing- Tourism Satellite Accounting (TSA) Unit - V Tourism Organizations: Objectives and
179	TSM-4	Tourism products of India	2018	Unit - I Introduction & Heritage tourism • Tourism products: meaning, characteristics, classification • Heritage: meaning, types, history, evolution, continuity • Heritage management organizations: UNESCO, ASI, ICOMOS, INTACH • Historic monuments of tourist significance: forts, palaces, museums, art galleries Unit - II Architecture & religion • Architectural Heritage of India; glimpses on the prominent architecture style flourished in different period. • Different style of architecture in India - Hindu, Buddhist and Islamic. • Popular religious centres: Hindu, Buddhist, Jain, Sikh, Muslim & Christian Unit - III Nature based products • Islands & beaches • Deserts & Hill stations • Protected areas: Wildlife sanctuaries, national parks & biosphere reserves • Adventure & Eco- Tourism Unit - IV Special interest tourism products • Performing art of India: classical dances, folk dances and folk culture • Handicrafts and textiles: important handicraft objects and centres, craft melas, souvenir industry. • Fairs and Festivals: Social, religious and commercial fairs of touristic significance. • Medical, health & rejuvenation tourism Unit - V Emerging products & cases • Emerging: Rural Gastronomy, Golf, cruise, wine & dark tourism • Case studies of World Heritage Sites: Tai Mahal, Khajuraho

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
180	ITSM-3	E-Governance and Framework of ICT	2018	Unit I Overview of E-Government and E-Governance: Stages of E-Governance, National E-Governance Plan (NeGP), Mission Mode Projects and their implementation status, E-Governance Introduction to E-governance, Unit II E-governance Models: Critical Flow Model, Interactive-service model/ Government to-Citizen-to-Government Model (G2C2G), Major areas of E-governance Services, Public Grievances: Telephone, Ration card, transportation, Rural services Land Records. Unit III Phases of e-government: "Brochure ware", Interactive, and Transaction, Five Stages of Electronic Government Development, Statutes affecting e-government development, Human Infrastructural preparedness, Challenges for E-governance Unit IV Policies: National Telecom Reforms, National Telecom Policies NTPs, Regulations: Digital Divide and Digital Dividends, Development and rationale of regulation and, deregulation, Unit V Role of Telecom Regulatory Agencies - Telecom Regulatory Authority of India (TRAI) & ITU, Information Technology Act (2000), Internet and E-commerce issues: privacy, security, domain names, etc, Wireless: frequency auctions, standards, competition.
181	ITSM-4	NETWORK APPLICATION AND MANAGEMENT	2018	Unit I Fundamentals of computer network management: Communicating in a Network-Centric World, Communicating over the Network, Application Layer Functionality and Protocols, OSI Transport Layer, Unit II OSI Network Layer, Addressing the Network: IPv4, OSI Data Link Layer, OSI Physical Layer, Ethernet, Planning and Cabling Networks, Configuring and Testing Your Network. Unit III Introduction to routing: Introduction to Routing and Packet Forwarding, Static Routing, Introduction to Dynamic, Routing Protocols, Distance Vector Routing Protocols, 5 RIP Version 1, VLSM and CIDR, RIPv2, The Routing Table, EIGRP, Link-State Routing Protocols, OSPF. Unit IV Switch & wireless technology: LAN Design, Basic Switch Concepts and Configuration, VLANs, Introducing VLANs, VTP, STP, Inter-VLAN Routing, Basic Wireless Concepts and Configuration, Introduction to WANs, PPP Concepts, Frame Relay, Network Security, ACLs, Teleworker, Services, IP Addressing Services, DHCP. Unit V Network management applications: Configuration management, Fault management, Performance management, Event Correlation Techniques, Security Management, Report Management, Service Level Management
182	LSCM 3	LOGISTICS CONCEPTS AND PLANNING	2018	UNIT I INTRODUCTION LOGISTICS Introduction - Scope of logistics in business, Logistics and Supply Chain Management, Core and support activities of logistics; Logistical integration hierarchy; Integrated Logistics; Operating objectives; Barriers internal integration; Logistical performance cycles; Supply chain relationships - Channel participants, Channel structure, Basic functions, Risk, power and leadership. UNIT II LOGISTICS SYSTEM DESIGN Logistics reengineering, Logistical environmental assessment, Time based logistics, Anticipatory and Response based strategies, Alternative strategies, Logistical operational arrangements, Time based control techniques; Integration theory - Location structure, Transportation economies, Inventory economies, Formulating logistics strategy. UNIT III LOGISTICS STRATEGY AND PLANNING Logistics planning triangle, Network appraisal; Guidelines for strategy formulation - total cost concept, Setting customer service level, Setting number of warehouses in logistics system, Setting safety stock levels, Differential distribution, Postponement, Consolidation, Selecting proper channel strategy. UNIT IV INVENTORY AND PURCHASING Review - Inventory and purchasing decisions; Multi facility location problems - Exact method, Heuristic methods, other methods; Logistics planning and design - Feasibility analysis
183	LSCM 4	LOGISTICS AND SUPPLY CHAIN PERFORMANCE MANAGEMENT	2018	UNIT I STRATEGIES, PLANNING AND PERFORMANCE Principles and strategies of Logistics and supply chain management, Logistics and supply chain operations planning, Approaches to develop metrics UNIT II LOGISTICS MEASUREMENTS SYSTEMS Logistical and supply chain measurement, Measurements in integration context UNIT III LOGISTICS CONTROL SYSTEMS Logistics / supply chain control, Characteristics of an ideal measurement system. UNIT IV UNDERSTANDING PERFORMANCE FRAMEWORKS Mapping for supply chain management, Lean thinking and supply chain management UNIT V SUPPLY CHAIN PERFORMANCE MEASUREMENT Measurement of supply chain performance



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
184	PHSM-3	Drug Regulatory Affair	2018	Unit I Historical perspective on the impact of Food and Drug laws. Unit II Manufacturing: Introduction, regulatory requirements as per Indian and other regulatory authorities for manufacturing information formula, process, validation of manufacturing process, equipment, documentation, inspection requirement, regulatory guidelines for active ingredients and formulations. Regulatory guidelines for packaging materials, test and evaluation of packaging materials, biological test, microbiological test and evaluation of closures. Unit III Federal Laws – FD & C Act - Definitions, History of FDA; Evolution of Drug Regulations – 1906 Act, 1938 Act, 1962 Amendments; Laws governing evaluation of New Drug products like IND, NDA, ANDA etc.; FDA Product recalls; DESI and OTC Review; Other regulations of 1962 Amendments like labeling requirements of prescription and OTC drugs. Unit IV FDA Enforcement powers, other federal laws affecting pharmaceutical industry (includes latest amendments in the Indian and international systems), Intellectual property rights: Introduction, purpose, guidelines as per Indian and other regulatory authorities. Unit V Clinical trials: Definition, Phase I, Phase II, Phase III and Phase IV studies, design documentation, presentation and interpretation, statistical analysis of clinical data, factorial design, guidelines as per Indian and other regulatory authorities. Unit VI Need and scope of Pharmaceutical selling, Pricing of pharmaceutical products. Unit VII Direct selling – concepts & types, Sales forecasting of pharmaceutical products. Unit VIII Role & responsibility of medical representatives. Unit IX Distribution channel and network in pharmaceutical industry. Unit X Managing sales force, Principal channel relationship.
185	PHSM-4	Pharmaceutical Sale and Customer Relationship Management	2018	Unit I Cooperative administration- a global perspective, ecology of cooperative administration, cooperative sector and economic development. Unit II Cooperative management- nature, functions and purpose of cooperatives – procurement, storage, processing, marketing, process of cooperative formation, role of leadership in cooperative management. Unit III The state and cooperative movement, effects of cooperative law in management, long range planning for cooperative expansion, policy making. Unit IV Human resource management, placement and role of board of directors in cooperative management. Unit V Overview of agribusiness cooperative – credit cooperatives, cooperative marketing, dairy cooperative; financing agribusiness cooperative.
186	ABSM-3	Management of Agri-Business Cooperatives	2018	Unit I Introduction to International Food market, India's Competitive Position in World Food Trade, Foreign Investment in Global Food Industry, Retail management and Food Retailing, The Nature of Change in Retailing, Organized Retailing in India, E-tailing and Understanding food preference of Indian Consumer, Food consumption and Expenditure pattern, Demographic and Psychographic factors affecting Food Pattern of Indian Consumer. Unit II Value Chain in Food Retailing, Principal trends in food wholesaling and retailing, food wholesaling, food retailing, the changing nature of food stores, various retailing formats, competition and pricing in food retailing, market implications of new retail developments, value chain and value additions across the chain in food retail, food service marketing. Unit III 4 P's in Food Retail Management, Brand Management in Retailing, Merchandise pricing, Pricing Strategies used in conventional and nonconventional food retailing, Public distribution system, Promotion mix for food retailing, Management of sales promotion and Publicity, Advertisement Strategies for food retailers. Unit IV Managing Retail Operations, Managing Retailers, Finances, Merchandise buying and handling, Merchandise Pricing, Logistics
187	ABSM-4	Food Retail Management	2018	UNIT- I Political Science – Nature and Scope, UNIT-II State and its authority State – origin and development, Power and authority, State – essential elements, Sovereignty UNIT- III Rights, duties, privileges, civil liberties of citizens Rights of citizens, Rights and duties, Human rights, UNIT- IV Development and welfare state, Legislative, Executive and Judiciary, Theory of separation of power UNIT- V Constitution and Kinds of Government Constitution – meaning and kinds, Kinds of Government – dictatorship, parliamentary and presidential, Unitary and federal,
188	BAL 102	POLITICAL SCIENCE	2014	UNIT- I Political Science – Nature and Scope, UNIT-II State and its authority State – origin and development, Power and authority, State – essential elements, Sovereignty UNIT- III Rights, duties, privileges, civil liberties of citizens Rights of citizens, Rights and duties, Human rights, UNIT- IV Development and welfare state, Legislative, Executive and Judiciary, Theory of separation of power UNIT- V Constitution and Kinds of Government Constitution – meaning and kinds, Kinds of Government – dictatorship, parliamentary and presidential, Unitary and federal,

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
189	BAL 105	LAW OF TORTS	2014	UNIT- I Evolution of Law of Torts 2. Definition, Nature, Scope and objects 1. A wrongful act – violation of duty imposed by law, duty that is owed to people generally (in rem) – damnum sine injuria an injuria sine damnum 3. The contact of unliquidated damages 5. Objects – prescribing standers of human conduct, redressal of wrong by payme of compensation, UNIT-II Volenti non – fit injuria, Necessity, private and public, Plaintiff's default, Act of god, Private defense, Judicial and quasi – judicial acts, Extinguishments of liability in certain situations UNIT- III Doctrine of sovereign immunity and its relevance in India Vicarious labiality, Defamation, master and servant relation, Malicious prosecution, Wrong affecting property, Trespass to land Negligence Basic Concepts, Theories of negligence Nuisance Definition, essentials and types, Acts, obstructions, Absolute / Strict liability, Legal remedies, Award of damages, Injunction, Extra – legal remedies UNIT- IV Consumer Protection Act Consumer, the concept, Unfair trade practices, Supply of essential commodities, Service, Enforcement of consumer rights, UNIT- V Motor Vehicle Act Types of <del>accident at road intersections collision involving children excessive speed in floods pedestrian running over cyclist</del>
190	BAL 106	LAWS OF CONTRACT	2014	UNIT 1 History and nature of contractual obligations, Agreement and contract : definitions, elements and kinds of contract, Proposal and acceptance, Consideration UNIT-II Capacity to contract Free consent, Undue Influence, Misrepresentation, Fraud, Mistake, Unlawful considerations and objects, Fraudulent UNIT- III Injurious to person or property, Acts which are immoral, Against public policy, Void and void able agreements, Contract without consideration, Agreements in restraint of marriage, Wagering contract and its exception UNIT- IV Contractual obligations – remedies, Damages, remoteness of damages, ascertainment of damages, Government Contracts UNIT- V Specific Relief Act Specific performance of contract, Contract that can be specifically enforced & that cant be enforced, Persons against whom specific enforcement can be ordered, Rescission and cancellation, Injunctions, <del>temporary permanent Declaratory decrees Discretion and powers of court</del>
191	BAL 201	ENGLISH	2014	UNIT- I Set expressions and phrases, One word substitution, Words often confused, Synonyms and Antonyms, especially Legal words UNIT-II Comprehension Skills Comprehension of Legal texts, Comprehending legal passages through queries UNIT- III Preparing legal briefs, UNIT- IV Grammar Cohesive Devices, Combination of sentences, Sentence structures, verb patterns, Modals, Possessives and „Self“ forms UNIT- V Composition and Translation Legal topics for essay writing, Translation and transliteration
192	BAL 202	POLITICAL SICENCE	2014	UNIT- I principle of representation, developing and welfare state UNIT-II Theory of separation of powers, Constitution meaning and type UNIT- III Legislature, Executive and Judiciary UNIT- IV Type of Government dictatorship, parliamentary and presidential UNIT- V Unitary and federal, party system, pressure groups, women"s empowerment
193	BAL 205	SPECIAL CONTRACT	2014	UNIT - I Indemnity The Concept, UNIT-IIGuarantee , consideration in guarantee contracts, Position of minor and validity of guarantee when minor is the principal debtor creditor or surety, Continuing guarantee, Right of surety, Position of surety in the eye of law, Various judicial interpretations to protect the surety, Co-surety and manner of sharing liabilities and rights, Extent of surety"s liability, UNIT- III-Bailment Rights of the pawner and pawnee, Pownee"s right of sale as compared to that of an ordinary bailee, Pledge by certain specified persons mentioned in the Indian Contract Act. UNIT- IV Agency ,Kinds of agents and agencies, distinction between agent and servant, Essential of agency transaction, Various methods of creation of agency, Delegation, Duties and rights of agent, Scope and extent of agent"s Authority, Liability of the principal for acts of the agent including misconduct and tort of the agent, Liability of the agent towards the principal, Personal liability towards the parties UNIT- V Sale of Goods -Concept of sale as a contract, Illustrative instances of sale of goods and the nature of such contracts, Transfer of title and passing of risk, Delivery of goods; various rules <del>regarding delivery of goods Unpaid seller and his rights Remedies for breach of contract</del>
194	BAL 206	CONSTITUTION 1	2014	UNIT- I Preamble, Nature of Indian Constitution, UNIT-II Citizenship, State, Fundamental Rights-equality, freedom and social control, personal liberty, UNIT- III Directive principles of State policy, Fundamental duties UNIT- IV Union Executive – the President, Vice President, Union Legislature – Council of ministers, Union Judiciary – Supreme Court UNIT- V State Executive – Governor, State Legislature – Vidhan Sabha, Vidhan Parishad, State Judiciary – High

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
195	BAL 301	POLITICAL SCIENCE	2014	UNIT- I Political Thinkers: From plato to Hobbes Plato, Aristotle, Bentham, Thomas Hobbes UNIT-II Political Thinkers: Locke to Marx John Locke, Rousseau, Montesquieu, Bentham, UNIT- III Ideologies Liberalism, Individualism, Socialism, Marxism, Capitalism, Constitutionalism, Pluralism UNIT- IV Indian Political thoughts: classical Era Hindu conception of state, Islamic conception of state, Christian conception of state UNIT- V Indian Political thoughts : Recent Era Gandhism – Sarvodaya, Kautilya's – Arth Shastra,
196	BAL 302	HISTORY	2014	UNIT- I A brief history of India from 1740 to 1947 with special reference to Warren Hastings; Cornwallis, Wellesley, Lord Hastings, William Bentinck, Dalhousie, Lytton, Ripon and Curzon UNIT-II The administrative infrastructure: law and justice, economic infrastructure – revenue, agriculture, railways, ruin of cottage industries, drain of wealth, impact of British economic policies on India, social legislation, education and reforms UNIT- III The social and religious movements during the 19th & 20th centuries – Brahma Samaj, Arya Samaj, Prarthana Samaj, Theosophical Society, Ramkrishna Mission., Social reforms – abolition of sati, abolition of infanticide, widow remarriage, upliftment of depressed classes, educational reforms UNIT- IV History of Indian National movement 1885 - 1947 UNIT- V Constitutional development in India from 1858 to 1947
197	BAL 303	HINDI	2014	UNIT- I Administration of Union Territories, The schedule and tribal areas UNIT-II Relation between UNIT- III Financial provisions: property, contracts, rights, liabilities obligation and suit, Public service commissions, service under the Union and the States UNIT- IV Tribunals, elections, special provisions, relating to certain classes UNIT- V Emergency provisions: effect of emergency, financial emergency, Amendment in the Constitutions
198	BAL 304	CONSTITUTION 2	2014	UNIT- I Introduction Definition of the term „Jurisprudence“, Definition of Law, Kinds of law, Justice & UNIT- IV Legal Rights: the Concept Rights: kinds, meanings, Duty: meaning and kinds, Relation between right and duty Personality, UNIT- V Possession and Ownership: the Concept Kinds of possession, Kinds of ownership, Difference between possession and ownership Liability Vicarious liability Obligation: Nature and kind
199	BAL 305	JURISPRUDENCE	2014	UNIT- I Definitions, Schools and Sources UNIT-II Marriage, Kinds, nullity of marriage, Hindu marriage Act 1955, Special marriage Act 1954, Divorce, Judicial separation, Restitution of conjugal rights, UNIT- III Joint family, Coparceners, property under Mitakshara and Dayabhag, Partition and Re-union, women estate, stridhan UNIT- IV Gifts, wills, Hindu adoption and maintenance Act 1956 UNIT- V Inheritance General rules of Succession, Religious Endowment
200	BAL 306	family (hindu law)	2014	UNIT- I, Legislature, Judiciary, Party System UNIT-II The Constitution of United States of America (U.S.A.) Federal Executives, The President of U.S.A., Legislature Congress, Judiciary, Party System in U.S.A. UNIT- III -Federal Executive, Judiciary, Legislature UNIT- IV The Constitution of Switzerland Salient Features, Federal executive, Federal Legislature, UNIT- V House of Lords of Britain & Senate of U.S.A., U.S.A. president, British Prime Minister, Indian President & Prime Minister
201	bal 401	POLITICAL SCIENCE	2014	UNIT- I Money – Definition, function and importance, Concept and effects UNIT-II Business cycles: various phases, Keynesian theories of employment UNIT- III Consumption demand and investment function Banks – definition and classification commercial banks, their functions process of credit creation, Central bank function, Reserve bank of India and its monetary policy UNIT- IV Free trade V/S protection, Balance of trade and balance of payment causes of advance balance of payment and corrective measures UNIT- V IBRD (World Bank) and India IMF – its functions, MNCs and their role in India, Capital market regulation - SEBI

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
202	BAL 404	COMPANY LAW	2014	UNIT- I Meaning, definitions, nature, historical development, sources, relationship with Constitutional law, Droit administrative, rule of law and separation of powers, classification of administrative functions and distinction between them. UNIT-II Delegated legislation and its kinds, administrative directions and distinction between delegated legislation and administrative directions, control over delegated legislation procedural, judicial and parliamentary control, principles of natural justice UNIT- III Administrative discretion and judicial control of discretionary power, act of State, tortuous and contractual liability of the State UNIT- IV Government privileges in legal proceedings, Estoppel and Waiver, official secrets and right to information, lokpal, lokayukt and central Vigilance Commissions, Commission of inquiry UNIT- V Administrative Tribunals-merits, demerits, reasons for growth, distinction between court and tribunals, Public corporation – classification characteristics, control, Remedies Constitutional and ordinary
203	BAL 405	ADMIN LAW	2014	UNIT- I - who is Muslims, conversation to Islam, Nature and history of Mohammedan law, schools of Muslim law and sources of Muslim law siya and sunnie UNIT-II Marriage, Iddet, Muta Marriage, UNIT- III -Guardianship – elements, types, Maintenance, types UNIT- IV Wills, gift, pre-emption wakf UNIT- V Succession and death bed transaction
204	BAL 406	MUSLIM LAW	2014	UNIT- I National Movement and process of constitution making Sources and process of Constitution making, Salient features of Indian Constitution, Preamble of the Indian Constitution UNIT-II Fundamental rights and duties and Election Fundamental rights and duties in Indian Constitutions, Election commission UNIT- III Office Bearers and Supreme Court Central Govt. – president, parliament, Prime Minister, Supreme Court UNIT- IV State Govt. and High Court State Govt. Governor, State legislature, Chief Minister Council of Ministers, High Court UNIT- V Miscellaneous Centre State relations, Political parties – national and Regional, Factors affecting Indian politics – caste religion, judicial reforms
205	BAL 501	POLITICAL SCIENCE	2014	UNIT- I iz'kklfud 'kCnkoyh jkT;ksa vkSj dsUnz esa fgUnh dh fLFkfr iz'kklfud 'kCnkoyh] izeq[k ysfVu lw=ksa dks fgUnh esa vfHkO;Dr djuk] jkT; esa fgUnh dh fLFkfr] dsUnz esa fgUnh dh fLFkfr UNIT-II nhokuh ,oa O;ogkj fof/k esa iz;qDr gksus okys 'kCn lafonk] izlafonk] vfHkle;] izLFkkiuk] izLrko ds fy, vkea=.k] lgefR Lohd'fr] izkM&U;k;] dsfo,V] ;kfpdk;sa] fu"iknu] mipkj] ifjrks"k] eqtjZ] vkKflr;ka] vuqKflr;ka] i]s] olh;r ¼bPNk½] laKs;] vlaKs;] 'keuh;] v'keuh;] iqujh{k.k} iqujkoyksdu@iqufoZyksdu] vihy UNIT- III fu.kZ; ys[ku ds fl]kar fo'ks"krk,a ,oa vijkf/kd lkexzh fu.kZ; ,oa fofu'p;] fu.kZ; ys[ku ds fl]kar] fu.kZ; ys[ku dh fo'ks"krk,a] fo"i; lkexzh & O;ogkfd fof/k ,oa vijkf/kd fof/k UNIT- IV fof/k;ksa dk oxhZdj.k O;ogkj fof/k] ,oa vijk/k fof/k] laoS/kkfud fof/k] vid'R; fof/k] lkjoku ,oa izfØ;kRed fof/k] lafof/k ,oa vf/kfu;e] vuqlwph] v;/kns'k UNIT- V laf{kIr 'kks/k ys[ku fuca/k ,oa 'kks/k fuca/k dk vFkZ ,oa ifjHkk"kk] fo"i; ls lacaf/kr lgl;d lkexzh] ys[ku ds fy, fl]kar

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
206	BAL 502 A	HINDI	2014	UNIT- I Concept of Environment and Pollution Environment, Meaning and standards, Culprits and victims, Offences and penalties UNIT-II International Historical Perspective, Stockholm conference, Rio conference, UNIT- III Constitutional Provisions related to Environment Constitution making – development and property oriented approach, Directive principles, Fundamental Duty, Judicial approach, Fundamental Rights (Rights to clean and healthy environment, Environment Vs. Development), Emerging principles (Polluter pays public liability insurance, Precautionary principles), Sustainable development UNIT- IV Environment Protection Measures , power and functions, Protection: means and sanctions,Hazardous waste, Bio-medical waste, Judiciary: complex problems in administration of environment justice UNIT- V Forest and wild Life Protection Forest conservation, Conservation agencies, Symbiotic relationship and tribal people, judicial approach, Wild life, Sanctuaries and national parks, Offences against wild life Bio-diversity Legal control
207	BAL 503	ENV LAW	2014	UNIT- I Concept of Environment and Pollution Environment, Meaning and standards, Culprits and victims, Offences and penalties UNIT-II International Historical Perspective, Stockholm conference, Rio conference, UNIT- III Constitutional Provisions related to Environment Constitution making – development and property oriented approach, Directive principles, Fundamental Duty, Judicial approach, Fundamental Rights (Rights to clean and healthy environment, Environment Vs. Development), Emerging principles (Polluter pays public liability insurance, Precautionary principles), Sustainable development UNIT- IV Environment Protection Measures , power and functions, Protection: means and sanctions,Hazardous waste, Bio-medical waste, Judiciary: complex problems in administration of environment justice UNIT- V Forest and wild Life Protection Forest conservation, Conservation agencies, Symbiotic relationship and tribal people, judicial approach, Wild life, Sanctuaries and national parks, Offences against wild life Bio-diversity Legal control
208	BAL 504	LABOUR LAW	2014	UNIT- Ilabour policy in India, Industrial revolution in India, labour problems Growth of labour legislation in India UNIT-II- Industrial dispute act 1947, industrial dispute to grievance settlements authorities, board, courts, tribunals, Power procedure & duties of authorities, Strike, lock out, lay, Retrenchment, Penalties UNIT- III Trade Union Act 1926, UNIT- IV Minimum wages Act 1948 UNIT- V Factories Act 1948
209	BAL 505	IPC	2014	UNIT-II Element of Criminal Liability-Person definition – natural and legal person, Men sea-evil intension, Recent trends to fix liability without means rea in certain socio-economic offences, Act in furtherance of guilty intent-common object, Factors negative guilty intension UNIT- III Group Liability Common Intension, Abetment, Instigation, aiding and conspiracy Mere act of abetment punishable, Unlawful assembly, Basis of liability, Criminal conspiracy, Rioting as a specific offences, Mental incapacity, Minority, Insanity, Medical and legal insanity, Intoxication, Private defence justification and limits, When private defence extends to causing of death to protect body and property, Necessity, Mistake of fact UNIT- IV Offences against human body Culpable homicide, Murder, Culpable homicide to murder, Grave and sudden provocation, Exceeding right to private defense, Hurt-grievous and simple, Assault and criminal force, Wrongful restraint and wrongful confinement-kidnapping-from lawful guardianship, outside India, Abduction UNIT- V Offences against property Theft, Robbery, Dacoit, Cheating, Extortion, Mischief, Criminal misrepresentation and criminal breach of trust Types of Punishment Death, Social relevance of capital punishment, Imprisonment, woman's minority and backward class
210	BAL 506	HUMAN RIGHTS	2014	UNIT- I Historical Development and concept of Human Right, Human Right in India ancient, medieval and modern concept rights, Human Right in Western tradition, Concept of natural law and natural rights, Human Right in legal tradition: International Law and National Law, UN and Human Rights, Universal Declaration of Human Rights (1948) – individual and group rights, Covenant on political and Civil Rights (1966) UNIT-II Convention on economic social and cultural rights (1966), Convention on the elimination of all forms of discrimination against women, Convention on the rights of the child UNIT- III Impact and Implementation of International Human Rights Norms in India, Human rights norms reflected in fundamental rights in the constitution, Directive principles; legislative and administrative implementation of international human rights norms through judicial process UNIT- IV Human Rights and disadvantage Groups, Enforcement of Human Right in India UNIT- V Role of courts: the Supreme Court high courts and other courts, Statutory Commissions – human rights,
211	BAL 601	INT RELATION AND ORGANISATION	2014	UNIT- I International organization - UNO UNIT-II National power meaning and elements-population, geography, resources technology, 1. Limitations on National power – International morality, public opinion, conventional and modern welfare, UNIT- III National interest – meaning and instruments for the promotion imperialism diplomacy, role of media, (propogavada), UNIT- IV -- Major problems : North and South Rivalries Indian Ocean, Regional organization in International politics SAARC UNIT- V India's relations with USA and neighboring countries Pakistan, Bangladesh, China, Nepal, Shrilanka

  
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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
212	BAL 602	LEGAL LANG AND WRITING	2014	UNIT- I Introduction to Legal Language Characteristics of Legal Language, History of Legal Language, Legal Language in India UNIT- II Phonetics Theory and Practice The phonetics Script, Reading exercises – stress, accent and intonation suitable for Indian speaker with emphasis on clarity speech and felicity of expression. Reading comprehension of principles and practice UNIT- III Legal Terminology Terms used in civil law and criminal law, Latin word and expressions – law register, General Juristic Writings in English UNIT- IV Fundamental Principles of legal Writing Concision – clarity cogency – simplicity of structure, Brief writing and drafting of law reports, Writing of case comments, Essay writing on topics of legal interest. UNIT- V Proficiency in Regional Language Every student should acquire skills of understanding analysis writing and communication in the regional language, which he has to use in the interaction with the potential clientele, Necessarily the proficiency in the language will contribute in a substantial measure to a successful practice in law, Phrases translation from English to Hindi and Vice Versa practice of Translations of any Act from Hindi to English and Vice Versa, Writing reacting and comments on important legal issues published in Newspapers in Hindi and English. Additive vocabulary in Hindi and English. Learning legal terms used in the courts.
213	BAL 603	CPC	2014	UNIT- I Introduction Concepts Affidavit, order, judgment, degree, plaint, restitution, execution, decree-holder, judgment-debtor, menseprofits, written statement, Distinction between decree and judgment and between decree and order Jurisdiction Kinds, Hierarchy of courts, Suit of civil nature – scope and limits, Res subjudice and resjudicata, Foreign judgement – enforcement, Place of suing, Institution of suit, Parties to suit : joinder mis – joinder or non – joinder of parties : representative suit, Frame of suit : cause of action, Alternative disputes resolution (ADR), Summons UNIT-II Pleading Rules of pleading, signing and verification, Alternative pleading, Construction of pleadings, Plaint: Particulars, Admission, return and rejection, Written Statement: Particulars, rules of Evidence, Set off and counter claim: distinction, Discovery, inspection and production of documents, Affidavits UNIT- III Appearance, Examination and Trial Appearance, Ex-prate procedure, Summary and attendance of witnesses, Trial, Adjournments, Interim orders: commission, arrest or attachment before judgment, injunction and appointment of receiver, Interests or costs, Execution, The concept, General principles, for execution (section 52-54), Enforcement, arrest and detention (ss 55-56), Attachment (ss 65-64), Sale (ss 65-97), Delivery of property, Stay of execution, UNIT- IV Suits in particular Cases By or against government (ss. 79-82), By aliens and by or against foreign rules or ambassadors (ss. 83-87A), Public nuisance (ss. 91-93), Suits by or against firm, Mortgage, Interpleaded suits, Suits relating to public charities UNIT- V Appeals review, reference and revision, Appeals from decree and order general provisions relating to appeal, Transfer of cases, Restitution, Caveat, Inherent powers of courts, Law reform: Law Commission on Civil Procedure, Amendments, law of Limitation, The concept – the law assists the vigilant and not those who sleep over the rights
214	BAL 604	LABOUR AND INDUSTRIAL LAW	2014	UNIT- I- Mines Act 1952, leave with wages, Regulation, rules, Penalties & procedures UNIT-II Bonded labour system (Abolition) Act 1976, Aims, object, operation, definition of Act, Abolition of bonded labour system, UNIT- III Equal remuneration Act 1976, Introduction, definition, Act to leave overriding effect, Payment of remuneration of equal rates to men & women works & other matters, UNIT- IV Child Labour (Prohibition & Regulation Act 1986), UNIT- V- E.S.I. Act 1948,
215	BAL 605	CRPC	2014	UNIT- I-the importance of fair trial, The constitutional perspectives : Article 14, 20 & 21 Pre- trial Process: Arrest The distinction between cognizable and non cognizable offences: relevance and adequacy problems, The absconder status (section 82, 83 and 85), Right of the arrested person, Right to know, ground of arrest (section 50 (1), 55, 75), Right to be taken to magistrate without delay (Section 56, 57), Right to not being detained for more than twenty – four hours (section 57) : 2.9 Article 22(2) of the constitution of India, Right to consult legal practitioner, legal aid and the right to be told of rights to bail, Right to be examined by a medical practitioner (Section 54) Pre- trial Process: Search and Seizure Search warrant (section 83, 94, 97, 98) and search without warrant (section 103), Police search during investigation (section 165, 166, 153), UNIT- II Pre- trial Process: FIR F.I.R. (Section 154), Evidentiary value of F.I.R. (see section 145 and 157 of Evidence Act) Pre- trial Process: Magisterial Powers to Take Cognizance, UNIT- III-Fair Trial-Conception of fair trial, Presumption of innocence, Venue of trial, Right of cross-examination and offering evidence in defence: the accused's statement, Right to speedy trial Charge, Discharge- pre-charge evidence Issue Estoppels, Compounding of offences, Trial before a court of sessions : procedural steps and substantive rights UNIT- IV Judgment
216	BAL 606	INTREPREATATION OF STATUES	2014	UNIT- I-Interpretation of Statues UNIT-II- Titles, Preamble, heading and marginal notes, Sections and sub-sections, Punctuation marks, Illustrative, exceptions, provisos and saving clauses, Schedules, Non-obstinate clause External aids Dictionaries, Translations, Travaux preparatoires, Statuesk in pari material, Contemporaneous Expositor, Debates, inquire commission reports and law commission reports UNIT- III Rules of Statutory Interpretation UNIT- IV Interpretation with reference to the subject matter an purpose Restrictive and beneficial construction, Taxing statues, Welfare legislation, Penal statues UNIT- V Principal of Constitutional Interpretation Harmonious constructions, Doctrine of pith and substance,

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
217	BAL 701	PROPERTY LAW	2014	UNIT- 1-Concept and meaning of property, various definitions given under transfer of property act, movable property – tangible and intangible property – copyright – patents and designs - trademarks, UNIT-II Law relating to Transfer of Property under Transfer of Property Act, 1882, General principles of transfer of property whether movable or immovable (sec. 5 to 37) UNIT- III General principles of transfer of immovable property sale, mortgage, (Sec. 38 to 53 A) UNIT- IV <del>Gift Leases exchange Actionable claims</del> UNIT- V <del>Easement Suspension and revival of easements Licenses</del>
218	BAL 702	INTELLECTUAL PROPERTY LAW	2014	UNIT- I the Berne, Convention, Universal Copyright, Convention, the Paris Convention, Trips, the world intellectual property rights organization (WIPO) and the UNESCO UNIT-II Selected aspects of the Law of copyright in India UNIT 2 copyright, Copyright in literacy, Copyright in sound records and musical works, Ownership of copyright, Remedies, especially, the possibility of Anton Pillar injunctive relief in India UNIT- III Intellectual Property in Trademarks, Definition and concept of trademarks, Registration of trademark – authorities under the trademark Act, Passing off and infringement, Remedies UNIT- IV The Law of Intellectual Property: patents Concepts of patents, Historical view of the patents law in India, Process of obtaining a patent: general Introduction, Procedure for filling patents: patent co-operation treaty, Injunctions and related remedies
219	BAL 703	MEDIA LAW	2014	UNIT- I- Mass Media – Types of – Press Films, radio Television Ownership patterns – press – private – public, Ownership patterns UNIT-II Press-Freedom of speech and Expression – Article 19 (1) (a) Includes Freedom of the Press, Laws of defamation, obscenity, Advertisement is it included within freedom of speech and expression? Press and the monopolies and Restrictive trade practices Act. UNIT- III Films – for Included in freedom of speech and expressions? Censorship of films – constitutionality, The Abbas case, Differences between films and press – Censorship under the cinematograph Act UNIT- IV Radio and television – Government monopoly Why Government department? Should there be an autonomous corporation? Effect of television on people, Report of the chandda committee, Government policy, Commercial advertisement, Internal Security of serials etc, Judicial Review of Doorarshan decisions : Freedom to telecast UNIT- V Constitutional Restrictions Radio and television subject to law of defamation and obscenity,Article 246 read with the seventh schedule
220	Bal 704 A	Banking Law	2014	UNIT- I- banking company in India, banking legislation in India , Commercial banks : functions, Essential functions, Agency services, System of banking : Unit banking, branch banking group banking and chain banking UNIT-II Bank and Customers Customer: meaning, Special types of customers : Lunatics, Minors, agents, partnership firms and companies, Cheque – Duties and liabilities of banks payment of cheques by bank liabilities of the banker in case of dishonor – forged cheques – alteration of cheque – collection of cheques and drafts –UNIT- III Bill of exchange, promissory note – distinction between a holder and holder in due course essential features of negotiable instrument – different types of bill and note reasonable acceptance and negotiation. Types of endorsement – restrictive endorsement – endorsement excluding personal liability – partial endorsement – (once a bearer instrument always a bearer instrument), Dishonour of negotiable instrument UNIT- IV Control Banking Theory and RBI issue, Credit control, Determination of bank rate policy, Open market operations, Banker of Government, Control over non-banking financial institutions, Economic and statistical research, Staff training, Control and supervisions of other banks, Interest : <del>Rule against negotiation default and recovery</del> UNIT- V <del>Merchant banking in India</del> <del>CFRBI (Merchant Bankers) Regulations, 1997</del>
221	BAL 704 C	INR ORG	2014	UNIT- I- Concept, development & importance of International organization UNIT-II United Nation Organization (UNO), United Nation Economic, Social and cultural organization development (UNESCO) UNIT- III- World Health Organization (WHO), Red Cross development, International labour organization development & role UNIT- IV -World Intellectual Property Organizations (WIPO), World Trade Organization (WTO) UNIT- V- Regional organizations – NATO, SAARC
222	BAL 705	DRAFTING PLEADING	2014	Drafting- General principles of Draftng and relevant substantive rules shall be taught b) Pleadings Civil : Complaint, W/s; Interlocutory application; Original petition; Affidavit; Execution petition; Memorandum of appeal and Revision; petition under Article 226 and 32 of the constitution of India Criminal – Compliants; Bail application; Memorandum of appeal and revision Conveyance – Sale deed; Mortgage deed ; Lease deed; Gift deed; promissory Note ; Power of Attorney ; and will – Drafting of writ petition & PIL petition



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
223	BAL 801	LAW OF EVIDENCE	2014	UNIT- I-Introductory-The main features of the Indian Evidence Act 1861, Problem of applicability of Evidence Act,Administrative Tribunals, Industrial Tribunals, Commissions of enquiry, Court-material Central Conceptions in Law of EvidenceFacts: section 3 definition: distinction – relevant facts / facts in issue, Evidence: oral and documentary,Circumstantial evidence and direct evidence, Presumption (section 4), "Proving" "not proving" and"disproving", Witness, Appreciation of evidenceUNIT-II Facts : relevancy The Doctrine of res gestae (section 6,7,8,10), The problems of relevancy of "otherwise" irrelevant facts (section 11), Facts concerning bodies and mental state (section 14, 15) Admission and Confessions General principles concerning admission (section 17, 23), Differences between "admission" and "confession", The problems on non-admissibility of confessions caused by "any inducement, threat of promise" (section 24), Inadmissibility of confession made before a police officer (section 25), Admissibility of custodial confessions (section 26), Admissibility of "information" received from accused person in custody; with special reference to the problem of discovery based on "joint statement" (section 27), Confession by co-accused (section 30), The problems with the judicial action based on a "retracted confession"UNIT- III Dying Declarations The justification for relevance on dying declarations (section 32), The judicial
224	BAL 802	GENDER JUSTICE	2014	UNIT- I Women in Pre-Independence India Social and legal inequality, Social reform movement in India, Gandhi and movement, Nehru"s views – joint family etc, Karachi congress – fundamental rights resolution, Equality of sexes. UNIT-II Women in Post – Independence India Preamble of the constitution – Equality provisions in fundamental rights and directives principles of state policy, Negative aspects of the constitutions -unequal position of women, Uniform Civil Code towards gender justice. UNIT- III Sex Inequality in Inheritance Rights Continuance of feudal Institutions of joint family – women"s inheritance position under Hindu Law, Inheritance right of women under Christian law, Inheritance right of women under Parsi law, Inheritance right of women under Muslim law, Movement towards uniform civil code, Matrimonial Property, Separation of property, Maintenance different system of personal law, Division of assets on divorce. UNIT- IV Social Welfare Laws for women Non-implementation of protective labour legislation Maternity benefits act, Equal remuneration Act, Factories Act, Inequality in the work place. UNIT- V Criminal Law Adultery, Rape, Dowry death, Cruelty to married women, Bigamy, Dowry prohibition, Amniocentesis
225	BAL 803	HEALTH LAW	2014	UNIT- I Concept & Definition of Health, Right of health, International law & health.UNIT-II Constitution protection – Fundamental Right & directive principle. UNIT- III Offence affecting the Public Health, (Chapter XIV of IPC) Nuisance, miscarriage, (312.313IPC), relevant provision of Cr.P.C.UNIT- IV Health & Legal protection – environmental law, J.J. Act, prenatal diagnostic technique, regulation & prevention of misuses Factory Act, Mental Health Act 1987, Maternity benefit Act UNIT- VHealth law & Judiciary
226	BAL 804 C	INT H R	2014	UNIT- I International enforcement of Human Rights ICJ, role of international organization and H.R.UNIT-II Development of the Concept of Human Rights under International Law Universal Declaration of Human Rights (1948), Covenant of political and Civil Rights (1966), Covenant on Economics, Social and Cultural Rights (1966)UNIT- III Role of Regional Organizations European Convention on human Rights, European Commission on human Rights/Court of Human Rights, American Convention on Human Rights, African Convention on Human Rights, African Convention on Human Rights, Other regional Conventions.UNIT- IV Protection agencies and mechanisms International Commission of Human Rights, Amnesty International, Non-Governmental Organizations (NGOs), U.N. Division of Human RightsUNIT- V International Labour Organization UNESCO, UNICEF, Voluntary organization, National and State Human Rights Commissions
227	BAL 805	PROF ETHICS & BARBENCH	2014	UNIT- I -Admission, enrolment & rights of advocate Importance of Legal Profession, Persons who may be admitted as advocate on a state roll, Disqualification for enrolment, Rights of Advocates, State Bar Councils- Establishment and organization, Powers and functions, Bar council of India – Organization, Powers and Functions. UNIT-II Ethics of Legal Profession Meaning, nature and need, Duty to the client UNIT- III Punishment for professional or other misconduct Professional or other misconduct – meaning and scope, The body or authority empowered to punish for professional or other misconduct – State Bar Council and its disciplinary committee, Bar Council of India and its disciplinary committee, Complaint against advocates and procedure to be followed by the disciplinary committee, Remedies against the order of punishment. UNIT- IV Bench Bar Relation Role of Judge on maintaining rule of Law, Mutual respect, maintenance of orderly society, Invaluable aid of advocates to judges, Privilege of advocates, Duty to avoid interruption of council, Administration of Justice clean & pure, Uncourteous conduct, misconduct of lawyers and insulting language UNIT- V Meaning and Categories of contempt of court Contempt of court – its meaning and nature, Kinds of contempt

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
228	BAL 901	TAXATION	2014	UNIT- I Admission, enrolment & rights of advocate Importance of Legal Profession, Persons who may be admitted as advocate on a state roll, Disqualification for enrolment, Rights of Advocates, State Bar Councils- Establishment and organization, Powers and functions, Bar council of India – Organization, Powers and Functions. UNIT-II Duty to the client. UNIT- III Punishment for professional or other misconduct Professional or other misconduct – meaning and scope, State Bar Council and its disciplinary committee, Bar Council of India and its disciplinary committee, Complaint against advocates and procedure to be followed by the disciplinary committee, Remedies against the order of punishment. UNIT- IV Bench Bar Relation Role of Judge on maintaining rule of Law, Mutual respect, maintenance of orderly society, Invaluable aid of advocates to judges, Privilege of advocates, Duty to avoid interruption of council, UNIT- V Meaning and Categories of contempt of court Contempt of court – its meaning and nature, Kinds of contempt – Criminal Contempt, Civil Contempt, Contempt by Lawyers, Contempt by judges,
229	BAL 902	LAND LAWS IN MP	2014	UNIT- I M.P. Land Revenue Code 1959, Definitions Board of Revenue : Revenue officers and their classes & powers, Procedure of revenue officer, revenue courts.UNIT-II Appeal, revision & review, Land & land revenue , Revenue survey & settlement in non urban areas , of land in urban areas, Land records, Boundaries & boundary marks, survey marks, UNIT- III Tenure holders, Govt. lessee & service land, Occupancy tenant, Alluvion & service land, Consolidation of holding, Village officers, Reghts in abadi & unoccupied & its procedure. UNIT- IV The M.P. ceiling on agricultural holding act 1960, Definitions – section 2, Exemptions & restriction on transfer of land (Sec. 3 to 5), Fixing of ceiling area; determination of surplus land and acquisition there of (section 6-16), Payment of compensation (Sec. 16-21), In-cumbrances on surplus land (Sec. 22-34), Disposal of surplus land (Sec. 35-37), Offences & penalties (Sec. 37-Ac-37.8), Miscellaneous (Sec. 38-50) UNIT- V M.P. Accommodation Control Act, 1961, Definitions, Provisions regarding rent, Control of Eviction of tenants, Eviction of tenants on grounds of “Bonafide” Requirement, Deposit of Post-Appointment of Post-Controlling Authorities, their powers, functions and appeals. Provisions Regarding special obligations
230	BAL 903 B	PROBATION PAROLE	2014	UNIT- I-Introduction and overview to probation, and community correction, The history of probation and parole, Repentance investigations, Historical and legal basics, Components parts UNIT-II The decision to grant probation and the supervision process, Parole selection, Parole boards, Release decisions UNIT- III Probation and parole administration, Probation and parole officers UNIT- IV Innovative programs and intermediate sanctions, Restorative justice, Pretrial release, diversion, special programs and halfway houses UNIT- V Probation and offences Act. Legal provision of parole
231	BAL 904 B	OFFENCE AGIANST CHILD & JUVENILE	2014	UNIT- I- Causes of offence against child, International protection to child and convention UNIT-II Offences against child Child abuse, Child labour, forced labour, Kidnapping, abduction, Abetment of suicide of child, UNIT- III Child marriage, (Child marriage Restrain Act), Abandonment of child, Custody of child during matrimonial suit, Obligations to supply necessities to children UNIT- IV Protection of child and juveniles Under the provisions of constitution (fundamental rights and directives – principles), Under IPC, 1860, Under CRPC, 1973, Under Contract Act, 1872, Under juvenile justice Act, 2001 UNIT- V Juvenile Delinquency Juvenile delinquency – nature, causes, Juvenile courts system, Treatment and rehabilitation of juveniles, Legislative and judicial protection of juvenile offender. juvenile justice Act 2001
232	BAL 905	ADR	2014	UNIT- I Introduction International arbitration, Ad hoc arbitration, specialized arbitration, Statutory arbitration, International convention – Matters that may be referred to arbitration, Capacity of the parties, Form of arbitration agreement, Mandatory consents of arbitration agreement, Validity of the agreement UNIT-II Domestic Arbitration Essential, kinds, who can enter into arbitration agreement, validity, reference to arbitration, interim measures by court UNIT- III Arbitrational Tribunal Appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance UNIT- IV Award Rule of guidance, form and content, correction and interpretation, grounds of setting aside an award, can misconduct be a ground, incapacity of a party, invalidity of arbitration agreement, want of proper notice and hearing, beyond the scope of reference, contravention of composition and procedure, breach of confidentiality, impartiality of the arbitrator, Bar of limitation, resjudieata, consent of parties, enforcement UNIT- V Conciliation Distinction between “conciliation”, “negotiation”, “Mediation” and “arbitration”, appointment, statements to conciliator, interaction between conciliator and parties, communication, duty of the parties to cooperate, suggestions by parties, confidentiality, consent to judicial proceedings, costs
233	BAL 1001	PUBLIC INT LAW	2014	UNIT- I Definition and concept of international Law, Source of International Law, Historical development of International Law UNIT-II Relationship of International Law and Municipal Laws, Subject of International Law, place of individuals in International Law UNIT- III States, recognition, States, succession, Acquisition and loss of state territory UNIT- IV Responsibilities of state CBBT, Nationality, aliens, Asylum, extradition, diplomatic agents, treaties UNIT- V- International organizations – U.N.O. including in its organs and International criminal court Settlement of Disputes, International terrorism, disarmament

  
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234	BAL 1002	CYBER LAW	2014	UNIT- I - What is Cyber Crime, Nature & History of Cyber Crime, Cyber terrorism, Computer & Cyber Crime UNIT-II Introduction to Indian Cyber Law, Overview of General Laws, Jurisprudence of cyber Law, Overview of computer and web Technology UNIT- III Banking & Credit Cards related Crimes, E-Commerce fraud related Crime, E-mail & IRC, Related Crime UNIT- IV Importance of cyber laws, Information Technology Act. 2000, Digital Signature, Provision under I.P.C. Indian Evidence Act or any other laws UNIT- V Penalties & adjudicatory for various offences, Establishment & Function of Cyber Regulation appellate tribunal, Constitution & function of Cyber Regulation & advisory committee
235	BAL 1003 B	COMPARATIVE CRIME PROCEDURE	2014	UNIT- I Organization of Courts and prosecuting Agencies Hierachy of criminal courts and their jurisdiction, Nayaya Panchyata in India, Panchyats in tribal ares, Organization of precutting agencies for prosecuting criminals, Prosecutors and the police, Withdrawal of prosecution UNIT-II Pre-trial Procedures Arrest and questioning of the accused, The right of the accused, The evidentiary value of statements/ articles seized/ collected by the police, Right of counsel, Roles of the prosecutor and the judicial officer in investigation. UNIT- III Trial procedures The accusatory system of trial and the inquisitorial system, Role of the judge, the prosecutor and defence attorney in the trial, Admissibility and inadmissibility of evidence, Expert evidence, Appeal of the court in awarding appropriate punishment, Plea bargaining UNIT- IV , The role of the court in correctional programmes in India UNIT- V Preventive Measures in India Provisions in the Criminal Procedures Code,
236	BAL 1004 A	IT ACT	2014	UNIT- I Preamble and introduction, Definition, authentication of electronic records UNIT-II Electronic governance, attribution acknowledgement and dispatch of electronic records, secure electronic records and secure digital signatures UNIT- III Regulation of certifying authorities, Digital signature certificates UNIT- IV Duties of subscribers, Penalties and adjudication, the cyber regulations appellate tribunal UNIT- V Offences, network service providers not to be liable in certain case
237	CSE-3021	Data Structure and Algorithms	2018	Unit 1 : Importance of algorithms and data structures in programming. Notion of Complexity covering time complexity and space complexity. Worst case complexity, Average case complexity. Examples of simple algorithms and illustration of their complexity. Unit 2 : List ADT. Implementation of lists using arrays and pointers. Stack ADT. Queue ADT. Implementation of stacks and queues. Dictionaries, Hash tables: open tables and closed tables. Unit 3 : Binary Trees- Definition and traversals. Huffman coding using binary trees. Binary search trees : worst case analysis and average case analysis. AVL trees. Red-Black Trees, Splay trees. Priority Queues -Binary heaps: insert and deletion operations and analysis. Unit 4 :Directed Graphs- Data structures for graph representation. Shortest path algorithms: Dijkstra (greedy algorithm). Depth- first search and Breadth-first search. Directed acyclic graphs. Undirected Graphs- Depth-first search and breadth-first search.Minimal spanning trees and algorithms (Floyd and Kruskal) and implementation. Unit 5: Sorting- Bubblesort, selection sort, insertion sort, Shell sort; Quicksort; Heapsort; Mergesort; Radix sort; Analysis of the sorting methods.
238	CSE -3031	Computer Organization and Architecture	2018	UNIT I : Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes. UNIT II: Arithmetic Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations. UNIT III : Basic Processing Unit Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining. Superscalar operation. UNIT IV Memory System concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage. UNIT V I/O Organization Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).
239	CSE -3041	Operating System	2018	UNIT I : Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter- process Communication. UNIT II : SCHEDULING Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria- Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical- Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization– Critical regions– Monitors. UNIT III: DEADLOCKS System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention– Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management– Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging. UNIT IV: PAGING AND FILE SYSTEM Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames– Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting, File Sharing, Protection. UNIT V: FILE MANAGEMENT File System Structure, File System Implementation

  
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240	CS -4021	Database Management System	2018	UNIT I : I Introduction to File and Database systems- Database system structure – Data Models – Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational Algebra and Calculus. UNIT II : Relational Model : SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependencies and Normalization for Relational Databases (up to BCNF). UNIT III : Data Storage And Query Processing : Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files – Different types of Indexes-B-Tree - B+ Tree – Query Processing. UNIT IV : Transaction Management : Transaction Processing – Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques. UNIT V : Current Trends : Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogeneous and Heterogeneous Distributed data Storage - XML - Structure of XML Data - XML Document
241	CS -4031	Software Engineering	2018	UNIT I : SOFTWARE Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) Verification – Validation – life cycle process – development process –system engineering hierarchy. UNIT II : SOFTWARE REQUIREMENTS Functional and non-functional. Requirement engineering process – feasibility studies- requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modeling. UNIT III : DESIGN CONCEPTS AND PRINCIPLES Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems- Real time software design – system design – real time executives – data acquisition system - monitoring and control system. SCM - Need for SCM – Version control UNIT IV : TESTING , test activities – types of s/w test - black box testing - testing boundary conditions - structural testing - test coverage criteria based on data flow mechanisms
242	CS -4041	Design and Analysis of Algorithm	2018	UNIT I : Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes. UNIT II: Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm- Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization. UNIT III : ANALYSIS OF SORTING AND SEARCHING ALGORITHMS. Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching– Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree- Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search. UNIT IV: ALGORITHMIC TECHNIQUES Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees. Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.UNIT V : ALGORITHM DESIGN METHODS Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound. Assignment problems - Knapsack problem - Traveling salesman problem
243	CSE -4051	Computer Network	2018	UNIT : I DATA COMMUNICATIONS Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing sequences. UNIT II : DATA LINK LAYER Error – detection and correction - Parity – LRC – CRC – Hamming code – low Control and Error control - stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges. UNIT III : NETWORK LAYER Internetworks – Packet Switching and Datagram approach – IP addressing methods – Subnetting– Routing – Distance Vector Routing – Link State Routing – Routers. UNIT IV : TRANSPORT LAYER Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services. UNIT V : APPLICATION LAYER Domain Name Space (DNS) – SMTP – FTP – HTTP – WWW – Security – Cryptography
244	CS -5021	Object Oriented Programming	2018	UNIT I :Principles of OOP, procedure oriented programming vs. object oriented programming, basic concepts, advantages, application of OOPs, object oriented languages. Beginning with C++: structure of C++ program, creating, compiling, linking & executing a C++ program, Tokens, expressions & control structures, keywords, identifiers, basic data types, user-defined data types, derived data types, symbolic constants, type compatibility, variable declaration, dynamic initialization of variables, reference variables, operators in C++. UNIT II: Scope resolution operator, memory management operators, manipulators, type cast operators, operator precedence, control structures. Main function , function prototyping, call by reference, call by value, inline functions, default arguments, constant arguments, function overloading. Introduction to constructors and destructors, operator overloading & type conversions. UNIT III: Specifying a class, defining member functions, making an outside function inline, private member function; array within a class, memory allocation for objects , static data members, static member functions, array of objects, objects as function arguments, returning objects. UNIT IV : Friend functions, Inheritance and its various types along with

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245	CS -5031(A)	Discrete Structure	2018	UNIT I: Set Theory- Introduction, Elements & Description, Types, Venn-Euler Diagrams, Operations, Inclusion and Exclusion Principle, Fuzzy sets, Functions- Introduction, Types, Range & Domain, Identity Function, Relations-Binary relation, Types, Partial Order, Equivalence relation, Hasse Diagram. UNIT II: Principle of Mathematical Induction, Pigeonhole Principle, Mathematical Logic- Introduction, propositional calculus, Logical operation, Statement, Converse, Inverse & Contra-positive Statement, Tautologies, Contradiction, Quantifiers, Predicate calculus. UNIT III: Algebraic Structures- Introduction, Mathematical Operations, Binary operations, Groups- Permutation Groups, Cyclic Groups, Subgroup, Semigroup and Monoid, Homeomorphism and Isomorphism, Rings, Fields, Poset and Lattices – Introduction, Chain, Lattice, Duality, Types of Lattices. UNIT IV: Graph Theory- Introduction, Types, Path, Cycles, Subgraph, Isomprphic Graph, Homeomorphic Graph, Eulerian and Hamiltonian graphs, Shortest Path Problem, Planar Graph, Graph Colouring and Chromatic Polynomials, Trees-Introduction, Properties, Binary tree, Computer representation of General Trees, Binary search Tree, Spanning Trees. UNIT V: Recurrence Relations and Generating Functions.
246	CS -5031(B)	Cyber Security	2018	UNIT 1 :Introduction of Cyber Crime, Challenges of cyber crime, Classifications of Cybercrimes: EMail Spoofing, Spamming, Internet Time Theft, Salami attack/Salami Technique, Data Diddling, Web jacking, Online Frauds, Software Piracy, Computer Network Intrusions, Password Sniffing, Identity Theft, cyber terrorism, Virtual Crime , Perception of cyber criminals: hackers, insurgents and extremist group etc. Web servers hacking, session hijacking. UNIT 2 :Cybercrime on Mobile and Wireless Device: Proliferation of Mobile and Wireless Devices, trends in Mobility Credit Card Frauds in Wireless Computing, Types and techniques of Credit Card Frauds, Attacks on Mobiles: Mobile Viruses, Mishing, Vishing, Smishing & Hacking Bluetooth. Web servers hacking, session hijacking. UNIT 3: Tools and Methods in Cybercrime: Proxy Servers and Anonymizers, Password Cracking, Keyloggers and Spyware, virus and worms, Trojan Horses, Backdoors, DoS and DDoS Attacks , Buffer and Overflow, Attack on Wireless Networks, Phishing : Method of Phishing, Phishing Techniques. UNIT 4 :Cyber Crime and Criminal justice: Concept of Cyber Crime and the IT Act, 2008. Hacking, Teenage Web Vandal, Cyber Fraud and Cheating, Defamation, Harassment and E-mail Abuse, Other IT Act.
247	CS -5031(C)	Data Analytics	2018	UNIT 1: Data Definitions and Analysis Techniques Elements, Variables, and Data categorization, Levels of Measurement, Data management and indexing, Introduction to statistical learning and R-Programming, UNIT 2: Descriptive Statistics Measures of central tendency, Measures of location of dispersions, Practice and analysis with R, UNIT 3: Basic Analysis Techniques Basic analysis techniques, Statistical hypothesis generation and testing, Chi-Square test, T-Test, Analysis of variance, Correlation analysis, Maximum likelihood test, Practice and analysis with R UNIT 4: Data analysis techniques Regression analysis, Classification techniques, Clustering, Association rules analysis, Practice and analysis with R UNIT 5 : Case Studies and Projects Understanding business scenarios, Feature engineering and visualization, Scalable and parallel computing with Hadoop and Map-Reduce, Sensitivity Analysis.
248	CSE -5041(A)	Theory of Computation	2018	UNIT I :AUTOMATA Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions. UNIT II: REGULAR EXPRESSIONS AND LANGUAGES Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata. UNIT III :CONTEXT-FREE GRAMMAR AND LANGUAGES Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata. UNIT IV :PROPERTIES OF CONTEXT-FREE LANGUAGES Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines– Programming Techniques for TM. UNIT V: UNDECIDABILITY A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem - The classes P and NP.
249	CS -5041(B)	Internet & Web Technology	2018	UNIT I :Introduction to Internet - Internet, Growth of Internet, Owners of the Internet, Anatomy of Internet, ARPANET and Internet history of the World Wide Web, basic Internet Terminology, Net etiquette. Internet Applications – Commerce on the Internet, Governance on the Internet, Impact of Internet on Society – Crime on/through the Internet. UNIT II :TCP/IP – Internet Technology and Protocol Packet switching technology, Internet Protocols: TCP/IP, Router, Internet Addressing Scheme: Machine Addressing (IP address), E-mail Addresses, Resources Addresses UNIT III :Introduction to HTML : The development process, Html tags and simple HTML forms, web site structure Introduction to XHTML : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser. DHTML: Combining HTML, CSS and Javascript, events and buttons, controlling your browser. XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT. UNIT IV: Style sheets: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background, image, color.

  
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250	CS -6011	Cloud Computing	2018	UNIT I :INTRODUCTION :Historical development ,Vision of Cloud Computing, Characteristics of cloud computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments .Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking. UNIT II: Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure UNIT III: Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits ,operational virtualization ,Block and file level storage virtualization ,Human resource management software, Infrastructure
251	CS -6021	Compiler Design	2018	UNIT - I :INTRODUCTION TO COMPILERS Structure of a compiler-Lexical Analysis-Role of Lexical Analyzer-Input Buffering-Specification of Tokens - Recognition of Tokens - Lex - Finite Automata - Regular Expressions to Automata-Minimizing DFA. UNIT-II : SYNTAX ANALYSIS Role ofParser- Grammars- Error Handling- Context-free grammars - Writing a grammar-TopDown ParsingGeneral Strategies Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LRParserLR(0) Item Construction of SLR Parsing Table-Introduction to LALR Parser-Error Handling and Recovery in Syntax Analyzer-YACC. UNIT- III :INTERMEDIATE CODE GENERATION Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Intermediate Languages: Syntax Tree, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking. UNIT -IV :RUN-TIME ENVIRONMENT AND CODE GENERATION Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap ManagementIssues in Code Generation-Design of a simple Code Generator. UNIT -V :CODE OPTIMIZATION Principal Sources of Optimization-Peep-hole optimization-DAG-Optimization of Basic Blocks-Global Data Flow Analysis- Efficient Data Flow Algorithms
252	CS -6031(A)	Artificial Intelligence	2018	Unit I:- Introduction: Introduction to Artificial Intelligence (AI), Foundations of AI, History of AI, Real life examples of AI, Turing test for AI, AI techniques, Problem Solving- Formulating problems, problem types, states and operators, state space. Unit - II: Search Techniques in AI: Search algorithms in AI, Types of AI search, Uninformed search, Informed search, heuristic functions, Depth first search, Breadth first search, Best first search, Hill climbing algorithm, A* algorithm, AO* algorithm,Iterative deepening A*(IDA), small memory A*(SMA). Unit - III :Game Playing and Planning:Perfect decisiongame, imperfect decision game, evaluation function, alpha-beta pruning, Minimax search, Planning, Components of planning, Goal stack planning, partial order planning, planning in theblocks world, hierarchical planning, conditional planning. Unit - IV : Reasoning and Logic: Probability and Bayes' Theorem,Bayesian networks,Dempster-Shafer theory, Representation, Inference, Propositional Logic, predicate logic (firstorder logic), logical reasoning, forward chaining, backward chaining. Unit - V : Expert Systems and Other Learning Methods:Representation- Expert custom shells- Knowledge acquisition- neural networks- reinforcement learning- genetic
253	CS -6031(B)	Computer Graphics and Multimedia	2018	UNIT I : OUTPUT PRIMITIVES: Introduction - Line - Curve and Ellipse Drawing Algorithms - Attributes - Two-dimensional Geometric Transformations - Two-Dimensional Clipping and Viewing. UNIT II :THREE-DIMENSIONAL CONCEPTS Three-Dimensional Object Representations - Three-Dimensional Geometric and Modeling Transformations - Three-Dimensional Viewing - Color models - Animation. UNIT III : MULTIMEDIA SYSTEMS DESIGN An Introduction - Multimedia applications - Multimedia System Architecture - Evolving technologies for Multimedia - Defining objects for Multimedia systems - Multimedia Data interface standards - Multimedia Databases. UNIT IV :MULTIMEDIA FILE HANDLING Compression & Decompression - Data & File Format standards - Multimedia I/O technologies - Digital voice and audio - Video image and animation - Full motion video - Storage and retrieval Technologies. UNIT V :HYPERMEDIA Multimedia Authoring & User Interface - Hypermedia messaging - Mobile Messaging - Hypermedia message component - Creating Hypermedia message - Integrated multimedia message standards - Integrated Document management - Distributed Multimedia Systems.
254	CS -6031(C)	Advanced Computer Architecture	2018	UNIT-I :Introduction: review of basic computer architecture, quantitative techniques in computer design, measuring and reporting performance. UNIT-II: CISC and RISC processors. Pipelining: Basic concepts, instruction and arithmetic pipeline, data hazards, control hazards, and structural hazards, techniques for handling hazards. Exception handling. UNIT-III :Pipeline optimization techniques. Compiler techniques for improving performance. Hierarchical memory technology: Inclusion, Coherence and locality properties; Cache memory organizations, Techniques for reducing cache misses; Virtual memory organization, mapping and management techniques, memory replacement policies. UNIT-IV :Instruction-level parallelism: basic concepts, techniques for increasing ILP, superscalar, super-pipelined and VLIW processor architectures. Array and vector processors. Multiprocessor architecture: taxonomy of parallel architectures. UNIT-V :Centralized shared-memory architecture: synchronization, memory consistency, interconnection networks. Distributed shared-memory architecture. Cluster computers. Non von Neumann architectures: data flow computers, reduction computer architectures, systolic architectures

  
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255	CSE -6041(A)	Pattern Recognition	2018	UNIT 1: Introduction – Definitions, data sets for Pattern, Application Areas and Examples of pattern recognition, Design principles of pattern recognition system, Classification and clustering, supervised Learning, unsupervised learning and adaptation, Pattern recognition approaches, Decision Boundaries, Decision region , Metric spaces, distances. UNIT 2: Classification: introduction, application of classification, types of classification, decision tree, naïve bayes, logistic regression , support vector machine, random forest, K Nearest Neighbour Classifier and variants, Efficient algorithms for nearest neighbour classification, Different Approaches to Prototype Selection, Combination of Classifiers, Training set, test set, standardization and normalization. UNIT 3: Different Paradigms of Pattern Recognition, Representations of Patterns and Classes, Unsupervised Learning \ Clustering: Criterion functions for clustering, Clustering Techniques: Iterative square -error partitional clustering – K means, hierarchical clustering, Cluster validation. UNIT 4: introduction of feature extraction and feature selection, types of feature extraction , Problem statement and flow Algorithms: Branch and bound algorithm, sequential forward / backward selection algorithms, (L2) algorithms. UNIT 5:
256	CSE -6041(B)	Internet Of Things	2018	UNIT I: IOT & WEB TECHNOLOGY - The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics. UNIT II :M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. UNIT III : IOT ARCHITECTURE -STATE OF THE ART – Introduction, State of the art, Architecture REFERENCE MODEL- Introduction, Reference Model and architecture, IoT reference Model, IOT REFERENCE ARCHITECTURE- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. UNIT IV :IOT APPLICATIONS FOR VALUE CREATIONS Introduction, IoT applications for industry, Future Factory Concepts, Smart Field IoT, Smart Objects, Smart Applications, Four Aspects in smart
257	CSE -6041(C)	Wireless and Mobile Communicating	2018	UNIT I :Antenna, variation pattern, antenna types, antenna gain, propagation modes, types of fading, Model for wireless digital communication, multiple access technique-SDMA, TDMA, FDMA, CDMA, DAMA, PRMA, MAC/CA, Cellular network organization, operations of cellular system, mobile radio propagation effects, , handoff, power control, sectorization, traffic engineering, Infinite sources, lost calls cleared, grade of service, poison arrival process UNIT II :GSM- Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS-architecture, Interfaces, Channels, mobility management DECT, TETRA, UMTS. UNIT III :IEEE 802.11: LAN-architecture, 802.11 a, b and g, protocol architecture, physical layer, MAC layer , MAC management, HIPERLAN-protocol architecture, physical layer, access control sub layer, MAC sub layer. Bluetooth-user scenarios- physical layer, MAC layer. UNIT IV :Mobile IP, DHCP, Ad hoc networks: Characteristics, performance issue, routing in mobile host. Wireless sensor network, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP, Introduction to WAP. UNIT V : Intruders, Intrusion detection
258	CS -7011	Software Architecture	2018	Unit 1.: Overview of Software development methodology and software quality model, different models of software development and their issues. Introduction to software architecture, evolution of software architecture, software components and connectors, common software architecture frameworks, Architecture business cycle – architectural patterns – reference model. Unit 2.: Software architecture models: structural models, framework models, dynamic models, process models. Architectures styles: dataflow architecture, pipes and filters architecture, call-and return architecture, datacentered architecture, layered architecture, agent based architecture, Micro-services architecture, Reactive Architecture, Representational state transfer architecture etc. Unit 3.: Software architecture implementation technologies: Software Architecture Description Languages (ADLs), Struts, Hibernate, Node JS, Angular JS, J2EE – JSP, Servlets, EJBs; middleware: JDBC, JNDI, JMS, RMI and CORBA etc. Role of UML in software architecture. Unit 4 : Software Architecture analysis and design: requirements for architecture and the life-cycle view of architecture design and analysis methods, architecture based economic analysis, Cost-Benefit Analysis Method (CBAM)
259	CS -7021(A)	Computational Intelligence	2018	Unit1 : Introduction to Computational Intelligence; types of Computational Intelligence, components of Computational Intelligence. Concept of Learning/Training model. Parametric Models, Nonparametric Models. Multilayer Networks: Feed Forward network, Feedback network. Unit2 :Fuzzy Systems: Fuzzy set theory: Fuzzy sets and operations, Membership Functions, Concept of Fuzzy relations and their composition, Concept of Fuzzy Measures; Fuzzy Logic: Fuzzy Rules, Inferencing; Fuzzy Control - Selection of Membership Functions, Fuzzyfication, Rule Based Design & Inferencing, Defuzzyfication. Unit3 : Genetic Algorithms: Basic Genetics, Concepts, Working Principle, Creation of Offsprings, Encoding, Fitness Function, Selection Functions, Genetic Operators-Reproduction, Crossover, Mutation; Genetic Modeling, Benefits. Unit4 :Rough Set Theory - Introduction, Fundamental Concepts, Set approximation, Rough membership, Attributes, Optimization. Hidden Markov Models, Decision tree model. Unit5 : Introduction to Swarm Intelligence, Swarm Intelligence Techniques: Ant Colony Optimization, Particle Swarm Optimization, Bee Colony Optimization etc. Applications of Computational Intelligence.



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260	CS -7021(B)	Deep and Reinforcement learning	2018	Unit 1: History of Deep Learning, McCulloch Pitts Neuron, Thresholding Logic, Activation functions, Gradient Descent (GD), Momentum Based GD, Nesterov Accelerated GD, Stochastic GD, AdaGrad, RMSProp, Adam, Eigenvalue Decomposition. Recurrent Neural Networks, Backpropagation through time (BPTT), Vanishing and Exploding Gradients, Truncated BPTT, GRU, LSTMs, Encoder Decoder Models, Attention Mechanism, Attention overimages. Unit 2 : Autoencoders and relation to PCA, Regularization in autoencoders, Denoising autoencoders, Sparse autoencoders, Contractive autoencoders, Regularization: Bias Variance Tradeoff, L2 regularization, Early stopping, Dataset augmentation, Parameter sharing and tying, Injecting noise at input, Ensemble methods, Dropout, Batch Normalization, Instance Normalization, Group Normalization. Unit 3 :Greedy Layerwise Pre-training, Better activation functions, Better weight initialization methods, Learning Vectorial Representations Of Words, Convolutional Neural Networks, LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet, Visualizing Convolutional Neural Networks, Guided Backpropagation, Deep Dream, Deep Art, Recent Trends in Deep Learning Architectures. Unit 4 : Introduction to reinforcement learning(DL), Bandit algorithms - UCB, PAC, Median Elimination, Policy Gradient, Full DL & MDPs, Bellman Optimality, Dynamic Programming.
261	CS -7021(C)	Big Data	2018	Unit1 :Introduction to Big data, Big data characteristics, Types of big data, Traditional versus Big data, Evolution of Big data, challenges with Big Data, Technologies available for Big Data, Infrastructure for Big data, Use of Data Analytics, Desired properties of Big Data system. Unit2 : Introduction to Hadoop, Core Hadoop components, Hadoop Eco system, Hive Physical Architecture, Hadoop limitations, RDBMS Versus Hadoop, Hadoop Distributed File system, Processing Data with Hadoop, Managing Resources and Application with Hadoop YARN, MapReduce programming. Unit3 : Introduction to Hive Hive Architecture, Hive Data types, Hive Query Language, Introduction to Pig, Anatomy of Pig, Pig on Hadoop, Use Case for Pig, ETL Processing, Data types in Pig running Pig, Execution model of Pig, Operators, functions, Data types of Pig. Unit4 : Introduction to NoSQL, NoSQL Business Drivers, NoSQL Data architectural patterns, Variations of NOSQL architectural patterns using NoSQL to Manage Big Data, Introduction to MangoDB. Unit5 : Mining social Network Graphs: Introduction Applications of social Network mining, Social Networks as a Graph, Types of social Networks, Clustering of social Graphs, Direct Discovery of communities in a social graph.
262	CS -7031(A)	Cryptography and Information Security	2018	UNIT I : Mathematical Background for Cryptography: Abstract Algebra, Number Theory, Modular Inverse, Extended Euclid Algorithm, Fermat's Little Theorem, Euler Phi-Function, Euler's theorem. Introduction to Cryptography: Principles of Cryptography, Classical Cryptosystem, Cryptanalysis on Substitution Cipher (Frequency Analysis), Play Fair Cipher, Block Cipher. Data Encryption Standard (DES), Triple DES, Modes of Operation, Stream Cipher. UNIT II :Advanced Encryption Standard (AES), Introduction to Public Key Cryptosystem, Discrete Logarithmic Problem, Diffie-Hellman Key Exchange Computational & Decisional Diffie-Hellman Problem, RSA Assumptions & Cryptosystem, RSA Signatures & Schnorr Identification Schemes, Primarily Testing, Elliptic Curve over the Reals, Elliptic curve Modulo a Prime., Chinese Remainder Theorem. UNIT III :Message Authentication, Digital Signature, Key Management, Key Exchange, Hash Function. Universal Hashing, Cryptographic Hash Function, MD, Secure Hash Algorithm (SHA), Digital Signature Standard (DSS), Cryptanalysis: Time-Memory Trade-off Attack, Differential Cryptanalysis, Secure channel and authentication, custom like Kerberos. UNIT IV : Information Security: Threats in Cryptography.
263	CS -7031(B)	Data Mining and Warehousing	2018	Unit 1: Data Warehousing: Introduction, Delivery Process, Data warehouse Architecture, Data Preprocessing: Data cleaning, Data Integration and transformation, Data reduction. Data warehouse Design: Datawarehouse schema, Partitioning strategy Data warehouse Implementation, Data Marts, Meta Data, Example of a Multidimensional Data model. Introduction to Pattern Warehousing. Unit 2.:OLAP Systems: Basic concepts, OLAP queries, Types of OLAP servers, OLAP operations etc. Data Warehouse Hardware and Operational Design: Security, Backup And Recovery Unit 3: Introduction to Data& Data Mining :Data Types, Quality of data, Data Preprocessing, Similarity measures, Summary statistics, Data distributions, Basic data mining tasks, Data Mining V/s knowledge discovery in databases. Issues in Data mining. Introduction to Fuzzy sets and fuzzy logic. Unit 4 :. Supervised Learning: Classification: Statistical-based algorithms, Distance-based algorithms, Decision tree-based algorithms, Neural network-based algorithms, Rule-based algorithms, Probabilistic Classifiers Unit 5 : Clustering & Association Rule mining : Hierarchical algorithms, Partitional algorithms, Clustering large databases - BRICH, DBSCAN, CURE algorithms, Association rules - Parallel and distributed algorithms.
264	CS -8011	Mobile Application Development	2018	Unit 1 Various types of mobile computing devices (mobile computers, smart phones and dedicated devices). Web based applications, Native applications and Compare and contrast web-based mobile applications against native applications, history of mobile platforms (PDA's, Notebooks, smartphones). Internet protocols for mobile applications .i.e. WAP), evolution of browsers and Internet languages such as HTML and JavaScript. Unit 2 :Infrastructure Describe mobile and cell phone technologies (CDMA, GSM, 3G, 4G), Compare and contrast 3G and 4G, Internet terms: IP address, subnet mask, gateway, DNS, static vs Dynamic IP, transport including HTTP , routing, secure connections, proxies and reverse proxies. Need for storage, local Storage, storage on Web Unit 3 :HTML/CSS/DOM and Scripting. Basic HTML: validation, rendering and web browser, Cascading Style Sheets (CSS) and how to use them, document object model (DOM) : document, objects, model, DOM tree and DOM's utilization in web design, basic JavaScript code and constructs of the JavaScript language. Unit 4 :Designing mobile user interfaces Design mobile interfaces, usability, ways to test user interfaces, various types of user interfaces for mobile apps : Interactive voice response (IVR)

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
265	CS -8021(A)	High Performance Computing	2018	Unit 1 :Introduction to modern processors:- General Purpose cache based architecture performance metric and bench marks, Moors Law, pipelining, super clarity, SIMD. Memory Hierarchies, Multi core processors, Multi threaded processors, Vector processors- Design principle , Max performance estimates, programming for vector architecture. Basic Optimizations for serial codes:- Scalar profiling, common sense optimizations, Simple measures and their impacts, role of compilers, C++ optimizations. Unit 2 :Data access optimizations: balance analysis and light speed estimates, storage order, Algorithm classifications and assess optimizations, case studies for data access optimizations. Parrall Computers: Shared memory computers, Distributed memory computers, hybrid systems, Network computers. Unit 3 :Basics of parallel computing: data and functional parallelism, parallel scalability- laws, metrics, factors, efficiency and load imbalance. Shared memory parallel programming with Open MP: Parallel execution, data scoping, work sharing using loops, synchronization, Reductions, loop scheduling and Tasking. Unit 4 :Efficient Open MP Programming: Program profiling, Performance pitfalls, improving the impact of Open MP, work sharing constructs.
266	CS -8021(B)	Block Chain Technologies	2018	Unit 1 : Introduction: Overview of Block chain, Public Ledgers, Bit coin, Smart Contracts, Block in a Block chain, Transactions, Distributed Consensus, Public vs Private Block chain, Understanding Crypto currency to Block chain, Permissioned Model of Block chain, Overview of Security aspects of Block chain; Basic Crypto Primitives: Cryptographic Hash Function, Properties of a hash function, Hash pointer and Merkle tree, Digital Signature, Public Key Cryptography, A basic crypto currency. Unit 2 :Understanding Block chain with Crypto currency: Bit coin and Block chain: Creation of coins, Payments and double spending, Bit coin Scripts, Bit coin P2P Network, Transaction in Bit coin Network, Block Mining, Block propagation and block relay. Working with Consensus in Bit coin: Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW) – basic introduction, Hash Cash PoW, Bit coin PoW, Attacks on PoW and the monopoly problem, Proof of Stake, Proof of Burn and Proof of Elapsed Time, The life of a Bitcoin Miner, Mining Difficulty, Mining Pool. Unit 3 :Understanding Block chain for Enterprises: Permissioned Block chain: Permissioned model and use cases, Decoin issuer for Permissioned block chains, Execute contracts, State machine to Decoin Pattern.
267	CS -8021(C)	Object Oriented Software Engineering	2018	Unit 1: Review of Object Oriented Concepts and Principles: The Object Oriented Paradigm, Basic Concepts, Software Development Life Cycle and Model Architectures. Unit 2 :Introduction to RUP: Basic Concepts, Symptoms in Software Development and their Root Causes, Best Practices of RUP, RUP software life cycle, 4+1 view model, Various Workflows. Unit 3 :Introduction to UML, Notations, Relationships, Stereotypes, Study of UML based tools Like Rational Rose, Poseidon, etc. Object Oriented Analysis: Conventional v/s OO analysis approach, Requirement analysis, Use case diagram,, Activity diagram, Analysis class Model. Unit 4 :Object Oriented Design: Conventional v/s OO design approach, Design of CRC cards, Class diagram Behavioral Modeling: Interaction Diagram, State chart Diagram, Implementation Diagram: Component and deployment Diagram. Illustrative Case Studies like ATM, Payroll, Course and Registration System. Unit 5 :Object Oriented Testing: Correctness and consistency of OOA & OOD models, Testing Strategies and test cases for OO software process, Project Management, Rational Tool Mentors. Introduction to Decoin Pattern.
268	CS -8031(A)	Image Processing and Computer Vision	2018	UNIT 1 :Introduction to computer vision and Image processing (CVIP): Basics of CVIP, History of CVIP, Evolution of CVIP, CV Models, Image Filtering,Image Representations,Image StatisticsRecognition Methodology: Conditioning, Labeling, Grouping, Extracting, and Matching, Morphological Image Processing: Introduction, Dilation, Erosion, Opening, Closing, Hit-or-Miss transformation, Morphological algorithm operations on binary images, Morphological algorithm operations on gray-scale images, Thinning, Thickening, Region growing, region shrinking. UNIT 2: Image Representation and Description: Representation schemes, Boundary descriptors, Region descriptors Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchal segmentation, Spatialclustering, Split& merge, Rule-based Segmentation, Motion-based segmentation. Area Extraction: Concepts, Data-structures, Edge, Line-Linking, Hough transform, Line fitting, Curve fitting (Least-square fitting). UNIT 3 :Region Analysis: Region properties, External points, Spatial moments, Mixed spatial gray-level moments, Boundary analysis: Signature properties, Shape numbers. General Frame Works For Matching: Distance relational approach, Ordered structural matching, View.
269	CS -8031(B)	Game Theory with Engineering Applications	2018	Unit 1 :Overview: What is a Game, Game Design Schema, Game Design fundamentals, Engineering application of game theory, Design Process: Iterative design, Commissions, Design & Testing of the Board Game, Introduction to meaningful play, two kinds of meaningful play- discernable & integrated. Unit 2 : Introducing design, design & meaning, Semiotics: A brief overview, four semiotic Concepts, Context Shapes interpretations. Unit 3 :Introduction to Systems, elements of a System, Framing Systems, open & closed systems, Introduction to Interactivity, a multivalent model of interactivity, interaction & choice, choice molecules, anatomy of choice, space of possibility. Unit 4 : Defining games: overview of digital games, magic circle. Primary Schemas: conceptual framework, rule, play, culture. Unit 5 :Rules: defining rules, a deck of cards, quality of rules, rules in context, Rules on three levels: Operational, Constitutive, Implicit, Identity of a Game, Specificity of Rules, Rules of Digital games. Case Studies: Tic Tac Toe, Deck of Cards.

  
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### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
270	CS -8031(C)	Managing Innovation and Entrepreneurship	2018	UNIT-1 Innovation, the basic definition and classification: The relationship of innovation and entrepreneurship, creation of competitive advantage based on innovation. Innovative models, Product, process, organizational and marketing innovation and their role in business development. UNIT-II Sources of innovation (push, pull, analogies), transfer of technology. Creative methods and approaches used in innovation management. Approaches to management of the innovation process (agile management, Six Thinking Hats, NUF test). UNIT-III Project approach to innovation management, method Stage Gate, its essence, adaptation of access to selected business models. In-house business development of the innovation process in the company. Open Innovation as a modern concept, the limits of this method and its benefits for business development. UNIT-IV Innovations aimed at humans, role of co-creation in the innovation process. The strategy of innovation process, types and selection of appropriate strategies. UNIT-V Measurement and evaluation of the benefits of innovation for business (financial and nonfinancial metrics, their combination and choice). <i>Barriers to innovation in business, innovation failure and its causes, post-audits of innovative projects, Organization and</i>
271	EE- 3011	Environmental Engineering	2018	Unit-I Principles of ecology, ecosystem concept: Biotic and biotic components of ecosystem, Segments of Environment: Biodiversity: Threats and conservation, Food Chain. Unit- II Energy General idea about: Natural Resources, Non Renewable Sources of energy, coal, oil, Gas, Hydrogen, nuclear sources. Unit –III Air Pollution & Sound Pollution - Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution Environmental problems, (Global warming, ozone depletion and acid rain) Unit –IV Water Pollution– Treatment of Domestic & Industrial water effluent. Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures. Unit- V Society & Ethics – Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, water preservation rain water collection.
272	EE - 3021	Electromagnetic Fields	2018	Unit-I scalar & vector fields, gradient, divergence & curl of a vector field, Divergence theorem & Stokes's theorem, concept of vectors. Coulomb's law – Electric field intensity – Field due to Gauss law and its application to symmetrical charge distributions – Gauss law applied to differential volume element – Concept of divergence – electric potential – Potential field due to different types of charges – Potential gradient – the dipole – field due to dipole Unit- II Laplace's & Poisson's equations, solution of Laplace's equation, Electric dipole, dipole moment, potential & electric field intensity due to dipole, ohms law in point form, equation of continuity. Unit –III Static Magnetic Field, Biot-Savart's law, Magnetic Field intensity due to straight current carrying filament, circular, square and solenoid current carrying wire, Ampere's circuital law Ampere's circuital law in point form, Lorentz Force on straight and long current carrying conductors in magnetic field, force between two long & parallel current carrying conductors. Magnetic dipole & dipole moment, a differential current loop as dipole, torque on a current carrying loop in magnetic field UNIT - IV Faraday's Law, transformer & motional EMFs, Displacement current, Maxwell's equations as Generalization of circuit equations, Maxwell's equation in free space, Maxwell's equation for harmonically varying field, static and steady fields, Maxwell's equations in Unit –III Feedback amplifier, L-C (Hartley-Colpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B, class A B, C amplifiers Unit –IV transistor as switch, Multivibrators, Clippers and clampers, Differential amplifier, Bootstrapping technique. Cascade and cascade amplifier. Unit- V log and antilog amplifier, voltage to current and current to voltage converters, comparators Schmitt trigger, active filters, 555 timer and its application.
273	EE - 3031	Semiconductor Devices and circuits	2018	Unit-I Semiconductor device, theory of P-N junction, Transistors BJT, FET, MOSFET, types, working principle, characteristics, and region of operation, load line biasing methods, transistor as an amplifier, gain, bandwidth, frequency response Unit –III Feedback amplifier, L-C (Hartley-Colpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B, class A B, C amplifiers Unit –IV transistor as switch, Multivibrators, Clippers and clampers, Differential amplifier, Bootstrapping technique. Cascade and cascade amplifier. Unit- V log and antilog amplifier, voltage to current and current to voltage converters, comparators Schmitt trigger, active filters, 555 timer and its application.
274	EE - 3041	Network Analysis	2018	Unit-I Active and passive two terminal elements. Ohms law, KCL and KVL analysis dual networks analysis of magnetically coupled circuits Dot convention, coupling co-efficient, Tuned circuits. Series & parallel resonance voltage & current sources, controlled sources Unit- II Network topology, concept of Network graph, Tree, Tree branch & link, Network Theorems – Thevenin's & Norton's theorem, superposition, reciprocity Unit –III Transient analysis Transients in RL, RC & RLC Circuits initial conditions Concept of phasor & vector, impedance & admittance. Node & mesh analysis of RL, RC and RLC networks with sinusoidal and other driving sources. Unit –IV Frequency domain analysis – Network Theorems in transform domain. Concept of signal spectra, Fourier series co-efficient of a periodic waveform. Unit- V Network function & Two port networks – concept of complex frequency, port. Two port parameters – Z, Y, chain parameters, relationship between parameters.

  
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### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
275	EE - 4021	Electrical Machines - I	2018	Unit-I Hysteresis and Eddy current losses. Energy in magnetic systems – Field energy & mechanical force – Single and Multiple excited systems. MMF of distributed windings – Magnetic fields in rotating machines – Generated voltages – Torque Unit- II Types of excitation – No load and load characteristics of DC generators – commutation – armature reaction – Parallel operation of DC generators Unit –III Starting of DC motors: 2 point starter, 3 point starter, 4 point starter – Speed control – Losses and efficiency –Applications.Unit –IV EMF equation – Transformer on No load and Load –Phasor diagram --equivalent circuit – Regulation - three phase transformer connections-parallel operations of single phase and three phase transformer- Auto transformers. Unit- V Double revolving field theory – Torque – Speed characteristics – Equivalent circuit – No load and Blocked rotor test - Performance analysis – Starting methods of Single phase motors
276	EE - 4031	Analog & Digital Communication	2018	Unit-I (Parseval's theorem), Power density of periodic gate and impulse function, impulse response of a system,convolutions, convolution with impulse function, causal and non causal system impulse response of ideal lowpass filter, Correlation & Autocorrelation.Unit- II Bandwidth, Power distribution. AM suppressed carrier waveformequation and frequency domain representation Generation (Balance/Chopper modulator) and synchronousdetection technique, errors in synchronous detection, Introduction to SSB and VSB Transmission Anglemodulation. Unit –III Sampling of signal, sampling theorem for low pass and Band pass signal, Pulse amplitude modulation (PAM),Pulse code modulation, Commanding, Data rateand Baud rate, Bit rate, multiplexed PCM signal, Differential PCM (DPCM), Delta Modulation (DM) andAdaptive Delta Modulation (ADM).Unit –IV Digital modulations techniques, Generation, detection.Unit –V Linear Block Code, Cyclic code and convolution codes. LineEncoding: Manchester coding,RZ, NRZ coding.
277	EE - 4041	Electrical Engineering Drawing	2018	Unit-I graphics software, AutoCAD, plotting techniques commands of computer drafting.Sectional and dimensional drawing using computer Unit- II Conventional Symbols and brief introduction to electrical equipment's and electronic devices, measuring instruments, parts of MI and MC instruments. Unit –III Sectional drawing of different types of Cables, wiring installation in small residences. Unit –IV Mounting and types of enclosures for electric motors , H.T and L.T windings. Unit- V Sketches of transmission line structures, types of towers, insulating equipments, single line diagram of power substation.
278	EE - 4051	Power System-I	2018	Chapter-1 Layout of different transmission and distribution systems, concept of short, medium and long lines, parameters of lines Chapter -2 Vibration dampers various system of transmission & their comparison, HVDC transmission Converter, inverter, filters & substation layout.Chapter –3 Distribution System Distribution Systems: Primary and secondary distribution systems,power loss calculations, voltage regulators, Feeders Kelvin's law and modified Kelvin's law for feeder conductor size and its limitations Chapter –4 Overhead Transmission Lines: Generalized ABCD constants and equivalent circuits of short, medium & long lines.Chapter - 5 , dielectric stress and sheath loss in cables.Carrier Communication: Principle of carrier communication over Power Lines, purposes, Equipment
279	EE -5011	Electrical Machine-II	2018	Unit-I Torque & Power equations – Slip – Torque characteristics – No load & blocked rotor tests Unit- II Starting methods of three phase induction motor – Cogging & Crawling – Synchronous induction motor.Unit –III excitation system including brushless excitation; , armature reaction; synchronous reactance and impedance, equivalent circuit of alternator, mmf, zpf and new A.S.A method.Unit –IV two reaction theory; determination of $X_d$ and $X_q$ by slip test; synchrosopes and phase sequence indicator.Unit –V Synchronous motor operation, hunting and damper winding efficiency and losses. Analysis of short circuit oscillogram, <del>determination of various transient reluctance motor Repulsion motor stepper motor</del>
280	EE -5021	Signals & Systems	2018	Unit-I Linear Time-Invariant Systems: Differential equation representation convolution Integral. Discrete form of special functions.Discreteconvolution and its properties. Unit- II Fourier Series, Fourier Transform and properties, Parseval's theorem, Frequency response of LTI systems.Sampling Theorem. Unit –III Frequencyresponse of discrete time LTI systems.Unit –IVSignificance of poles & zeros. Z-Transform and its inverse: Definition, existence, Region of convergence and properties, Application of ZTransformfor the analysis of Discrete time LTI System Unit- V The sampling theorem, samplingof discrete-time signals.
281	EE -5031	Energy Conservation & Management	2018	Unit-I Energy management & audit, Energy audit, Types of energy audit, energy management (audit), qualities and function of energy managers.Unit- II energy efficient housekeeping, energy recoveryin thermal systems, waste heat recovery techniques, thermal insulation Unit –III, Economic analysis depreciation method, Payback period, Energy economics, Cost Benefit Risk analysis.Unit –IV Simulation & modeling, formulation & Objective & constraints, alternative option, Matrix chart.Unit- V Industry Sugar, Textiles, Cement Industry etc Electrical Energy Conservation in building, heating and lighting. domestic gadgets.

  
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### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
282	EE -5041	Control System	2018	Unit-I Transfer function block diagram reduction technique P, PI, PD and PID controllers. Unit- II step response of first order and second order under damped systems. Responses of first order systems with P, PI, PID controllers. Unit -III polar plots, bode plots, constant M and N circles, Nichols plot, Nichols chart. Unit -IV Routh's stability criterion - relative stability analysis - root locus technique Unit- V Design of lead, lag, lead-lag compensating networks using bode plot technique, feedback compensation, Design of PI, PD and PID using bode plot technique
283	EE -6011	Microprocessors and Microcontrollers	2018	UNIT I Introduction to 16-bit 8086 microprocessors, architecture of 8086, Pin Configuration, interrupts, minimum mode and maximum mode, timing diagram, Memory interfacing, Comparative study of salient features of 8086, 80286 and 80386. UNIT II Instruction set of 8086, Addressing mode, Assembler directives & operations, assembly and machine language programming, subroutine call and returns, Concept of stack, Stack structure of 8086, timings and delays. UNIT III Memory Mapped I/O and Peripherals I/O. PPI 8255 Architecture and modes of operation, DMA controller (8257) Architecture, Programmable interval timer 254, USART 8251, 8 bit ADC/DAC interfacing and programming. UNIT IV Intel family of 8 bit microcontrollers, Architecture of 8051, Pin description, I/O configuration, interrupts; Interrupt structure and interrupt priorities, Port structure and operation, Accessing internal & external memories and different mode of operations, Memory organization, Addressing mode, instruction set of 8051 and programming. UNIT V 8051 interfacing to ADC and DAC, Stepper motor interfacing, Timer/ counter functions, 8051 based thyristor firing circuit, 8051 connections to RS-232, RS-485, Serial communication, Serial communication modes, Serial communication programming, Serial port programming in C
284	EE -6021	Power system II	2018	UNIT-I power systems restructuring, distributed generation, congestion, pricing of energy and transmission services. UNIT-II Economic operation of power system - economic dispatch, Emission dispatch, line loss, I <sup>2</sup> L, economic dispatch using Lagrangian multiplier method. UNIT-III block diagrammatic representation of single and two area interconnected system, static and dynamic response, UNIT-IV MVAR Voltage control. UNIT-V Power System Stability - equal area criterion, solution of swing equation using step by step method modified Euler's method and Runge-Kutta method
285	EE -6031(B)	Utilization Of Electrical Energy	2018	UNIT-I inverse square and cosine laws, methods of calculations, factory lighting, flood lighting and street lighting, UNIT-II methods of electrical welding, resistance welding, arc welding, energy storage welding, laser welding, electro beam welding UNIT- III Special features of Traction motors, selection of Traction Motor, Mechanics of train movement: specific energy consumption, factors affecting specific energy consumption, acceleration and braking retardation. UNIT-IV , plugging, rheostatic and regenerative braking load equalization use of fly wheel criteria for selection of motors for various industrial drives, UNIT-V vehicle performance and energy consumption
286	EE -6041(A)	Electrical Power Generation	2018	Unit I MHD generation, Solar generation, Wind power station, Geothermal power generation. Unit II thermal power station. Nuclear Power Station: Unit III Hydro Power Station Unit IV fixed charges, interest and depreciations, Methods of Depreciation. Tariffs. Unit V load dispatching in power system, co-generation and coordination of power plants
287	EE -7011	Power System Analysis & Control	2018	UNIT I -p-f and Q-v control loops-recent trends in real time control of power system, load forecasting, unit commitment, Loadshedding and Islanding. UNIT II concept of control area-LFC control of a single area system static and dynamic response of uncontrolled system-tie line with frequency bias control of two area system Unit III. Types of Excitation system OLTC, synchronous condenser, SVC, Shunt capacitor UNIT IV base point and participation factors. Unit commitment(UC) problem-constraints in UC-Solution methods-Priority list methods(Numerical problems) Economic dispatch controller added to load frequency control. UNIT V National, regional and state level-SCADA system-computer configuration functions- monitoring, data acquisition and controls-EMS system-System operating states.
288	EE -7021	Electrical drives	2018	UNIT-I single phase semi and fully controlled converters and three semi and fully controlled converters connected to d.c. separately excited and d.c. series motors-continuous current operation. UNIT-II Electric braking, Plugging, dynamic and regenerative braking operations. Four quadrant operation of D.C. motor by Dual converters Control of D.C. Motors by Choppers:- Single quadrant, Two quadrant and four quadrant chopper fed d.c. separately excited and series excited motors UNIT-III , PWM control Comparison of VSI & CSI operations, Speed torque Characteristics. UNIT-IV Static rotor resistance control, Slip power recovery static Scherbius Drive, Static Kramer Drive. UNIT-V VSI, CSI and Cycloconverters. Load commutated CSI fed Synchronous motor. Operation Waveform
289	EE -7031	Power Electronics	2018	UNIT-I series and parallel operation of SCR, need for snubber circuits, di/dt & dv/dt protection. Introduction to Triac, GTO, MOSFET, IGBT, FCT and MCT. UNIT II Operation of 1-phase half wave rectifiers with R load, 1-phase FWR with R, RL & RLE load (fully controlled & half controlled), operation operation of 3-phase HWR & FWR with R & RL loads for continuous current mode, UNIT III Classification & operation of choppers (A,B,C,D,E), control strategies 1- phase step up & step down cycloconverters. UNIT IV basic series inverter, Modified series Inverter, 1- phase parallel inverter operation (without feedback diode), 1-phase basic McMurray inverter, Introduction to harmonics and PWM inverters. UNIT V SMPS, UPS (on line and off line), Introduction to FACTS - shunt and series compensators

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
290	EE -8011	Power System Protection	2018	Unit-I Three phase short circuit, Line to line fault, Line to ground fault, Double line to ground fault. Sequence networks and their inter connections for different types of faults. Unit-II differential and distance relays on R-X diagram. Static Relays: Introduction, advantage and limitation of static relays, static over current, directional, distance and differential relays. Unit-III alternator protection scheme (stator, rotor, reverse power protection etc.). Power transformer protection (external and internal faults protection), generator-transformer unit protection scheme, bus bar protection. Unit-IV -bulk oil and minimum oil, air break and air blast, SF6 and vacuum circuit breakers. Rating selection and testing of circuit breakers/operating mechanisms. LT switchgear, HRC fuses, types construction and applications.
291	EE -8021	Computer application to power system	2018	UNIT – I Models of power system components, network model using graph theory, transmission line models, UNIT – II SVC & SVS, Regulated shunt compensation, UNIT – IV pre-contingency and postcontingency, corrective rescheduling. UNIT – V modal analysis using reduced Jacobian, participation factor.
292	EE -8031	High voltage Engineering	2018	UNIT – I need for generating high voltages in laboratory. Important applications of high voltage. UNIT-II Breakdown in Gases Breakdown in liquid; fundamentals of insulating oils, conduction and breakdown in pure and commercial liquids. Breakdown in Solid UNIT – III Triggering of impulse generator by three electrode gap arrangement. Triggering gap and oscillograph time sweep circuits. Generation of switching impulse voltage. Generation of high impulse current. UNIT – IV. Standard sphere gap measurements of HV AC, HV DC, and impulse voltages; Potential dividers-resistance dividers capacitance dividers mixed RC potential dividers. UNIT V, tests on isolators, circuit breakers, cables insulators and transformers.
293	EX - 3011	Environmental Engineering	2018	Unit-I Principles of ecology, ecosystem concept: Biotic and biotic components of ecosystem, Segments of Environment: Biodiversity: Threats and conservation, Food Chain. Unit- II Energy General idea about: Natural Resources, Non Renewable Sources of energy, coal, oil, Gas, Hydrogen, nuclear sources. Unit –III Air Pollution & Sound Pollution - Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution Environmental problems, (Global warming, ozone depletion and acid rain) Unit –IV Water Pollution- Treatment of Domestic & Industrial water effluent. Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures. Unit- V Society & Ethics – Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, water preservation rain water collection.
294	EX - 3021	Electromagnetic Fields	2018	Unit-I scalar & vector fields, gradient, divergence & curl of a vector field, Divergence theorem & Stokes's theorem, concept of vectors. Coulomb's law – Electric field intensity – Field due to Gauss law and its application to symmetrical charge distributions – Gauss law applied to differential volume element – Concept of divergence – electric potential – Potential field due to different types of charges – Potential gradient – the dipole – field due to dipole Unit- II Laplace's & Poisson's equations, solution of Laplace's equation, Electric dipole, dipole moment, potential & electric field intensity due to dipole, ohms law in point form, equation of continuity. Unit –III Static Magnetic Field, Biot-Savart's law, Magnetic Field intensity due to straight current carrying filament, circular, square and solenoid current carrying wire, Ampere's circuital law Ampere's circuital law in point form, Lorentz Force on straight and long current carrying conductors in magnetic field, force between two long & parallel current carrying conductors. Magnetic dipole & dipole moment, a differential current loop as dipole, torque on a current carrying loop in magnetic field UNIT - IV Faraday's Law, transformer & motional EMFs, Displacement current, Maxwell's equations as Generalization of circuit equations, Maxwell's equations in free space, Maxwell's equation for homogeneous field static and steady fields, Maxwell's equations in matter.
295	EX - 3031	Electrical Measurement and Measuring Instruments	2018	Unit 1 : Errors in measurement. Measurement of R, L, C – Wheatstone, Kelvin's double, Maxwell, Anderson and Schering bridges. Measurement of high resistance – Megger , Unit 2 : Principle of operation and construction of PMMC, MI, Dynamometer, Induction, Thermal and Rectifier type instruments – Measurement of voltage and current – CT and PT for extending instrument ranges. Unit 3 : Dynamometer type wattmeter – induction type energy meter- 1 phase & 3 phase – errors and compensation – energy meter calibration by direct and phantom loading Unit 4. MEASUREMENT OF FREQUENCY, POWER FACTOR AND PHASE SEQUENCE Frequency meters – Power factor meter - 1 phase & 3 phase – Synchronoscope – Phase sequence indicator. Magnetic tape recorders , Cathode Ray Oscilloscope, Dual Trace oscilloscope. Unit 5: ELECTRONIC INSTRUMENTS Electronic voltmeters – Digital voltmeter , Function generator. Classification of transducers – resistive, capacitive and inductive – piezoelectric transducer – strain gauges – LVDT



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
296	EX - 3041	Network Analysis	2018	Unit-I Active and passive two terminal elements. Ohms law, KCL and KVL analysis dual networks analysis of magnetically coupled circuits Dot convention, coupling co-efficient, Tuned circuits. Series & parallel resonance voltage & current sources, controlled sources Unit- II Network topology, concept of Network graph, Tree, Tree branch & link, Network Theorems – Thevenins & Norton’s theorem, superposition, reciprocity Unit –III Transient analysis Transients in RL, RC & RLC Circuits initial conditions Concept of phasor & vector, impedance & admittance. Node & mesh analysis of RL,RC and RLC networks with sinusoidal and other driving sources.Unit –IV Frequency domain analysis –Network Theorems in transform domain.Concept of signal spectra, Fourier series co-efficient of a periodic waveform. Unit- V Network function & Two port networks – concept of complex frequency, port . Two port parameters – Z, Y, chain parameters relationship between parameters
297	EX - 3051	Value Education	2018	Chapter -1 Concepts of Values-Definition and Types of values –The need for Education in values-Challenges for Value adoption-Character development-Vision of a better world.Chapter -2 Inculcation of values Classification of values- Personal Values-Family Values-Social Values-Spiritual values-Benefits of value adoption.Chapter –3Definition-Purpose-implementation-situations to adopt-reflection questions-quotable quotes of Active listening- Decision making-Determination-Perseverance-Discipline-Responsibility. Chapter –4 Business ethics Ethics and Entrepreneurship- Professional Ethics –Ethical choices- Resolving Ethical Dilemmas-Leadership and Social Responsibility- Corporate Social Responsibility. Chapter - 5 Quality of Life Dealing with change- Trends, Organizations and the Individual-Self and the world-Quality from within-Relating to others-The dynamics of personal powers.Chapter - 6 Exploring the self True Identity-Anatomy of the self-The cyclic processes within the self-States of the awareness-Innate and Acquired qualities-Empowering the self .Chapter 7 Understanding Self-Esteem Know self-esteem-Understanding the self-Components of self-esteem-Association with self-esteem-Levels of self-esteem-Reflection exercise Chapter 8 Principles of living Be introspective-Be an observer-Being optimistic-Appreciate differences-Don’t compare yourself with others-Live at present.Chapter 9 Practical Meditation Why meditate?-Soul consciousness-The supreme-Karma-Timeless dimension-The
298	EX - 4021	Electrical Machines - I	2018	Unit-I Hysteresis and Eddy current losses. Energy in magnetic systems – Field energy & mechanical force – Single and Multiple excited systems. MMF of distributed windings – Magnetic fields in rotating machines – Generated voltages – Torque Unit- II Types of excitation – No load and load characteristics of DC generators – commutation – armature reaction – Parallel operation of DC generators Unit –III Starting of DC motors: 2 point starter, 3 point starter, 4 point starter – Speed control – Losses and efficiency –Applications.Unit –IV EMF equation – Transformer on No load and Load –Phasor diagram --equivalent circuit – Regulation - three phase transformer connections-parallel operations of single phase and three phase transformer- Auto transformers. Unit- V Double revolving field theory – Torque – Speed characteristics – Equivalent circuit – No load and Blocked rotor test - Performance analysis – Starting methods of Single phase motors
299	EX - 4031	Digital Electronics	2018	Unit-I ASCII code and EBCDIC codes, Hollerith code, concept of parity, complement’s & (r-1)’s, subtraction with Demorgan’s theorem, Boolean expression & logic diagram. Negative logic, Alternate logic gate representation . Unit- II Combinational Circuits : Design procedure, Adders (half and Full), sub tractor (half and full) code convertors, Analysis of design Unit –III Sequential Logic Circuit : Latches, SR latch with NAND & NOR gates, D latch, edge triggered flip flop, J-K flip flop, T flip flop, Master slave flip flop, Analysis of clocked sequential circuit, state table, state diagram, state Unit –IV Registers and Counters : Asynchronous and Synchronous counter, counters with MOD numbers, Down counter, UP/DOWN counter, propagation delay in ripple counter, programmable counter, Unit- V Binary weighted & R/2R D to A convertors.
300	EX - 4041	Electrical Engineering Drawing	2018	Unit-I graphics software, AutoCAD, plotting techniques commands of computer drafting.Sectional and dimensional drawing using computer Unit- II Conventional Symbols and brief introduction to electrical equipment’s and electronic devices, measuring instruments, parts of MI and MC instruments. Unit –III Sectional drawing of different types of Cables, wiring installation in small residences. Unit –IV Mounting and types of enclosures for electric motors , H.T and L.T windings. Unit- V Sketches of transmission line structures, types of towers, insulating equipments, single line diagram of power substation.
301	EX - 4051	Power System-I	2018	Chapter-1 Layout of different transmission and distribution systems, concept of short, medium and long lines, parameters of lines Chapter -2 Vibration dampers various system of transmission & their comparison, HVDC transmission Converter, inverter, filters & substation layout.Chapter –3 Distribution System Distribution Systems: Primary and secondary distribution systems,power loss calculations, voltage regulators, Feeders Kelvin’s law and modified Kelvin’s law for feeder conductor size and its limitations Chapter –4 Overhead Transmission Lines: Generalized ABCD constants and equivalent circuits of short, medium & long lines.Chapter - 5 , dielectric stress and sheath loss in cables.Carrier Communication: Principle of carrier communication over Power Lines, purposes, Equipment



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
302	EX -5011	Electrical Machine-II	2018	Unit-I Torque & Power equations – Slip – Torque characteristics – No load & blocked rotor tests Unit- II Starting methods of three phase induction motor – Cogging & Crawling – Synchronous induction motor. Unit –III excitation system including brushless excitation, , armature reaction; synchronous reactance and impedance, equivalent circuit of alternator, mmf, zpf and new A.S.A method. Unit – IV two reaction theory; determination of $X_d$ and $X_q$ by slip test; synchrosopes and phase sequence indicator. Unit –V Synchronous motor operation, hunting and damper winding efficiency and losses. Analysis of short circuit oscillogram, determination of various transient reluctance motor. Repulsion motor stepper motor.
303	EX -5021	Switchgear & Protection	2018	UNIT I FAULT ANALYSIS Fault Analysis per unit, representation and its advantages, faults in power systems (Symmetrical & Unsymmetrical), Single line and equivalent impedance diagram representation of power system components. UNIT II PROTECTIVE RELAYS frequency relays-negative sequence relays - Introduction to static relays - comparison of electromagnetic and static relays, Bucholz Relay UNIT III PROTECTION OF GENERATOR, TRANSFORMER AND BUSBAR Generator protection-differential protection, balanced earth fault protection, restricted earth fault protection. UNIT IV CIRCUIT BREAKERS Theory of arcing and arc quenching-RRRV-current chopping-capacitive current breaking-DC circuit breaking switchgear UNIT V FUSES & MICROPROESSOR BASED RELAYS Definitions-characteristics of fuses-types of fuses-low voltage fuses-high voltage fuses Introduction to Microprocessor based over current relays, impedance relays, Directional and reactance relay.
304	EX-5031	Energy Conservation & Management	2018	Unit-I Energy management & audit, Energy audit, Types of energy audit, energy management (audit), qualities and function of energy managers. Unit- II energy efficient housekeeping, energy recovery in thermal systems, waste heat recovery techniques, thermal insulation Unit –III, Economic analysis depreciation method, Payback period, Energy economics, Cost Benefit Risk analysis. Unit –IV Simulation & modeling, formulation & Objective & constraints, alternative option, Matrix chart. Unit- V Industry Sugar, Textiles, Cement Industry etc Electrical Energy Conservation in building, heating and lighting, domestic gadgets.
305	EX-5041	Control System	2018	Unit-I Transfer function block diagram reduction technique P, PI, PD and PID controllers. Unit- II step response of first order and second order under damped systems. Responses of first order systems with P, PI, PID controllers. Unit –III polar plots, bode plots, constant M and N circles, Nichols plot, Nichols chart. Unit –IV Routh's stability criterion – relative stability analysis – root locus technique Unit- V Design of lead, lag, lead-lag compensating networks using bode plot technique, feedback compensation, Design of PI, PD and PID using bode plot technique.
306	EX-6011	Microprocessors and Microcontrollers	2018	UNIT I Introduction to 16-bit 8086 microprocessors, architecture of 8086, Pin Configuration, interrupts, minimum mode and maximum mode, timing diagram, Memory interfacing, Comparative study of salient features of 8086, 80286 and 80386. UNIT II Instruction set of 8086, Addressing mode, Assembler directives & operations, assembly and machine language programming, subroutine call and returns, Concept of stack, Stack structure of 8086, timings and delays. UNIT III Memory Mapped I/O and Peripherals I/O. PPI 8255 Architecture and modes of operation, DMA controller (8257) Architecture, Programmable interval timer 254, USART 8251, 8 bit ADC/DAC interfacing and programming. UNIT IV Intel family of 8 bit microcontrollers, Architecture of 8051, Pin description, I/O configuration, interrupts; Interrupt structure and interrupt priorities, Port structure and operation, Accessing internal & external Memories and different mode of operations, Memory organization, Addressing mode, instruction set of 8051 and programming. UNIT V 8051 interfacing to ADC and DAC, Stepper motor interfacing, Timer/ counter functions, 8051 based thyristor firing circuit, 8051 connections to RS-232, RS-485, Serial communication, Serial communication modes, Serial communication programming, Serial port programming in C.
307	EX -6021	Power system II	2018	UNIT-I power systems restructuring, distributed generation, congestion, pricing of energy and transmission services. UNIT-II Economic operation of power system – economic dispatch, Emission dispatch, line loss, I <sup>2</sup> L, economic dispatch using lagrangian multiplier method. UNIT-III block diagrammatic representation of single and two area interconnected system, static and dynamic response, UNIT-IV MVAR Voltage control. UNIT-V Power System Stability - equal area criterion, solution of swing equation using step by step method modified Eulers method and Runge-Kutta method.
308	EX-6031(B)	Utilization Of Electrical Energy	2018	UNIT-I inverse square and cosine laws, methods of calculations, factory lighting, flood lighting and street lighting, UNIT-II methods of electrical welding, resistance welding, arc welding, energy storage welding, laser welding, electro beam welding UNIT-III Special features of Traction motors, selection of Traction Motor, Mechanics of train movement: specific energy consumption, factors affecting specific energy consumption, acceleration and braking retardation. UNIT-IV , plugging, rheostatic and regenerative braking load equalization use of fly wheel criteria for selection of motors for various industrial drives. UNIT-V vehicle performance and energy consumption.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
309	EX -6041(A)	Electronics Instrumentation	2018	Unit-I Electrostatic focusing, Electrostatic deflection, post deflection acceleration, Unit-II A.C. Bridge Measurement:- Sources and detectors, Use of Bridges for measurement of inductance, Capacitance & Q factor Maxwells bridge, Maxwells inductance capacitance bridge, Hays bridge, Andersons bridge, Owen's Bridge, De-sauty's Bridge, Unit-III Thermistor, Thermo couples, LVDT, RVDV, Synchros, Piezo-Electric transducers, Unit-IV Sine wave generators, Standard signal generator, AF Sine and Square wave generator Function generator, TV Sweep generator, Unit-V Digital Instruments:- Digital Voltmeter - Ramp type, Dual slope integration type,
310	EX -7011	Power Electronics	2018	UNIT-I series and parallel operation of SCR, need for snubber circuits, di/dt& dv/dt protection. Introduction to Triac, GTO, MOSFET, IGBT, FCT and MCT. UNIT II Operation of 1-phase half wave rectifiers with R load, 1-phase FWR with R, RL & RLE load (fully controlled & half controlled), operation operation of 3-phase HWR & FWR with R & RL loads for continuous current mode,UNIT III Classification & operation of choppers (A,B,C,D,E), control strategies 1- phase step up & step down cycloconverters.UNIT IV basic series inverter, Modified series Inverter, 1- phase parallel inverter operation (without feedback diode), 1-phase basic McMurray inverter, Introduction to harmonics and PWM inverters.UNIT V SMPS, UPS (on line and off line), Introduction to FACTS – shunt and series compensators
311	EX -7021	Electrical drives	2018	UNIT-I single phase semi and fully controlled converters and three semi and fully controlled converters connected to d.c. separately excited and d.c. series motors-continuous current operation.UNIT-II Electric braking, Plugging, dynamic and regenerative braking operations. Four quadrant operation of D.C. motor by Dual converters Control of D.C. Motors by Choppers:-Single quadrant, Twoquadrant and four quadrant chopper fed d.c. separately excited and series excited motors UNIT-III , PWM control Comparison of VSI & CSI operations, Speed torque Characteristics.UNIT-IV Static rotor resistance control, Slip power recovery static Scherbius Drive, Static Kramer Drive.UNIT-V VSI, CSI and Cycloconverters. Load commutated CSI fed Synchronous motor, Operation, Waveform
312	EX -7031	Power System Protection	2018	Unit-I Three phase short circuit,Line to line fault,Line to ground fault,Double line to ground fault. Sequence networks and their inter connections for different types of faults.Unit-II differential and distance relays on R-X diagram. Static Relays: Introduction, advantage and limitation of static relays, static over current, directional, distance and differential relays.Unit-III alternator protection scheme (stator, rotor, reverse power protection etc.). Power transformer protection (external and internal faults protection), generator-transformer unit protection scheme, bus bar protection. Unit-IV -bulk oil and minimum oil, air break and air blast,SF6 and vacuum circuit breakers. Rating selection and testing of circuit breakers/operating mechanisms. LT switchgear, HRC fuses, types construction and applications.
313	EX -8011	Computer Aided Electrical Machine Design	2018	Unit-I Programming techniques (LP & NLP only), Methods of solution, Unconstrained optimization problems, constrained optimization problems. Unit-II Design of armature, Windings and field systems, Selection of variables for optimal design, Formulation of design equations. Unit-III Design of magnetic circuit, Design of windings, Selection of variables for optimal design, Formulation of design equations.Unit-IV Design of stator, windings, Design of Field systems for salient pole and non-salient pole machines.Unit-V Design of stator, Windings Design of squirrel cage rotor, Design of slip ring rotor.
314	EX -8021	Computer application to power system	2018	UNIT - I Models of power system components, network model using graph theory, transmission line models, UNIT - II SVC & SVS, Regulated shunt compensation, UNIT - IV pre-contingency and postcontingency, corrective rescheduling.UNIT - V modal analysis using reduced Jacobian, participation factor.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
315	EX-8031	High voltage Engineering	2018	UNIT – I need for generating high voltages in laboratory. Important applications of high voltage. UNIT-II Breakdown in Gases Breakdown in liquid; fundamentals of insulating oils, conduction and breakdown in pure and commercial liquids. Breakdown in Solid UNIT – III Triggering of impulse generator by three electrode gap arrangement. Triggering gap and oscillograph time sweep circuits. Generation of switching impulse voltage. Generation of high impulse current. UNIT – IV. Standard sphere gap measurements of HV AC, HV DC, and impulse voltages; Potential dividers-resistance dividers capacitance dividers mixed RC potential dividers. UNIT V, tests on isolators, circuit breakers, cables insulators and transformers.
316	CE- 3011	Engineering Mathematics-III	2018	Unit-1: Difference Operators and Interpolation of Newton Forward & Backward Formulae Unit-2: Errors & Approximations, Solution of Algebraic & Trancedental Equations Unit-3: Functions of complex variables Unit-4: Solution of Ordinary Differential Equations of Taylor's Series, Picard's Method, Modified Euler's Method Unit-5: Concept of Probability
317	CE- 3021	Transportation Bridges and Tunnels	2018	Unit-1: Transportation by Roads, railways, Airways, Waterways their importance and limitations Unit-2: Geometric Design Unit-3: Bridge Site Investigation and Planning Unit-4: Bridge Foundations, Construction, Testing and Strengthening of Bridges Unit-5: Tunnels
318	CE- 3031	Strength of Materials	2018	Unit-1: Simple Stress and Strains Unit-2: Bending & Deflection Unit-3: Torsion of Shafts Unit-4: Unsymmetrical Bending Unit-5: Columns and Struts
319	CE- 3041	Building Design and Drawing	2018	Unit-1: Drawing of Building Elements Unit-2: Building Planning, Provisions of National Building Code and Building bye-laws Unit-3: Building Services Unit-4: Introduction of Vastu Science and Home Vastu Analysis Unit-5: Commercial & Industrial Vastu
320	CE- 3061	Computer Programming Lab	2018	Unit-1 : Basic Java Features Unit-2: Java Collective Frame Work Data Structures Unit-3: Advance Java Features Multithreading Unit-4: Advance Java Technologies Servlets Unit-5: Advance Web Internet Programming
321	CE.- 5011	Transportation Engineering-I	2018	Unit-1: Principles of highway planning Unit-2: Determination of Los Angeles Abrasion value Unit-3: Determination of California Bearing Ratio values Unit-4: Determination of flash point and fire point of bituminous material Unit-5: Control, Airport, Obstructions
322	CE.- 5021	Structure Design Drawing-I(RCC)	2018	Unit-1: Basic Principles of Structural Design Unit-2: Design of Beams: Doubly reinforced rectangular & Flanged Beams Unit-3: Slabs spanning in one direction Unit-4: Short and long cloumns- Square, Rectangular and Circular columns, Isolated and combined footings, Strap footing Unit-5: Staircases
323	CE- 4011	Environmental Engineering	2018	Unit-1: Sources of Energy, Renewable & Non Renewable Unit-2: Segments of Environment, Ecosystem and Biodiversity Unit-3: Air Pollution & Sound Pollution Unit-4: Water Pollution, Soil Pollution Unit-5: Society, Ethics & Human values
324	CE- 4021	Concrete Technology	2018	Unit-1: Introduction of concrete as per Indian Standard Specifications Unit-2: Properties of Fresh and Hardened Concrete Unit-3: Design of Concrete Mix Unit-4: Production and Quality Control of Concrete Unit-5: Special Concretes, Light weight concrete and Ready mix concrete
325	CE- 4031	Surveying and Geomatics	2018	Unit-1: Traversing by theodolite, EDM and Total Station Unit-2: Tachometry and contouring. Unit-3: Curves, Classification and use Unit-4: Control Surveys Unit-5: Geoinformatic, Remote Sensing, GIS and GPS
326	CE- 4041	Engineering Material and Construction Techniques	2018	Unit-1: Stones Unit-2: Advance Construction Materials Unit-3: Foundation Unit-4: Masonry and Walls Unit-5: Floors and Roofs
327	CE- 4051	Fluid Mechanics	2018	Unit-1 : -Fundamentals Fluid Properties Unit-2: Kinematics of Flow Unit-3: Dynamics of Flow Unit-4: Laminar Flow and Boundary layer concept Unit-5: Dimensional Analysis and Dynamic Similitude
328	CE- 4061	Software Lab	2018	Unit-1 : Introduction to AutoCAD, Software and hardware requirements Unit-2: Learning and practice of Draw commands Unit-3: Drawing basic Geometric Shapes, Basic Plotting and Editing Tools Unit-4: 3D modeling with AutoCAD and Structural software for building sysystem in ETABS Unit-5: Introduction to STAAD .PRO & Primavera.
329	CE.- 5031(A)	Water Resource and Irrigation Engineering	2018	Unit-1: Recording and non-recording rain gauges Unit-2: Types of floods and their estimation by different methods Unit-3: Planning of water resources projects, data requirements Unit-4: Irrigation water requirement and soil-water-crop relationship Unit-5: Types of canals, alignment, design of unlined and lined canals

  
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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
330	CE.- 5031(B)	Marine Construction	2018	Unit-1: Classification of harbours, natural and artificialUnit-2: Harbour components, ship characteristicsUnit-3: Natural Phenomena: Wind, waves, tides formation and currents phenomenaUnit-4: General design aspects, breakwaters -functionUnit-5: Operation of lock gatesand passage, repair docks
331	CE.- 5031©	Urban & Town Planning	2018	Unit-1 : - Trend of urbanization - Planning processUnit-2: Urban Planning agencies and their functionsUnit-3: Building bye-laws. Elements of City PlanningUnit-4: Legal Issues in Planning and Professional PracticeUnit-5: Planning agencies for various levels of planning
332	CE.- 5041(A)	Fluid Mechanics-II	2018	Unit-1 : Laminar and turbulent boundary layers and laminar sublayerUnit-2: Channel geometry and elements of channel sectionUnit-3: Basic assumptions and dynamic equations of gradually varied flowUnit-4: To study the performance & details of operation of Hyd. RamUnit-5: Pelton-wheel turbine-their construction and settings, speed regulation
333	CE.- 5041(B)	Remote Sensing & GIS	2018	Unit-1 : Data and Information, Remote sensing data collectionUnit-2: Introduction, platforms- IRS, Landsat, SPOT, Cartosat, Ikonos, Envisat etcUnit-3: Geographically Referenced Data, Spatial DataUnit-4: Relational Database, Raster DataUnit-5: Applications in land use land cover analysis
334	CE.- 5041©	Renewable Energy Sources	2018	Unit-1 : Comparison of Conventional and nonconventionalUnit-2: Grid connected systems. System configurationUnit-3: Solar Phototonic System Solar cell, Solar cell materialsUnit-4: Principles of OTEC, plant operationsUnit-5: Energy saving in Power Electronic controlled drives
335	CE.- 5051	Material Testing Lab	2018	Unit-1 :1. Determine Compressive Strength of concrete by using Manual Rebound Schmidt HammerUnit-2: Determine the concrete ability to resist chloride ion penetrationUnit-3: Determine Location of Rebars, measurement of concrete cover and bar diameter by using Rebar detectorUnit-4: Determine the Humidity of Concrete and other structure by using VaisalaUnit-5: 8. Determine the Rate of Corrosion in concrete structure by using
336	CE.- 6011	Environmental Engineering-II	2018	Unit-1 : Quantity of water, fire demand, water requirement for various usesUnit-2: To study of sampling techniques for waterUnit-3:Design of sedimentation, coagulation, filtrationUnit-4: valves and appurtenances, analysis of distribution systemUnit-5: Financing and management of water supply project
337	CE.- 6021	Geo Tech Engineering	2018	Unit-1 : Soil composition. Minerals, Influence of clayUnit-2: Permeability Determination of permeability in laboratory and in fieldUnit-3: Mohr - Coulomb's theory of shear failure of soilsUnit-4: Types of slope failures, Rotational slips. Stability numberUnit-5: Analytical and graphical methods of determination of earth pressures
338	CE.- 6031(A)	Quantity Surveying & Costing	2018	Unit-1 : Methods of taking out quantities of items of workUnit-2: . Current schedule of rates.(C.S.R.)Unit-3: R.C.C. works, earth work calculations for roads and estimatingUnit-4: Contingencies and work charge establishment, various percentagesUnit-5: Sinking fund, scrap value, year's purchase
339	BCM-103	Business Law	2012	Unit-1:Contract Act 1872Unit-2:Breach of contractUnit-3:Indian Partnership Act, 1932Unit-4:The Consumer Protection Act 1986Unit-5:Foreign Exchange Management Act 2000 (FEMA)
340	CE.- 6031©	Cost-Effective & Eco-Friendly Construction	2018	Unit-1 : Cost effective materials: Soil, Fly ash, Ferro-cement, Lime, FibersUnit-2: Equipments: Brick moulding machine, Stabilized soil blockUnit-3: Waste water disposal systemUnit-4: Low Cost Road ConstructionUnit-5: Cost analysis and comparison
341	CE.- 6041(A)	Environmental Impact Assessment (EIA)	2018	Unit-1 : Environmental Impact Assessment (EIA)Unit-2: Methods of EIA -Check listsUnit-3: PREDICTION AND ASSESSMENTUnit-4: ENVIRONMENTAL MANAGEMENT PLANUnit-5: CASE STUDIES
342	BCM-202	Business Mathematics	2012	Unit-1:Ratio-Gaining, Sacriticing RatioUnit-2:Preparation of InvoiceUnit-3:Elementary MatricesUnit-4:Logarithms and anti LogarithmsUnit-5:Simple and compound interest.
343	CE.- 6041©	Operational Research	2018	Unit-1 : Linear programming – Graphical methodUnit-2: Transportation Models And Network Models: Transportation AssignmentUnit-3: Maximum flow models -Project networkUnit-4: - Queuing systems and structuresUnit-5: Graphical solution- Algebraic solution- Linear Programming solution
344	CE.- 6051	Quantity Surveying and Cost Lab	2018	Unit-1 : Preparation of detailed estimate.Unit-2: Detailed estimate for services of plumbing and water supply or Electrification work.Unit-3: Detailed estimate for earth work for the road construction or arched culvert.Unit-4: Rate analysis for at least 8 items of constructionUnit-5: Preparation of DPR of Civil Engineering Project.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
345	CE.- 6061	Prestressed Concrete Structure Lab	2018	Unit-1 : Fabrication, casting and testing of simply supported prestressed concrete beam/slab Unit-2: Different layout of cables for strength and deflection behaviour Unit-3: Casting and testing of various prestressed structures as per contents Unit-4: Minimum 15 problems from above topics along with cross checking using any opensource Unit-5: <b>Modeling and analysis of at least one real-life structure</b>
346	CE- 7011	Advanced Structural Design-1(Steel)	2018	Unit - I:Design of structural connections -Bolted, Rivetted and Welded connections. Unit - II:Design of compression members, Tension members, Roof Trusses - Angular & Tubular, Lattice Girders. Unit-III:Design of simple beams, Built-up beams, Plate girders and gantry girders. Unit - IV:Design of columns-simple and compound, Lacings & battens. Design of footings for steel structures, Grillage foundation. Unit - V:Design of Industrial building frames, multistory frames, Bracings for high rise structures, Design of transmission towers.
347	CE- 7021(A)	Computation Methods in Structure Engineering	2018	Unit - I:Matrix formulation for the principle of virtual work and energy principles, Unit - II:Basics of the Direct Stiffness method - Analysis of frames (Sway & Nonsway) Unit - III:Exploiting symmetry, skew symmetry and cyclic symmetry in structures, Imposition of Constraints - Lagrange Multiplier and Penalty Method Unit - IV:Analysis of continuum structures Unit - V:computation of stiffness matrix for isoparametric elements, degrading of elements, plate bending elements.
348	CE- 7021(B)	Design of Hydraulic Structure	2018	Unit - I:Gravity dams: Design Criteria, forces acting on gravity dams, elementary profile, low and high gravity dams, stability analysis, evaluation of profile by method of zoning, practical profile, foundation treatment, construction joints, galleries in gravity dams. Unit - II:Earth Dams: Types, causes of failure and design criteria, soils suitable for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden draw down, steady seepage and construction pore pressure condition. Unit - III:Spillways : Ogee spillway and its design, details of syphon, shaft, chute and side channel spillways Unit - IV:design principles and details of Energy dissipations and gates Unit - V:Hydropower Plants: Assessment of power potential
349	CE- 7021(C)	Structural Dynamics	2018	Unit 1:Equation of motion, mass-spring damper system, D'Alembert's Principle, Solution of differential equation of motion, frequency, period and amplitude of motion. Unit-2:Damped Single Degree of Freedom System Viscous damping, equation of motion, critically damped systems, over and under damped systems, logarithmic decrement. Unit-3:force transmission and vibration isolation, Fourier series representation, response to periodic force. Unit-4:Response to Arbitrary, Step, and Pulse Excitation Response to unit impulse Unit-5:Matrix formulation, stiffness and flexibility influence coefficients, eigen value problem, normal modes and their properties. Matrix iteration technique for eigen value, and eigen vectors, Free and forced vibration by modal analysis.
350	CE- 7021(D)	Environmental Engineering-III	2018	Unit -I:design of sewer, construction & maintenance of sewer, sewer appurtenances, pumps & pumping stations.Characteristics and analysis of waste wate, rcycles of decomposition, physical, chemical & biological parameters. Oxygen demand i.e. BOD & COD, TOC, TOD, Th OD, Relative Stability, population equivalent, instrumentation involved in analysis, natural methods of waste water disposal i.e. by land treatment & by dilution, self purification capacity of stream, Oxygen sag analysis. Unit -II:Unit operations for waste water treatment, preliminary treatment such as screens, grit chamber, floatation tank, sedimentation and chemical clarification, role of micro-organism in biological treatment, Sewage filtration theory& design. Unit -III:Methods of Biological Treatment (Theory & Design) - Activated Sludge process, Oxidation ditch, stabilization ponds, aerated lagoon, anaerobic lagoons, septic tank & imhoff tank, sources & treatment of sludge, sludge thickening and digestion sludge drying beds, sludge disposal. Unit - IV:Advanced Waste Water treatment - Diatomaceous earth filters, ultra filtration, Adsorption by activated carbon, Phosphorus removal, Nitrogen removal, Physico-chemical waste water treatment, and Solid waste
351	CE-7031(A)	Internet of Thing	2018	Unit 1:-Physical design of IOT, Logical design of IOT, Application of IOT Unit 2:-Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT Unit 3:- Design Principles for Web Connectivity Unit 4:-Internet Connectivity Principles: Unit 5:-Sensor Technology , Participatory Sensing, Industrial IOT and Automotive IOT

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
352	CE- 7031(B)	Construction Planning and Management	2018	Unit -I:Schedule of construction, job layout, principles of construction management, modern management techniques like CPM/PERT with network analysis.Unit -II:Construction equipments:Factors affecting selection, investment and operating cost, output of various equipments, brief study of equipments required for various jobs such as earth work, dredging, conveyance, concreting, hoisting, pile driving, compaction and grouting.Unit -III:Contracts: Different types of controls, notice inviting tenders, contract document, departmental method of construction, rate list, security deposit and earnest money, conditions of contract, arbitration, administrative approval, technical sanction. Unit -IV:Specifications & Public Works Accounts: Importance, types of specifications, specifications for various trades of engineering works. Various forms used in construction works, measurement book, cash book, materials at site account, imprest account, tools and plants, various types of running bills, secured advance, final billUnit-V:Site Organization & Systems Approach to Planning: Accommodation of site staff, contractor's staff, various organization charts and manuals, personnel in construction, welfare facilities, labour laws and human relations, safety engineering. Problem of Unit 3:-Transfer Station-Processing and segregation of the solid waste- various methods of material segregation.Unit 4:- methods of compostingUnit 5:-Design and Operation of landfills, Land Farming, Deep well injection
353	CE-7031©	Integrated Waste Management	2018	Unit 3:-Transfer Station-Processing and segregation of the solid waste- various methods of material segregation.Unit 4:- methods of compostingUnit 5:-Design and Operation of landfills, Land Farming, Deep well injection
354	CE- 7031(D)	Geology	2018	UNIT-I:Soil formation, soil profile, geological classification of soil and concept of earthquake Plate- tectonics.UNIT-II:study of common rock forming minerals, ores & minerals of economic importance to civil engineeringUNIT-III:Rocks of civil engineering importance.UNIT-IV:Classification and detailed studies of geological structures i.e. folds,Faults,Joins,Un-conformity and their importance in Civil Engineering.UNIT-V:Applied Geology: Introduction to applied geology and its use in civil engg.,properties of rocks, selection of sites for roads, bridges, dams, reservoirs and tunnels. Prevention of engineering structures from seismic shocks, stability of hill sides, water bearing strata, artesian wells, Use of remote-sensing techniques in selection of above sites.
355	CE-7041	Advanced Surveying Lab	2018	Practical and project based learning of modern surveyng instruments
356	CE-7051	Internet of Thing Lab	2018	Practical and project based learning of Internet of thing
357	CE- 8011	Theory of Structural Design	2018	Unit-1:Virtual work and Energy PrinciplesUnit-2:Analysis of Fixed and Continuous beams by theorem of three moments, Effect of sinking and rotation of supports, Moment distribution method (without sway)Unit-3:Analysis of beams and frames by slope Deflection method, Column Analogy method.Unit-4:Three hinged arches of different shapes, Eddy's Theorem, Suspension cable, stiffening girders, Two Hinged and Fixed Arches - Rib shortening and Temperature effects.Unit-5:Influence Lines for Determinate Structures- Beams, Three Hinged Arches.
358	CE- 8021(A)	Traffic Engineering	2018	Unit -I:PIEV theory. Vehicular characteristicsUnit -II:Traffic Studies :(i) Spot Speed Studies and Volume Studies.(ii) Speed and Delay Studies purpose, causes of delay, methods of conducting speed and delay studies.(iii) Origin and Destination Studies ( O & D) : Various methods, collection and interpretation of data, planning and sampling.(iv) Traffic Capacity Studies: Volume, density, basic practical and possible capacities, level of service.(v) Parking Studies: Methods of parking studies cordon counts, space inventories, parking practices.Unit -III:Traffic Operations and Control :Unit -IV:Street Lighting :1. Methods of light distribution.2. Design of street lighting system.Unit -V:Accident Studies & Mass Transportation:
359	CE-8021(B)	Foundation Engineering	2018	Unit 1:- Selection of foundation and Sub-soil exploration/investigationUnit 2:- Bearing capacity determination using IS Code, Bearing capacity from in-situ tests (SPT, SCPT, PLATE LOAD),Unit 3:- Pile load test, Pile group: carrying capacity, efficiency and settlementUnit 4:- Foundations on problematic soil & Introduction to Geosynthetics:Unit 5:- Rankine's theory of earth pressure, Earth pressures in layered soils, Coulomb's earth pressure theory, Culmann's graphical method.
360	CE-8021©	Bridge Engineering	2018	Unit 2:- design examples of Slab culvert, pipe culvert, T-beam, box culvert bridge super structureUnit 3:- design example of steel superstructureUnit 4:-Design example of piers and abutmentsUnit 5:- design criteria, shallow foundations, deep foundations, piles, wells and pneumatic caissons, river training works.
361	CE-8021(D)	Earthquake Resistant Design of Structures	2018	Unit III:-Structural configuration for earthquake resistant design,Concept of plan irregularities and vertical irregularities, Soft storey, Torsion in buildings. Design provisions for these in IS-1893. Effect of infill masonry walls on frames, modeling concepts of infill masonry wallsUnit IV:-Design of structure for earthquake resistanceUnit V:- Requirements of efficient earthquake resistant structural system, damping devices, base isolation systems. Retrofitting of structures.



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
362	CE- 8031(A)	Pavement Design	2018	Unit –I:repetition of loads and their effects on the pavement structures.Unit –II:Flexible Pavements : Component parts of the pavement structures and their functions, stresses in flexible pavements, Stress distribution through various layers, Boussinesque’s theory Burmister’s two layered theory, methods of design, group index method, CBR method, Burmister’s method and North Dakota cone method.Unit –III:Rigid Pavements : Evaluation of subgrade, Modulus-K by plate bearing test and the test details, Westergaard’s stress theory stresses in rigid pavements, Temperature stresses, warping stresses, frictional stresses, critical combination of stresses, critical loading positions.Unit –IV:Rigid pavement design : IRC method, Fatigue analysis, PCA chart method, joints, design and construction & types, AASHTO Method, Reliability analysis.Unit –V:Evaluation and Strengthening of Existing Pavements : Benkleman beam method, Serviceability Index Method. Rigid and flexible overlays and their design procedures.
363	CE- 8031(B)	Air quality Monitoring and Control	2018	Unit – II:toxicity of various pollutants. Plums patterns and height of chimneys.Unit – III:Atmospheric chemistry, formation of secondary pollutants – PNN, PBN, Photolytic cycles, general diseases and toxicity of pollutantsUnit – IV:Sampling and Analyzing of Air Pollutants: Instruments pollution survey, standards of air pollution.Principle of air pollution control, site selection and zoning, various control methods, process and equipment changes, design and operation of various air pollution control equipments.
364	CE- 8031(C)	Finite Element Method	2018	Unit II:One-Dimensional Elements-Analysis of Bars and Trusses, Linear interpolation polynomials in terms of local coordinate’s for 1D, 2D elements. Higher order interpolation functions for 1D quadratic and cubic elements in natural coordinates, , Constant strain triangle, Four-Nodded Tetrahedral Element (TET 4), Eight-Nodded Hexahedral Element (HEXA 8), 2D isoparametric element, Lagrange interpolation functions, Numerical integration: Gaussian quadrature one point, two point formulae, 2D integrals.Fore terms: Body force, traction force and point loads,Numerical Problems: Solution for displacement, stress and strain in 1D straight bars, stepped bars and tapered bars using elimination approach and penalty approach, Analysis of trusses.Unit-III:Beams and Shafts: Boundary conditions, Load vector, Hermite shape functions, Beam stiffness matrix based on Euler-Bernoulli beam theory, Examples on cantilever beams, propped cantilever beams, Numerical problems on simply supported, fixed straight and stepped beams using direct stiffness method with concentrated and uniformly distributed load.Torsion of Shafts: Finite element formulation of shafts. determination of stress and twists in circular shaftsUnit-IV:Heat Transfer: Basic equations of heat transfer:
365	CE-8031(D)	Artificial Intelligence	2018	Unit 1:- Programming languges preferably used in AI,Techniques/Algorithms used inAI,AI Software plaforms,Future of AIUnit 2:- Various types of production systems and search techniquesUnit 3:- Knowledge Representation and ProbabilisticUnit 4:- Game playing techniquesUni 5:-Various techniques used in learning
366	CE-8041	Earthquake Resistant Lab	2018	Whole syllabus give the practical knowlege of effect of earthquake on structure
367	MEPS-1002	Advance power system protection	2014	Unit I Protective Relays: Relaying review, differential relay, over-current relay, reverse power relay, distance relays, Unit II- voltage regulator square wave generator, time delay ckts level detectors, summation device, sampling circuit, COMPARATORS, Hall effect devices , Unit III Protective devices for system. Protective devices for stator, rotor, three winding transformer protection, Unit IV : Distance protective schemes, directional wave detection relay, features of500 KV relaying protection, Unit V : types of digital and computer aided relays, di/dt relays.Algorithms for transmission line, transformer & bus bar protection;
368	MEPS-1003	Advance Course In Electrical Machines	2014	Unit I : Primitive machine, voltage and torque equation. Concept of transformation, m/c variables and transform variables, Unit II : Operation of 1- $\phi$ induction motor & scharge motor, Unit III: Voltage and power equation for salient and non salient alternator, Simplified equations of a synchronous machine with two damper coils. Unit IV: Operational Impedances and Time Constants of Synchronous Machines , Unit V : Approximate Methods for Generator & System Analysis, Analysis of line to line short circuit
369	MEPS-1004	Power Electronics Applications in Power System	2014	Unit I : Models of OLTC & Phase shifting transformer, load flow study, Unit II : Power systems security levels, contingency selection & evaluation, Pre-contingency corrective rescheduling, Unit III: Jacobian participation factors based on modal analysis, Unit IV: operating characteristics of TCR, FC-TCR, TSC, SVCs, Unit V: analysis variable reactance model and transient stability model of TCSC
370	MEPS-1005	Power System Dynamics Analysis and Control	2014	Unit I :Rotor angle stability, voltage stability and voltage collapse, Unit II : System model, Unit III : synchronous machine, transient analysis of a synchronous machine, Unit IV: Excitation system Modeling, Unit V : static var compensators, inclusion of SVC Model, Unit VI: structure and tuning of PSS



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
371	MEPS - 2001	Reactive Power Control & Facts	2014	Static Var Compensator (SVC), Thyristor Controlled Series compensator (TCSC), STATCOM , Unit - II efron-Phillips model of a SMIB system installed with SVC, TCSC and TCPS, Unit -III Design of robust FACTS based stabilizers installed in SMIB systems , Selection of installing locations and feedback signal for FACTS , Unit - IV Power Transmission Control using UPFC, <u>General Structure of the FACTS devices control.</u>
372	MEPS - 2002	Restructured Power Systems	2014	Transmission Pricing and Tracing of power, IT applications in restructured markets
373	MEPS - 2003	Power System Transients	2014	UNIT - I Lumped and distributed circuit transients. Line energisation and de-energisationtransients. Earth and earth wire effects. UNIT - II Current chopping in circuit breakers. Short line fault condition and its relation to circuit breaker duty. UNIT - III Lightning phenomena. Influence of tower footing resistance and earth resistance Traveling waves in distributed parameter multi-conductor lines, UNIT - IV Simulation of surge diverters in transient analysis. Influence of pole opening and pole closing. Fourier integral and Z transform methods in power system transients. Bergeron methods of analysis and use of EMTP, Unit V: Insulation Coordination: overvoltage limiting devices, dielectric properties, <u>breakdown of gaseous insulation, tracking and erosion of insulation</u>
374	MEPS - 2004	Power Quality and Conditioning	2014	UNIT - II converter configuration and their contribution to supply harmonics UNIT - III Radio interference, supply standards, design of harmonic filters, Improved power quality converter topologies, PWM converter as a voltage source active filter, current source active filter, UNIT - IV constant frequency control, constant tolerance band control ,Electromagnetic interference(EMI), EMI generation , EMI standards, and elimination
375	MEPS - 2005	Energy Conservation and Management	2014	UNIT - I Energy use patterns and scope for conservation. Energy audit: Energy monitoring, Energy accounting and analysis, Auditing and targeting. UNIT - II Thermal energy audit in heating, ventilation and air conditioning. Maintenance and Energy audit, friction, lubrication and tribo- logical innovations. UNIT - III Energy storage for power systems (Mechanical, Thermal, Electrical & Magnetic) Evaluation method of projects, Payback period, Energy economics, UNIT - IV Energy efficient electric drives, Energy efficient motors V.S.D. power factor improvement in power system, UNIT - V <u>Energy conservation task before industry. Energy conservation equipments. Co-Generation</u>
376	MEPS-3001 (1)	Power System Instrumentation	2014	UNIT - I display instruments, recorders. UNIT - II Transducers, sensors, measuring devices UNIT - III Gas analysers, power plants and industrial instrumentation and pollution monitoring devices. UNIT - IV D/A and A/D converters,
377	MEPS-3002 (1)	Special Machines	2014	UNIT - I Square wave permanent magnet brushless dc motor, commutation, UNIT - II Sine wave permanent magnet brushless dc motor, UNIT - III Switched reluctance motor, UNIT - IV Linear Induction Motors UNIT - VStepper motor – variable reluctance stepper motor, single stack stepper motor multistackstepper motor, permanent magnet stepper motor
378	Ay-UG-RS	Rachana Sharir	2021	Shariropakramniya sharir, Paribhsdha sharir, Garbha sharir, Asthi sharir, sandhi shrair,Snayu sharir, peshi sharir, Kesha, Danta, Nakha sharir, Embryology, Osteology,Arthology, Myology, Nervous system, Endocrinology,Lymphatic system, Pramana sharir, Koshtha evam Ashay sharir, Sira sharir, Dhamani sharir, Srotas sharir, Kala sharir, Indriya sharir, Twacha sharir, Marma sharir,Respiratory system, Digestive system, Cardiovascular system, Urinary system, <u>Reproductive system, Sensorv organs</u>
379	Ay-UG-KS	Kriya Sharir	2021	Sharir, Basic principles of Ayurved, Tridosha, Vata Doshha, Pitta Doshha, kapha Doshha, Dosh Vrudhi Kshay, Kriya kal, Prakruti, Aahar, Agni, Aaharpak,Physiology of Homeostasis, Physiology of respiratory system, Physiology of Gastro intestinal system, Physiology of Nervous system, Phusiology of Endocrine glands,Dhatu, Rasa dhatu, Raktadhatu, Mansdhatu, Meddhatu, Asthidhatu, Majjadhatu, Shukradhatu, Concerpt of Ashary Ashrayee Bhav, Ojas, Updhatu, Mala,Indriya Vigyan, Manas, Aatma, idra and Swapna, Hoemopoietic system, Immunity, Physiology of Cardiovsacular ststem, Muscles physiology, Adipose tissue,Physiology of Male and female reproductive system, Physiology of excretion, Spinal senses sleep and dream

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
380	Ay-UG-SA1	Samhita Adhyanam -1	2021	Introduction to samhita, Ashtang Hridayam, Ayushkamiya, Dincharya, Rutucharya, Roganutpadaniya, Dravya Vigyaniya, Anyaswaroop, Anyaraksha, Matrashitiya, Dravyadi, Rasabhedadi, Doshadivigyaniya, Doshbhedadi, Doshotkramaniya, Dwividopakramaniya, Shodhandai gan sangrah, Dirgha jivanteeya, Apamarg tanduliya, Aragwadhadi, Shadvirechan shatashritiya, Matrashitiya, Tasya shitiya, Na vegan Dharayet, Indriyopakramaniya, Khuddak Chatushpada, Maha chatushpada, Treshaniya, Vatkakakaliya.
381	Ay-UG-PV	Padarth Vigyan	2021	Ayurved niruppan, Padarth and darshan niruopan, Dravya vigyaniya, Kula vigyaniy, Karma vigyaniya, Samanya Vigyaniya, Vishesh vigyaniya, Samavya vigyaniya, Abhav vigyaniya, Pariksha, Aaptopadesh pariksha, Pratyaksh pariksha, Anuman pariksha, Yukti pariksha, Upman praman, Karva karan siddhsnta
382	Ay-UG-SN & AI	Sanskrit and Ayurved Itihas	2021	Sanskrit Vrana parichay, Sangya, Upsarg, Avyayani, Karak prakaran, Sandhi, samas, Shabdrupani, Dhaturupani, Pratyay, Visheshan vishesh, Nirukti and paryay, Paribhasha padani, Anvay lekhanam, Panchatantra, Deivation and definition of Itihas, Origin and lineage of Ayurveda, Structure, speciality and time period of Ayurveda, Structure, contribution and importance of Laghutrayi, Origin and period of different systems of medicine in the world, Introduction to Vrukshayurveda, Status of Ayurveda during Askoi, Mughal and British rule, Contribution of scholars of modern era, Globalization of Ayurveda, Development, activities in Ayurveda in the oist independence period
383	BLS-101	FOUNDATION OF LIBRARY & INFORMATION SCIENCE	2018	Unit-I, Social and historical of library. Five laws of Library Science types and functions of libraries with special reference to National Library (Calcutta) Library of congress (Washington) and British Library (London), Role of library in formal and informal Education. Unit - II Library Movement in India: UK and USA, library development plant and programmers in India after independent Role of library in Modern Society. Unit - III Library legislation in Indian status: their salient features, deliver of books, Act copy right and Censorship Act, Intellectual property Act, Right to information Act. Unit - IV Library Building: Planning and designing, location, lighting and ventilation Role of librarian and architect in designing of building, furniture, ect. Unit - V Cooperative & Consulate: Library co-operation and resource sharing library extension services consultancy services, Role of professional associations with special reference to ILA, LASLIC, SISRRLLF role of UNESCO.
384	BLS- 102	MANAGEMENT OF LIBRARIES & INFORMATION CENTRES	2018	Unit - I Concept of Management: Principles of Scientific Management, management, management of school of thought organizational structure policy making bodies of libraries. Library authority and library committee. Unit - II Human Resource Development: Job analysis, Job description, motivation in service training staff recruitment procedures, staff, formula. Unit - III Collection Development: Types of documents and selection principles, different types of section tools and their importance, Acquisition procedure. Budgeting (PPBS, ZBB). Accounting Library rules and regulations. Cost effectiveness Auditing. Unit - IV Technical section: Preparation of books for use routines of classification and cataloguing, filling routines, serial control. Acquisition methods. Methods of recording. Three card system and karex. Unit - V Management and operation of various sections, department maintenance section (Shelvin and stock verification binding), circulation section (work, system- Brows new ark).
385	BLS- 103	KNOWLEDGE, ORGANISATION AND PROCESSING	2018	Unit - I Universe of subjects- structure attributes and modes of formation library classification. Definition need & purpose, including knowledge classification. Unit - II General theory of library classification, facel analysis, fundamental categories devices phase analysis, notation. Unit - III Design & development of schemes of library classification. Specifics of classification schemes introduction to CC, DDC & UDC. Trends in library classification. Unit - IV Library Cataloguing: Definition need and purpose. Theory and physical form. Standard codes of cataloguing- CCC & AACR-II kind of entries and theirs function. Personal & corporate authorship. Unit - V Principles of subjects cataloguing. Current trends in standardization in description & exchange AACR-II, ISBD, MARC ISO 2709, CCF. Introduction to ISBN & ISSN.
386	BLS- 104	KNOWLEDGE, ORGANISATION AND PROCESSING	2018	Practical classification of books and periodicals according to colon classification ( Rev 6th Ed.) and Dewy Decimal classification (19th Ed.) adequate number of titles will be given from disciplines will candidates will be required to classify 20 titles in all. Classified by CC and five by DDC only.
387	BLS- 105	KNOWLEDGE, ORGANISATION AND PROCESSING	2018	Practical cataloguing according to classified catalogues code with Amendment and Anglo- American Cataloguing Rules- 1998 ( Rev, AACR-2) in CCC, Class index entries will be prepared though chain procedure, In AACR-2 subject entries will be prepared according to sear's list of subject headings. Candidates will be required to catalogue fully five in all minimum to by CCC and two by AACR-2.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
388	BLS- 106	DOCUMENTATION AND INFORMATION RETRIEVAL	2018	Unit – I Documentation: Meaning genesis and scopes, facet of documentation, documentation list, documentation in India, Reprographic, Micrographic and translation services. Unit - II Index and indexing: types of indexes per and post co- ordinate indexing, UNITERM, keyword indexing (KWIC-KWOC, KWAC, KWWC) chain indexing. Unit - III Abstracting: Characteristics, elements types, Ranganathan's canon of abstracting. Important abstracting services, Indian science, Biological abstraction. Unit - IV National system: NISSAT, National Documentation centre of India: MSCARE, NASSDOC, And DELNET. Unit - V Information storage and retrieval system: Meaning, purpose and evaluation. Search strategies, concepts of vocabulary control. Theories
389	BLS- 107	INFORMATION TECHNOLOGY: BASIC	2018	Unit - I Introduction of computer, historical background of computer and generation of computer, Architecture- CPU, input/output devices, Basic hardware's. Unit - II Software aspect: Types of Software types and generation of computer operating system- MSDOS/MS Windows. Unit - III Information Technology: Definition, scope and history, CD-ROM, technology, DVD. Unit - IV DBMS- Introduction to database management system (DBMS) with special reference to CDS/SIS. Introduction to library automation software package, SOUL. Unit - V Library Automation: Meaning- brief history, factors and goals. Area of library automation, bar code
390	BLS- 108	REFERENCE SERVICE AND SOURCES OF INFORMATION	2018	Unit - I Documentary sources of information: Print, non print including. Electronic media, nature, characteristics, Utility and evaluation of different types of information sources. Non documentary information sources. Categories primary, secondary and tertiary information sources. Internet as source of information. Unit - II Reference service: Meaning scope. Types of reference service: Short range and long ranges reference service. Reference service v/s information service. Reference service in public- academic and special libraries Reader's initiation/ orientation user education. Unit - III Bibliographies definition need and purpose. Types of bibliographies. Methods of compilation of a bibliography, Evacuation of Bibliographies. Unit - IV Encyclopedias, yearbooks and almanac, names as almanac. Unit - V Dictionaries, Directories, geographical sources, Bibliographical sources. Definition purpose and importance.
391	MLS-201	UNIVERSE OF SUBJECTS & RESEARCH METHODOLOGY	2018	Unit – I Various subjects having degree as the field of study and their interrelation. Religion, philosophy and science their contributions to knowledge. Modes of thinking: speculative. Positivist and authority centered mode of thinking. Unit – II Definitions and types of research: steps Researches process, research methods: Historical survey/ descriptive and with Ranganathan's spiral of Scientific methods. Unit – III Data collection techniques: Documentary, Observation, Experimental. Questionnaire, interview, sampling. Unit – IV Definition and types of research design meaning. Definition and testing of hypothesis Bibliometrics. Unit – V Report writing organization of report. Tabular presentation and reporting. Reporting format. Graphics in report representation.
392	MLS-202	ADVANCED LIBRARY ORGANISATION AND MANAGEMENT	2018	Unit – I Academic Library System Role of Academic library in Higher Education in India. Role of UGC and state Government in promoting Academic library like university. College and academic institutions. Report of committees and commissions of higher education. Ranganathan as advisory committee, UGC committee react 1998. Unit – II Personal management, overview of personnel management. Manpower planning HRD- quality improvement programmers. UGC service condition and pay scales. Yofeshers counsels and career advancement. Unit – III Collection development policy: weeding policy. System analysis and design: MIS, PERT/CPMS, TQM. Unit – IV Personnel management and organizational behavior: organizational structure, hierarchy's authority and delegation, staffing, understanding human behavior etc. group behavior MBO, MBE, official communication, internal and external co- ordination, social communications responsibility of management. Unit – V Implications of INFLIBNET and Resource Sharing. Role of internet in promoting of academic library services. Functional capabilities of a local library network. UGC information centers for sciences and technology and social sciences.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
393	MLS- 203	INFORMATION PROCESSING RETRIEVAL SYSTEMS	2018	Unit – I Information storage and retrieval objectives of ISAR systems. ISAR systems: Operation and design compatibility ISAR system. Evaluation of ISAR systems. Unit – II Information Retrieval: Information Retrieval Process. The process of searching search strategies and Heuristics common command languages and multiple data base searching. Unit – III Index and indexing : definition, indexing systems sss, PRECIS, POPSI, Special types of indexing : KWIC, KWOC etc. citation indexing languages. Thesaurus. Automation indexing. Unit – IV Network and networking: concept of network, major networking in India and abroad, NICNET, INFLIBNET, DELNET, and CALIBNET. Unit – V Reprography: Concept, methods basis of choice of reprographic equipments, micrograph evolution, types of microforms, microforms, microform retrieval system digital microform
394	MLS- 204	INFORMATION COMMUNICATION AND SOCIETY	2018	Unit – I Information: its nature, property and scope, comparative study of data information and knowledge. Data: definition, type's nature properties and scope. Unit – II Information generation and communication: communication process and media. Modes and forms of information, information theory. Unit – III Information diffusion process, knowledge generation cycle. Knowledge generation to utilization, personal knowledge and public knowledge. Knowledge acquisition, learning process. Unit – IV Intellectual property act, rishi to information act, data security and fair use. Unit – V Information as on Economic Resource. Information policies national and international information society. Knowledge of duplications of information.
395	MLS- 205	INFORMATION SOURCES, SYSTEMS AND PROGRAMMES	2018	Unit – I Physical medium of information, print media, multimedia and hypertext, non- print media: micro form, electronic and optical media. Unit – II Information sources, systems and programmers, Indian council of social science research, VISSAT, National manuscript mission India. Unit – III Non- disciplinary studies, content analysis and its correlation to cliental, customized organization of information source. Informational organizational INIS, AGAIS, ARIS. Unit – IV Rural community information system, enjournance programmed. Environmental information system and biotechnology information system. Unit – V User education programmer goals objectives, techniques, methods UEP industrial environment information literacy and digital divide.
396	MLS- 206	INFORMATION TECHNOLOGY: APPLICATIONS	2018	Unit – I Overview of information technology: computer technology, printing and publishing technology CD rom and DVD. Unit – II Storage devices definitions, types of networking (LAN, WAN), data transmission, communication channel, transmission media, switching mechanism topology of network, wireless LANs. Unit – III Internets and its services: Origin and development, resource and services though internet, searching on the internet (WWW, subject directories, search engines, uses of internet access in libraries) intranets. Unit – IV Library automation: Library keeping operations, automated acquisitions, serial control catalogue system, silent features of SOUL. Unit – V Digital libraries general definition, e book founds hardware and software requirement, data capturricy like scanners, OCR and digital camera.
397	MLS- 207	INFORMATION INSTITUTIONS, PRODUCTS AND SERVICES	2018	Unit – I Information centers: types and their organization, data centers and referral centers, information analysis and consolidation centers. Unit – II Literature searches and bibliographies. Technical enquiry service document delivery service, translation services. Unit – III Information products- information news letter, houses bulletin, in-house communications. Trade and product bulletins, state of art reports. Technical digests. Unit – IV Database support service, database: types and use, database intermediaries such as searchers, editor's etc. online information systems and information network networks and information networks information standards for database design and development. Unit – V Study of meddlers, OCLC, inspects, IFLA and FID.
398	CC1	Childhood & Growing Up	2013	Unit 1 : - Perspectives in Development-Skill Development Unit 2 : - Child as a developing individual; a psycho-social entity; stages of development-Skill Development Unit 3 :- Development of emotions: functions of emotions, attachment-Skill Development Unit 4: - Family and child relationships; parenting, child rearing practices -Skill Development
399	CC2	Education in India Status Problems & Issues	2013	Unit 1 : - Concept of Education -Skill Development Unit 2: Silient Features of Ancient Indian Education -Activities Unit 3: Secondary Education -Skill Development Unit 4: Teacher Education and Secondary School Curriculum -Employability

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
400	CC3	Language Across the Curriculum	2013	Unit 1 : -Reading strategies, such as scanning, skimming and reading for extracting information -Skill Development /EmployabilityUnit 2: Writing a review or a summary of the text, with comments and opinions -Skill DevelopmentUnit 3: Texts would include newspaper or magazine articles on topics of contemporary interest -Skill Development -Skill Development /Employability
401	CC4	Curriculum Development and School	2013	Unit 1 : - Curriculum, Syllabus and Text books -Skill Development /EmployabilityUnit 2 : -Curriculum Designing: Concepts and differences -ActivitiesUnit 3 :- Development and Implementation of Curriculum. Enrichment of Curriculum.-Skill DevelopmentUnit 4: - Designing a Curriculum in a given condition Reviewing of Syllabus/Books.-Skill Development
402	CC5	Reading Reflecting on Text	2013	Unit 1 : - Creating environment for reading – reading clubs, class libraries.-ActivitiesUnit 2 : -Reading with comprehension.-ActivitiesUnit 3 :- Narrative text , Expository , Autobiographical Narratives,Field Notes , Ethnographies.-Activities
403	CC21	LEARNING & TEACHING	2013	Unit 1 : -THEORETICAL PERSPECTIVES ON LEARNING.- Skill DevelopmentUnit 2 : - Role of teacher in teaching-learning situations.-ActivitiesUnit 3 :- Creating facilitative learning environments, teachers' attitudes, expectations . Skill DevelopmentUnit 4: - cognitive abilities, interest, aptitude, creativity, personality, values. - Skill Development
404	CC22	LANGUAGE ACROSS THE CURRICULUM	2013	Unit 1 : -Scanning, skimming and extracting relevant information from the books by making notes .- Skill DevelopmentUnit 2 : -extracts or chapters from authors who deal with themes from education, schooling, teaching or learning .- Skill Development
405	CC23	DRAMA & ART IN EDUCATION	2013	Unit 1 : -different methods of Visual Arts like Painting, block printing, collage, clay modelling, paper cutting and folding, etc. Paper framing and display of Art works-Entrepreneurship/ Skill developmentUnit 2 : -Listening/viewing and exploring Regional Art forms of music, dance, theatre and puppetry. -Entrepreneurship/ Skill developmentUnit 3 : -Identification of different performing Art forms and artists ; dance, music and musical instrument, theatre, puppetry, etc. (based on a set of slides, selected for the purpose -Entrepreneurship/ Skill development
406	CC24	Social Science	2013	Unit 1 : -exploration, criticism synthesis and exposition.- Skill DevelopmentUnit 2 : -Functional awareness of Rights and Duties of citizens.- Skill DevelopmentUnit 3 : -Functional awareness of Rights and Duties of citizens. and plan according to active learning strategies.- Skill DevelopmentUnit 4 : -Importance and Organization of Field trips, Visits -Activities
407	CC25	Physical Science	2013	Unit 1 : -Teaching techniques helpful to develop scientific attitude and scientific method.-Activities / Skill DevelopmentUnit 2 : -Learner's academic and process skills development-ActivitiesUnit 3 :- Lectures-Cum-Demonstration .- Skill DevelopmentUnit 4: - Instructional Design, Resources and Teaching Aid for teaching.- Skill Development
408	CC26	Commerce	2013	Unit 1 Place of commerce in secondary school curriculum and its critical appraisal. .- Skill DevelopmentUnit 2 Techniques of teaching commerce .- Skill DevelopmentUnit 3 Analysis and Discussion on skills of teaching Commerce.- Skill DevelopmentUnit 4 . Evaluation of a commerce text-book.- Skill Development
409	CC27	Hindi	2013	Unit 1: Perspectives of Hindi Language.- Skill DevelopmentUnit 2: Perspectives of Hindi Language.- Skill DevelopmentUnit 3: Development of language skills- listening activities for its development-ActivitiesUnit 4: Transaction of curriculum / Co-curricular, Extracurricular activities pertaining to teaching and learning.-Skill Development /Activities
410	CC28	English	2013	Unit 1: Informative, expressive and Directive Linguistic.- Skill DevelopmentUnit 2: English as a library language, link language and international language. .- Skill DevelopmentUnit 3: Instructional design of Teaching English Language.- Skill DevelopmentUnit 4 : - Activities for its development , role of learning by heart, role play, extempore and prepared speeches, debates, language games-Activities
411	BCM-203	Business Organization and Communication	2012	Unit-1:Sole Proprietorship and Partnership.Unit-2:Company OrganizationUnit-3:Communication to ManagersUnit-4:Business CommunicationUnit-5:International Communication for Global Business

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
412	BCM-302	Corporate Accounting	2012	Unit-1: Issue of Shares, Forfeiture, Reissue of Shares and buy back of shares Unit-2: Final Accounts of Companies Unit-3: Valuation of Goodwill and Shares Unit-4: Preparation of Consolidated Balance Sheet of a holding company with one subsidiary company Unit-5: Internal Reconstruction of a company as per Indian Accounting Standard 14
413	BCM-303	Principles of Statistics	2012	Unit-1: Preparation of Statistical Series Unit-2: Measurement of Central Tendency Unit-3: Dispersion and Skewness. Analysis of Time Series Unit-4: Correlation, Regression Analysis Unit-5: Index Number
414	CC31	Pedagogy of School Subjects Part-II	2013	Unit 1 : -Micro Teaching Cycle, Process of Micro Teaching -Skill Development/Activities Unit 2 : -Personality test - Introvert and Extrover -Skill Development Unit 3 : -Advantages , limitations and uses of Micro Teaching -Skill Development
415	CC41	Gender School & Society	2013	Unit 1 : - gendered roles in society: Family, caste, religion, culture, the media and popular culture (films, advertisements, song.- Skill development Unit 2 : -Schools nurture or challenge creation of young people as masculine and feminine selves.- Skill development Unit 3 :-Unit 3 :- Perceptions of safety at school, home and beyond.- Skill development Unit 4 : -Role of the Media and Life Skills Education.- Skill development
416	CC42	Educational Technology & ICT	2013	Unit 1 : - Fundamentals of Computer.- Activities/entrepreneurship Unit 2: Computer Organization: Hardware and Software.- Activities/entrepreneurship Unit 3: Microsoft Windows (System Software).- Activities/entrepreneurship Unit 4: Graphic Effects and Techniques Components of Multi media.- Activities/entrepreneurship
417	CC43	Creating an Inclusive School	2013	Unit 1 : -trends of education for children with special need in India.- Skill development Unit 2: mental retardation and slow learners. - Skill development Unit 3: Support services needed for inclusive school Philosophy of inclusive educations.- Skill development Unit 4 : -individual educational program (IEP) and use of emerging technolog.- Skill development
418	CC44	EPC-4 Understanding the Self	2013	Unit 1 : -Basic Concepts in Environmental Education Ecology Eco-System Food Chain, Pollution and Pollutants , Ecological Balance .- Skill development Unit 2 : -Air Pollution, Water Pollution, Soil Pollution.- Skill development Unit 3 : - United Nations Environment Programme (UNEP) .- Skill development Unit 4 : -Co-curricular and Extra-Curricular , ctivities, Paryavaran Vahini Eco-clubs /Nature clubs -Skill Development /activities
419	CC45	Environmental Education	2013	Unit 1 : -Enable students to develop a vision of life for themselves.- Skill development Unit 2 : -develop the power of positive attitude. encourage students to develop the capacity for self-reflection and personal integration. .- Skill development Unit 3 : -enable students to examine and challenge the stereotypical attitudes and prejudices that influence identity formation and the process of individuation.- Skill development Unit 4 : -leadership and develop attitudes and skills of a catalyst .- Skill development
420	MED 101	Philosophical Perspective of Education	2013	Unit 1 : -Metaphysics, Axiology and Epistemology in Philosophy. -Skill development Unit 2 : -Structure of Inference, Process of Theory building. -Skill development Unit 3 : -traditional Indian schools of Philosophy: Sankhya, Vedanta, Nyaya, and Yoga with Special Reference to their Basic Tenets and their Educational Implications for Aims. -Skill development Unit 4 : -Study of Idealism, Naturalism, Realism, Pragmatism, Existentialism, Logical Empiricism Philosophies . -Skill development Unit 5 : -Western Philosophers: Rousseau, Russell and Dewey. -Skill development
421	MED 102	Educational Research- I	2013	Unit 1 : -Basic/Fundamental Research, Applied Research & Action Research.. -Skill development Unit 2 : -Reviewing Literature and Writing the rationale for any research problem based on review.. -Skill development Unit 3 : -Research Hypothesis, Statistical Hypothesis (Null and Directional), and Operational Hypothesis. . -Skill development Unit 4 : - POPULATION, SAMPLE, AND RESEARCH DESIGN-. -Skill development Unit 5 : -Formats, style and essential elements of research proposal. -Skill development
422	MED 103	Information Communication & Technology (ICT)	2013	Unit 1 : -Input and Output Devices used in Research Process, Memory, Modern Components of different Hardware like laptop, tablet , smart mobiles.- Activities/entrepreneurship Unit 2 : -OPERATING SYSTEMS, WINDOWS, Memory Management, Security and Privacy.- Activities/entrepreneurship Unit 3 : -MS OFFICE, MS Word, Power point: Different Menus and ribbons, making slides. Custom Slide Show.- Activities/entrepreneurship Unit 4 : -Utility of Different Topologies in the field of Education, Online Dictionaries, Translator, Plagiarism Software.- Activities/entrepreneurship Unit 5 : -Computer in Research.- Skill development



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
423	MED 104	First Advance Level Course (Education Tech.)	2013	Unit 1:- Trends in educational technology, mass instructional technology, role of technology in education.- Activities/enterpreneurshipUnit 2 :- APPROACHES OF EDUCATIONAL TECHNOLOGY,Hardware, software and system.- Activities/enterpreneurshipUnit 3 :- Multimedia approach, Classroom communication, Education and Training .- Activities/enterpreneurshipUnit 4 :- MULTI SENSORY AIDS .- Skill developmentUnit 5 :- DESIGNING INSTRUCTIONAL SYSTEM,yes: LPLM, BPLM. MPLM, developing various types of PLM. Development of Modules.- Activities/enterpreneurship
424	MED 201	Psychological Perspectives of Education	2013	Unit 1 :- PSYCHOLOGICAL ORIENTATION TO EDUCATION. -Skill DevelopmentUnit 2 Language development theories- Behaviouristic, Nativist and Interactionist . -Skill DevelopmentUnit 3 Constructivist Theories of Bruner and Vygotsky,Experiential learning of Kolb . -Skill DevelopmentUnit 4:- PERSONALITY THEORIES. -Skill DevelopmentUnit 5:- MENTAL HEALTH AND HYGIENE. -Skill Development
425	MED 202	Research- Data Analysis and Interpretation -I	2013	Unit 1:- understand relationship between types of research tools and the nature of data.. -Skill DevelopmentUnit2:- MEASUREMENT AND DESCRIPTIVE STATISTICS. -Skill DevelopmentUnit3:- NORMAL PROBABILITY CURVE. -Skill DevelopmentUnit 4:- Sampling distribution of mean, sampling error, setting confidence intervals for population mean. . -Skill DevelopmentUnit 4:- COMPUTERS IN DATA ANALYSIS. -Skill Development
426	MED 203	First Advance Level Course Educational Tech.	2013	Unit 1:-TECHNOLOGY OF TEACHING. -Skill DevelopmentUnit 2:-Computer assisted instruction, Web based instruction: uses, web links, online learning, m learning, flipped classroom, blended learning, Virtual classrooms, computer based assessment.- Skill Development/Job orientedUnit3:- MULTIMEDIA; Models of designing multimedia: Reeves Multimedia Design Model, ADIE Model, Script writing for multimedia.- Skill Development/Job orientedUnit 4:-Mass Media: Media – Educational TV and Radio as mass media.- Skill Development/Job orientedUnit 5:-Problem of sub-optimal use of technology in education,. -Skill Development
427	MED301	Sociological Perspectives of Education	2013	Unit 1 : -Conceptualizing Education: Society, Culture, Socialization and Education -EntrepreneurshipUnit 2 : - Theoretical perspectives on education as a social system: Structural-Functional School, Conflict School, Symbolic Interactionism-Skill DevelopmentUnit 3 : -Education and the Family, Education and the Community, Concept of the Community Schools-Skill DevelopmentUnit 4 : -Education and Social Mobility,Social Processes -Skill DevelopmentUnit 5 : -Constitutional Ideals- Social equity and equality of educational opportunities – Addressing education deprivation of SC/ST/OBC/women/ Rural Populati-Skill Development
428	MED 302	Education Technology-II	2013	Unit 1:-Descriptive research, Survey Research , Ex-post facto research, Experimental Research.- Skill DevelopmentUnit 2 : -QUALITATIVE RESEARCH, Case studies, Ethnographic studies, Phenomenological researc. - Skill DevelopmentUnit 3:- Questionnaires, Interviews and observation as tools of research. Socio-metric techniques. - Skill DevelopmentUnit 4:-RESEARCH DESIGN,factors affecting validity of experimental design - Skill DevelopmentUnit 5:- RESEARCH PAPER WRITING AND RESEARCH REPORT WRITING- Skill Development
429	MED 303	Guidance & Counselling	2013	Unit 1 :- GUIDANCE,Philosophical, Sociological and Psychological Foundations of Guidance-EmployabilityUnit 2 :- historical development and importance of counselling,Qualities of effective counsellor-Skill Development/EmployabilityUnit 3 :-Behavior Description, Questionnaire, Rating Scale and Checklist, Observation and Interview schedules, Sociometric Devices. Scientific (Standardized)-Skill Development.Unit 5 :-ORGANIZATION OF GUIDANCE PROGRAM AT VARIOUS LEVELS- Skill Development
430	MED 401	Contemporary and Future of Education	2013	Unit 1 :- Free, universal and compulsory school education: SSA and RMSA,quality and equity concerns.- Skill developmentUnit 2 :- Education for universal human values,Life Skills and education.- Skill developmentUnit 3 :- Campus disturbances,Public-private partnership, Community participation in functioning of institutions- SMCs, PTAs.- Skill developmentUnit 4 :- Online provisions – Entrance, teaching learning and evaluation, Knowledge networks (NKC), Institutional websites as MIS, ODE, Quality of Education.- Skill developmentUnit 5 :- Effects of Globalization, Liberalization and Privatization on teacher education.- Skill development



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
431	MED 402	Research- Data Analysis and Interpretation - II	2013	Unit 1 : -: FACTORIAL DESIGN ANOVA,Two way ANOVA of equal and unequal cell size.- Skill developmentUnit 2 : -: NON PARAMETRIC TESTS,One sample Chi square test: hypotheses of equality- Skill developmentUnit 3 : -: NON PARAMETRIC TEST FOR TWO INDEPENDENT SAMPLES,Mann Whitney U test.- Skill developmentUnit 4 : -: PAIRED SAMPLES TEST,Testing null and directional hypothesesUnit 5 : -: COMPUTERS IN DATA ANALYSIS,Data entry in computer software, Microsoft Excel/ SPSS .- Skill development
432	MED 403	Guidance & Counselling Part -II	2013	Unit 1 : -EDUCATIONAL GUIDANCE,Guidance and Curriculum,different educational stages.- Skill developmentUnit 2 : - VOCATIONAL GUIDANCE, career development,Analysis and Filing of Occupational Information, - Skill developmentUnit 3 : -Personal Guidance,Personality Development,Self Confidence.- Skill developmentUnit 4 : -Group Guidance in Indian Situations,Areas of Research in Guidance and Counseling.- Skill developmentUnit 5 : -Behaviour Patterns of Gifted, underachiever, Slow learner/educationally backward child, Attention deficit hyperactive (ADH) Children, ,Visual/ auditory/ Speech, Orthopedic and Mentally challenged.-Activities/enterpreneurship
433	BCM-402	Cost Accounting	2012	Unit-1:Methods of Wages PaymentsUnit-2:Preparation of Cost Sheet and statement of CostUnit-3:Contract and Job costing, Operating costingUnit-4:Process CostingUnit-5:Cost Audit
434	BCM-403	Principles of Management	2012	Unit-1:ManagementUnit-2:Planning, OrganizationUnit-3:Motivation:, LeadershipUnit-4:Human Resource ManagementUnit-5:Recruitment, Selection and Promotion
435	BCM-502	Income Tax Law & Practice	2012	Unit-1:Indian Income Tax Act. 1961Unit-2:Income from Salary, Income from house propertyUnit-3:Income from Business and ProfessionUnit-4:Set off and arry forward of LossesUnit-5:Advance Payment of Tax
436	BCM-503	Management Accounting	2012	Unit-1:Management AccountingUnit-2:Financial statementUnit-3:Fund Flow Statement, Cash Flow StatementUnit-4:Absorption and Marginal CostingUnit-5:Budgetary Control
437	BCM-603	Auditing	2012	Unit-1: AuditingUnit-2:Internal Check SystemUnit-3:Vouching, Verification of Assets and LiabilitiesUnit-4:Company AuditUnit-5:Special Audit of Banking Companies, Educational, Non Profit Institutions and Insurance Companies
438	BSM 1	Consumer Behavior and Service Marketing	2012	UNIT-IIntroduction to Consumer Behavior: Consumer Behavior& Marketing Strategies. (Segmentation promotion and Positioning Strategies).UNIT-IIConsumer Perception: Purchase search, information processing and Consumer Involvement theory; Evaluative criteria & Decision Rules; Consumer attitude & attitude Change.UNIT-IIIAdvertising campaign-Advertising V/s Consumer behavior; Sales promotion- Role of Creative strategies; Advertising- Retail, National, Cooperative, Political International, Public Service Advertising.UNIT-IVMarket Situation Analysis: Analysis of Competitor"s Strategies and Estimating their Reaction Pattern and Competitive Position;UNIT-VCompetitive Market Strategy for Emerging Industries, Declining Industries and Fragmented Industries; Balancing Customer and Competitor Orientations
439	FC 101/1	English Language	2012	Unit 1:Tryst with Destiny : Jawaharlal Nehru, Satyagraha : M.K. GandhiUnit 2: ComprehensionUnit 3: Paragraph WritingUnit 4: Speech SkillsUnit 5: Language Skills: Grammar and usage
440	FC 101/2	Development of Entrepreneurship	2012	Unit- 1 : EntrepreneurshipUnit-2 : Motivation to achieve targets and establishment of ideas, Development of self confidence, Communication skills,Capacity to influence, leadership.Unit-3 : Project Report, Economic managementUnit-4 : Production management, Marketing managementUnit- 5: Role of regulatory institutions, MP Finance Corporation, Various grant schemes, Schemes of M.P. Tribal Finance Development Corporation
441	FC 401/1	English Language	2012	Unit- 1 : William WordsworthUnit-2 : Short Essay of about 250-300 words.Unit-3 : Translation of a short passage from Hindi to English.Unit-4 : Drafting CV, writing e-mail message for official purpose.Unit- 5:Language Skills
442	FC 401/2	Development of Entrepreneurship	2012	Unit- 1 : EntrepreneurshipUnit-2 : Types of entrepreneurship, importance and views of various thinkers,Self motivationUnit-3 : Projects and various organisations,Govt. Projects, Non-Govt. projectsUnit-4 : Functions, qualities, management of a good entrepreneurUnit- 5:Problems and Scope of the Entrepreneur
443	FC 501/2	Basic Computer InformationTechnology-I	2012	Unit- 1 : Introduction of computer organizationUnit-2 : RAM, ROM, EPROM,PROM.Unit-3 : INPUT & OUTPUT DEVICESUnit-4 : STORAGE DEVICESUnit- 5:INTRODUCTION TO OPERATING SYSTEM

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
444	FC 601/2	Basic Computer Information Technology-I	2012	Unit- 1 : Introduction to word ProcessingUnit-2 : Worksheet basic.Unit-3 : Editing and formatting textUnit-4 : Bullets , footer, paragraph formatting, spell checkingUnit- 5:Internet Ethics, Computer virus, Antivirus software wage, Web Browsers
445	FC-101/2	Development of Entrepreneurship	2012	UNIT I : Entrepreneurship- Definition, Characteristics and importance, Types and functions of an entrepreneur, merits of a good entrepreneur motivational factors of entrepreneurship.UNIT II: (a) Motivation to achieve targets and establishment of ideas. Setting targets and facing challenges. Resolving problems and creativity. Sequenced planning and guiding capacity, Development of selfconfidence. (b) Communication skills, Capacity to influence, leadership. UNIT III : (a) Project Report - Evaluation of selected process. Detailed project report – Preparation of main part of project report pointing out necessary andviability. (b) Selecting the form of Organization – Meaning and characteristics of sole Proprietorship, Partnership and cooperative committees, elements affecting selection of a form of an organisation. (c) Economic management – Role of banks and financial institutions banking, financial plans, working capital- evaluation and management, keeping of accounts. UNIT IV (a) Production management. Methods of purchase. Management of movable assets/goods. Quality management. Employee management.Packaging. (b) Marketing management. Sales and the art of selling. Understanding the market and market policy. Consumer management. Time management. UNIT V (a) Role of regulatory institutions – district industry centre, pollution control board, food and drug administration, special study of electricity development and municipalcorporation. (b) Role of development organizations, khadi & village Commission/ Board, MP Finance Corporation, scheduled banks, MP Women's Economics Development Corporation. (c) Self-employment oriented schemes, Prisma Minister's Employment schemes, Golden Jubilee Urban environment
446	FC-401/2	Development of Entrepreneurship	2012	UNIT I : Entrepreneurship - Meaning, Concept, Characteristics of entrepreneur. UNIT II : Types of entrepreneurship, importance and views of various thinkers. UNIT III : Projects and various organisations (Govt., non-Govt.), Govt. Projects, Non-Govt. projects.Contribution of Books, their limitations,scope UNIT IV : Functions, qualities, management of a good entrepreneur.Qualities of the entrepreneur . UNIT V : Problems and Scope of the Entrepreneur
447	FC-601/2	Basic Computer Information Technology-II	2012	UNIT I : Word Processing: Word. UNIT II : Introduction to Excel Excel & Worksheet UNIT III : Introduction to Power Point. UNIT IV : Power Point– II. UNIT V : Evolution, Protocol, concept, Internet, Dial-up connectivity, leased line, VSAT, Broad band, URLs, Domain names, Portals. E-mail, Pop & web based Email. Basic of sending and receiving Emails, Email & Internet Ethics, Computer virus, Antivirus software wage, Web Browsers.
448	FC-101/1	English Language	2012	Unit 1 : 1. Amalkanti : NirendranathChakrabarti 2. Sita : ToruDutt 3. Tryst with Destiny : JawaharlalNehru 4. Delhi in 1857 : MirzaGhalib, 5. Preface to the Mahabharata : C.Rajagopalachari 6. Where the Mind is Without Fear : RabindranathTagore, 7. A Song of Kabir : Translated byTagore 8. Satyagraha : M.K.Gandhi, 9. Toasted English : R. K.Narayan, 10. The Portrait of a Lady : KhushwantSingh, 11. Discovering Babasaheb : AshokMahadevan. Unit 2 : Comprehension Unit 3 : Composition and Paragraph Writing. Unit 4 :Basic Language Skills : Vocabulary . Unit 5: Basic Language Skills: Grammar and usage
449	MCA - 102	Problem Solving in and Programming & C++	2012	UNIT I : An overview: Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & flowcharts; Characteristics of a good program - accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/conventions of coding, documentation, naming variables; Top down design; Bottom-up design. UNIT II: Fundamentals of C ++Programming: History of C++, Structure of a C++ Program; Data types; Constant Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators. UNIT III : Modular Programming: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion, examples. UNIT IV: Advanced Programming Techniques: Special constructs – Break, continue, exit(), goto & labels, Function returning pointers, Pointer to function, Function as parameter, Structure – basic declaration, membership

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450	BBT-111	CELL AND MOLECULAR BIOLOGY & MOLECULAR GENETICS	2012	UNIT I : Cell as a basic unit - classification of cell types - cell theory - organization of plant and animals cells - comparison of microbial, plant and animal cells. Ultra structure of cells . UNIT II : Cell division (Eukaryotic and Prokaryotic) - mitosis, meiosis and cell cycle. Cell . UNIT III: Chromosomal Architecture - modern concept of Gene; Prokaryotes and Eukaryotes, Genetics of bacteria - Gene transfer in bacteria . UNIT IV: Gene as a unit of mutation and recombination - DNA as a genetic material- different types; RNA as a genetic material - different types-genetic code; Mutation UNIT V: DNA replication.
451	BCH-111	BASED ON INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY	2012	UNIT I : Covalent Bond. UNIT II : Gaseous States. UNIT III : Critical Phenomenon, Classification of solids, Laws of crystallography . UNIT IV : Stereochemistry of Organic Compounds-I, Stereochemistry of Organic Compounds-II. UNIT V : Mechanism of Organic Reactions.
452	BSB 111	Diversity of Microbes & Cryptogams	2012	UNIT I : Viruses- Mycoplasma and Bacteria . UNIT II : Algae - General characters, classification and economic importance; important features and life history. UNIT III : Fungi- general characters, classification and economic importance, important features and life history UNIT IV : Bryophyta - Classification, study of morphology, anatomy, reproduction. UNIT V : Pteridophyta - Important characters and classification. Stelar organization. Morphology and anatomy
453	BSZ 111	INVERTEBRATA & CHORDATA	2012	UNIT I : A brief introduction and nomenclature - Level of Organization. Phylum Protozoa. UNIT II: Phylum Porifera: General characters, Phylum Coelenterata, Phylum Mollusca. UNIT III : Phylum Platyhelminthes, Phylum Annelida. UNIT IV: Introduction- Type Study: Amphioxus, Class: Pisces. UNIT V : Class : Amphibia, Class: Reptelia.
454	BCS-111	COMPUTER FUNDAMENTALS & APPLICATION	2012	UNIT : I Objective, Introduction, Generations of computer. UNIT II : Hardware, Computer Language, Machine Language, Assembly Language, High Level languages, Operating Systems and their Applications. UNIT III : Software-Concept, software-Classification, What is Operating system. UNIT IV : General introduction to network, Meaning of network, Definition of network, LAN, WAN, VLAN, SONET, Types of network, Common types of network, Categories of networks, Topology in network:-BUS, STAR, RING, TREE, MESH. UNIT V : Accessing the internet, Getting an internet account, Getting connected to internet, World Wide Web, Web page, Net surfing, Beginnings of Email, Email settings, Web browser, web Servers, HTTP
455	BEC111	FUNDAMENTALS OF ELECTRONICS	2012	UNIT I : Diode circuits and power Supplies: Junction diode characteristics- Half and full wave rectifiers-Expression for efficiency and ripple factor Construction of low range power peakusing diodes. UNIT II: Transistor circuits: Characteristics of a transistor in CB, CE modes - Relatively merits - Graphical analysis in CE configuration- Transistor as a amplifier- RC coupled B.Sc. Electronics . UNIT III: Amplifiers: General principles of small signal amplifiers- Classifications- RC coupled amplifiers- Gain- Frequency response- Input and output impedance- Multistage amplifiers- Transformer coupled amplifiers- Equivalent circuits at low, medium and high frequencies . UNIT IV : Feedback Amplifiers: Basic concept of feedback amplifiers- Transfer gain with feedback- General characteristics of negative feedback amplifier- Effect of negative feedback on gain. UNIT V: Operational Amplifiers: Principles- Transfer characteristics- Various offset parameters- Differential gain - CMRR - Slew rate - Band width. Op-amp Circuits: Basic operational amplifier circuits under inverting and non inverting modes- Adder- Subtractor- Integrator- Differentiator.
456	BMM-111	Algebra and Trigonometry	2012	UNIT I: Linear Algebra:- Rank of a Matrix, Eigen values, Eigen vectors, Characteristics equation of a matrix, Cayley Hamilton theorem. UNIT II: Theory of Equations. Relation between the roots and coefficients of a general polynomial equation in one variable, Transformation of equations, sum of rth powers of roots. UNIT III: Expansion of Trigonometrical function. UNIT IV: Group Theory and number theory . UNIT V: Boolean Algebra and graph theory.
457	BMB 111	Fundamental of Microbiology	2012	UNIT 1 : History, Taxonomy and Classification: History and Scope of microbiology. UNIT 2 : Microscopy and Staining Techniques. UNIT 3: Morphology of Bacteria- Size, shape and arrangement of bacterial cells, Structures external to cell . UNIT 4 : Microbial Taxonomy: Bacteria with unusual properties. UNIT 5: Introduction to acellular forms of life Introduction to viruses, viroids and prions.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
458	BFS 111	INTRODUCTION TO FOOD TECHNOLOGY	2012	UNIT I : Introduction to food science, Definition, historyFood science concept. UNIT II : Colloidal systems in foods Constituents of food, true solution, suspension, stability of colloidal system,Classification of food. UNIT III : Food additive and adulteration Food additives, antioxidants, sequestrants, preservatives, nutrient supplement, emulsifiers, stabilizers and thickening agents, bleaching and maturing agent, sweeteners, humectants and anti caking agents coloring and flavoring substance,Food adulteration. UNIT IV : Sampling and sample preparation, Population and sample, Methods of sampling-simple random sampling, systematic sampling, stratified random sampling, Summary Measures. UNIT V : Food safety, quality and evaluation.
459	BCH-121	Based on inorganic, organic and physical chemistry	2012	UNIT I :Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Vander WaalsForces Metallic Bond and Semiconductors. UNIT II: Rate of reaction, rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst.Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction.Half life period of a reaction.Methods of determination of order of reaction. Kinetics-II. UNIT III: Electrolytic conduction, factors affecting electrolytic „Arrhenius theory of ionization, Ostwald’s Dilution Law. Debye-Huckel – Onsager’s equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included). Electrochemistry-II . UNIT IV : Nomenclature of alkenes, , mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. The Saytzeff rule, Hofmann elimination. UNIT V : IUPAC nomenclature of branched and unbranched alkanes , thealkyl group classification of carbon atoms in alkanes
460	BSB 121	Cell Biology & Genetics	2012	UNIT I: The cell envelope-Structure and function of cell organells. UNIT II:Ultrastructure andfunction of nucleus: Nuclear membrane, Nucleolus, Extranuclear genome, Presenceand functionsofmitochondrialand plastid-DNA, Plasmids. UNIT III: Variations in chromosomes structure. UNIT IV: Structure of gene: genetic code, transfer of genetic information; trascription, translation, protein syntesis, tRNA, and ribosomes. UNIT V: Genetic inheritance: Mendelism; laws of segregation and independent assortment; linkage analysis; interactions of genes
461	BBT-121	BIOMOLECULES & ORGANIC MECHANISM	2012	UNIT 1: Biomolecules :configuration and conformation .Properties of water as biological solvent. Carbohydrates: Chemicalstructures, nature,properties, Classification and Importance in Biological Systems. Amino acid. UNIT 2 : Enzymes: Classification, Characteristics, Factors affecting enzyme activity. Enzyme Kinetics. UNIT 3: Nucleic acids: Bases, nucleosides and nucleotides, DNA & RNA structure, DNA forms, RNA types.Watson and crick model . UNIT 4 : Carbohydrate Metabolism . UNIT 5: Aminoacid Metabolism– Aminoacid breakdown (amino acid deamination, Ureacycle,metabolic breakdown of individual amino acids .
462	BSZ 121	CELL BIOLOGY & GENETICS	2012	UNIT I : Prokaryotic and eukaryotic cells. UNIT II :Lysosomes: Ultra structure and polymorphism- chemical composition and functions: Peroxisomes and glyoxysomes. Mitochondria: Ultra structure- chemical composition- enzyme systems- functions-Oxidation- Respiratory chain (ETP)- Kreb’s cycle, ATP Production and Biogenesis. UNIT III : Ribosomes: Ultra structure-types- chemical composition - functions. Nucleus and Neucleolus: Ultra structure of Nucleus and Nucleolus. Nucleic Acids: DNA –Ultra structure-replication- transcription, Chromosomes UNIT IV :Introduction –Laws of Mendel –Interaction of genes (Epistatic gene ,Complementary genes and Lethal genes . Inheritance of Blood group in man and Coat colour in Rabbit . Mechanism of linkage and crossing over –Types and theories - Chromosomal Mapping . UNIT V : Sex determination in man, Drosophila and Bonellia. Mutations – Point mutation and Chromosomal aberrations and mutagens

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
463	BCS-121	Operating System	2012	UNIT I : Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, Operating system structure, Operating system design & Implementations. UNIT II: File: concepts, access methods, free space managements, allocation methods, directory systems, protection. UNIT III : Process: Concept, Process Control Blocks (PCB), Scheduling criteria Preemptive & non Preemptive process scheduling, Scheduling algorithms, inter process communication. Deadlock: Characterization. UNIT IV: Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation .UNIT V : Distributed operating system:-Types, Design issues, File system, Remote file access, RPC,RMI, Distributed Shared Memory(DSM).
464	BEC 121	SEMICONDUCTOR DEVICES AND IC FABRICATION	2012	UNIT : I Digital Electronics. UNIT II : Number system and codes: Decimal, binary, octal, hex numbers, conversion from one to another- codes,BCD, excess 3, gray codes conversion from one to another-Error correction / detection codes.Booleanalgebra and theorems: Basic, Universal logic gates. UNIT III : Sequential Digital Circuits: Flip- Flops, RS, clocked SR, JK, D, T, master-slave types -shift registers, ringcounters-ripple counters- Design of counters - modulus of counters - timer IC 555, applications.DAC andADC: Parameters, Accuracy, Resolution- DAC, variable resistor network, R-2R ladder network types-ADC, counting, continuous, successive approximation, dual-slope types - comparison of various types ofADCand DAC. UNIT IV : Transistors- Working of PNP and NPN transistors- Transistor connections- Relation between $\beta$ and $\alpha$ -Expression for collector current- Transistor characteristics in CE mode - Transistor as an amplifier and oscillator its performance-Semi conductor devices numbering system. UNIT V : Construction, working characteristics of UJT and SCR I Equivalent circuit of UJT-SCR as a switch andrectifier-ApplicationsofUJTandSCR- CharacteristicsofTRIAC.Schottkyeffect
465	BMM-121	Calculus and Numerical Analysis	2012	UNIT I :Successive differentiation, Leibnitz theorem, Maclaurin and Taylor series expansions, Curvature, Tests for concavity and convexity, Points of inflexion, Multiplepoints, Tracing of curves in Cartesian co-ordinates. UNIT II: Limit and continuity of functions of two variables, Introduction of Partial differentiation, Euler's Theorem on homogeneous function, Jacobians, Differentiability of real-valued functions of two variables, Taylor's theorem . UNIT III: Numerical integration: General quadrature formula, Trapezoidal rule, Simpson's one- third rule, Simpson's three-eighth rule, Weddle's rule, Euler-Maclaurin Summation formula, Sterling's formula. UNIT IV : Linear Differential equations and equations reducible to the linear form, Exact differential equation, First order and higher degree equations Solvable for x, y and p, Clairaut's form and singular solutions, linear differential equations with constant coefficients. UNIT V: Vector differentiation, Gradient, Divergence and Curl, Vector integration, Theorem of Gauss and problems based on it, Theorem of Green and problems based on it, Stoke's theorem
466	BMB 121	Microbial Physiology & Microbial Genetics	2012	UNIT I: Cultivation and Pure Culture Techniques Nutrition and nutritional types of bacteria, Bacteriological media . UNIT II: Microbial Growth Mathematical expression of bacterial growth, generation time and growth rate, Growth curve and phases of growth cycle, Batch, continuous and synchronous cultures; diauxic growth, Factors affecting microbial growth. Measurement and Preservation Methods. UNIT III: Control of Microorganisms- I Microbial death curve under adverse condition, Concept of sterilization, disinfection, asepsis and sanitation, Physical methods of control. UNIT IV: Fundamentals of Genetics DNA as genetic material, Structure and types of DNA and RNA, Genetic code, Proteinsynthesis - Transcription and translation, DNA Replication and Gene Structure. UNIT V: Mutation- Evidence for spontaneous nature of mutation, Molecular basis of mutation,Genetic Recombination- I, Gene transfer in bacteria, Transformation.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
467	BFS 121	BASIC NUTRITION	2012	UNIT 1 :Introduction to nutrition-Definition, optimum nutrition, nutritional status, good nutritional status, poor nutritional status, malnutrition. UNIT 2 : Food and our body Food and its functions, digestion, absorption and metabolism of food Buccal digestion, gastric digestion and intestinal digestion, factors that affect digestion, absorption and metabolism. UNIT 3: Energy metabolism Introduction, unit of measurement, energy value of food- calorimetry or bi proximate composition; energy needs of the body- reference man and reference woman; basal metabolic rate, factors affecting the BMR, Carbohydrates. UNIT 4: Proteins Introduction, classifications of proteins, nutritional classification of amino acids protein quality - biological value, net protein utilization, protein efficiency ratio, Fat. UNIT 5: Vitamins-Classification- fat soluble and water soluble vitamins;Fat soluble vitamins, A, D, E and K - introduction, function, deficiency, sources, RDA Water soluble vitamins- B complex and C-introduction, functions, deficiency, sources, RDA,Minerals-major or macro minerals. Water- Introduction, functions, water
468	BCH-131	Based on inorganic, and Physical Chemistry	2012	UNIT : I Definition of transition elements, position in the periodic table, General characteristics & properties of Ist transition elements, Structures & properties of some compounds of transition elements- TiO <sub>2</sub> , VOCl <sub>2</sub> , FeCl <sub>3</sub> , CuCl <sub>2</sub> and Ni (CO) <sub>4</sub> .Chemistry of Elements of IInd & IIIRD transition series . UNIT II : Werner's coordination theory, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes. Non-aqueous Solvents. UNIT III : Definition of thermodynamic terms: system, surrounding etc. First law of thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law – Thermodynamics-II . UNIT IV : Monohydric alcohols nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters.Hydrogen bonding. UNIT V : Nomenclature of Carboxylic acids, structure and bonding, physical properties, acidity of carboxylic acids,.Preparation of carboxylic acids.Reactions of carboxylic acids.Acid Derivatives
469	BSB 131	Diversity & systematics of seed plants	2012	UNIT I : Characteristics and Classification of Gymnosperms, Heterospory and Origin of Seed Habit, Evolution and Diversity of Gymnosperms. UNIT II: Morphology, Anatomy Reproduction and life cycle of Cycas, Pinus and Ephedra. UNIT III: Origin and Evolution of Angiosperms, Fundamental components of $\alpha$ , $\beta$ , $\gamma$ taxonomy, Plant Identification, Principles and rules of Botanical Nomenclature, Herbarium and Botanical gardens; Classification of Angiosperms. UNIT IV : Diagnostic characteristics and Economic Importance of Families –Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, and Apiaceae. UNIT V: Diagnostic characteristics & Economic Importance of Families –Asteraceae, Asclepiadaceae, Solanaceae,Lamiaceae,Euphorbiaceae, Liliaceae and Poaceae .
470	BSZ 131	ANIMAL PHYSIOLOGY & DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY	2012	UNIT I: Nutrition –types, Enzymes – Enzyme action, Coenzymes, Digestion in man. Respiration . UNIT II: Excretion – types of nitrogenous wastes – structure of the mammalian kidney and urine formation – renal failure – kidney stone – kidney transplantation. Osmotic . UNIT III: Amoeboid, ciliary and flagellar movements.Types of muscles . UNIT IV: Spermatogenesis – definition – process and significance, structure of mammalian sperm. Oogenesis . UNIT V: Cleavage patterns (types) – Cleavage in Frog, Chick and Mammals.Morula and Blastulation. Introduction – cells and organs involved in immune response. Types of immunity .
471	BBT-131	FOOD BIOTECHNOLOGY & BIOPROCESSENGINEERING	2012	UNIT 1 :Food as a substrate for microorganisms: pH, moisture content, redox potential, nutrient content and inhibitory substances. Microorganisms important in food industry. UNIT 2 : General principles underlying spoilage: Causes of spoilage. UNIT 3: Foods and enzymes produced by microorganisms. UNIT 4 : Introduction to fermentation: rate of microbial growth and death. Fermentation-types,classification. UNIT 5: Isolation and preservation of industrially important microorganisms -strain development mutation and recombination



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
472	BCS-131	NETWORK SECURITY	2012	UNIT I : Security trends – Attacks and services .types of attacks. UNIT II : Cryptography, Classical Cryptographic Techniques, Encryption, Decryption, Code Breaking Methodologies. UNIT III : Hash functions, One way hash functions, SHA(Secure Hash Algorithm), Authentication Requirements, Authentication Functions, Kerberos, Message Authentication Codes, MD5, Message Digest Functions, SSL (Secure Sockets Layer),SSH(Secure Shell) UNIT IV : Trojans and Backdoors- Overt and Covert Channels, Working, Types . UNIT V : IP Security, web Security, firewalls, trusted systems, Computer Forensics, Hacking, classes of hacker
473	BEC 131	ELECTRONIC COMMUNICATIONSYSTEMS	2012	UNIT I : Basic communication systems: Block diagram. UNIT II: Modulation - Needs for Modulation - Types of Modulation - Amplitude Modulation - Generation anddetections circuits- Balanced Modulator- DSB/SC and SSB Modulation- VSB modulation.Blockdiagram of AM Radio transmitter and super heterodyne Receiver. UNIT III : Pulse Modulation- Sampling theorem- PAM, PWM, PPM, PCM- quantizing, sampling, coding,decoding, quantization error, delta modulation and adaptive delta modulation. Multiplexing- FDM, TDM,CDMA- ASK, FSK, PSK-Advantagesof Digital Communication . UNIT IV: Frequency and phase modulation: Definition- Relationship between FM & PM- Frequency deviation-Spectrum and transmission BW of FM, comparison of AM and FM systems.UNIT V : Television of TV system- Block diagram- Scanning- Synchronisation- VSB transmission and receptionColoursignaltransmission.
474	BMM-131	Linear Algebra	2012	UNIT : I ALGEBRA :Partial fractions, binomial, exponential and logarithmic series. UNIT II : THEORY OF EQUATIONS :Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation , FINITE DIFFERENCES :Operators E, difference tables, Newton's forward and backward interpolation formulae, Lagrange's interpolation formulae. UNIT III : Laplace transformations: Laplace transformations, Linearity of the Laplace transformation, Existence theorem of Laplace transforms. UNIT IV : DIFFERENTIAL CALCULUS: Series Solution of Differential Equations-Power series Method, Bessel's Equation . UNIT V : Groups :-Normal sub group, Quotient groups, homomorphism and isomorphism of groups, Kernel of homomorphism of groups, fundamental theorem of homomorphism of groups
475	BMB 131	Microbial Biochemistry & Environmental Microbiology	2012	UNIT I : Carbohydrates-Chemical structures, nature and properties, Classification and importance in biological cells. UNIT II: Enzymes & Bioenergetics- General characteristics.Factors affecting enzyme activity, Regulation of enzyme activity, Enzyme kinetics. UNIT III: Lipids, vitamins and hormones, Saturated and unsaturated fatty acids, Structure, classification, properties and function of lipids and vitamins . UNIT IV : Soil Microbiology, Water Microbiology. UNIT V: Food Microbiology & Air Microbiology.
476	BFS 131	BASIC PRINCIPLES OF FOOD ENGINEERING	2012	UNIT I: Engineering units Dimensions – Primary, secondary Engineering units. UNIT II: Heat transfer in food processing systems. UNIT III: Mechanical operations, Mixing-different type of mixers used in food in industry, continuously stirred mixing tanks. Filtration- batch filtration, continues filtration, ultra filtration, reverse osmosis, Clarification and concentration process- evaporation, diffusion concentration, single and multiple stage freeze concentration, reverse osmosis. Dehydration systems. UNIT IV: Mechanical separation- sedimentation, centrifugation, filtration, phase separation, distillation Thermal processing of packaged foods . UNIT V:Food Freezing, Introduction, Thermodynamics of food freezing.
477	MCA - 202	Database Management Systems	2012	UNIT I : Introduction: Advantage of DBMS approach, various view of data, data independence, schema and subschema, primary concepts of data models, Database languages, transaction management, Database administrator and users, data dictionary, overall system architecture.ER model: basic concepts, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema, reduction of ERSchema to tables. UNIT II : Domains, Relations and Keys: domains, relations, kind of relations, relational database, various types of keys, candidate, primary, alternate and foreign keys. Relational Algebra & SQL: The structure, relational algebra with extended operations, modifications of Database, idea of relational calculus, basic structure of SQL, set operations, aggregate functions, null values, nested sub queries, derived relations, views, modification of Database, join relations, DDL in SQL UNIT III :Functional Dependencies and Normalization: basic definitions, trivial and non trivial dependencies, closure set of dependencies and of attributes, irreducible set of dependencies, introduction to normalization, non loss decomposition, FD diagram, first, second, third Normal forms.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
478	BCH-141	BASED ON INORGANIC, AND PHYSICAL Chemistry	2012	UNIT I : Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds. Actinides. UNIT II: Second law of thermodynamics, need for the law, , Carnot's cycles and its efficiency, Carnot's theorem, .Thermodynamics scale of temperature. Concept of entropy - entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, Third law of thermodynamics. UNIT III : Electrolytic and Galvanic cells . UNIT IV: Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabrielphthalimide reaction, Diazonium Salts Mechanism of diazotisation, structure of benzene diazoniumchloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO <sub>2</sub> reaction and its synthetic application. Nitro Compounds.UNIT V : Nomenclature and structure of the carbonyl group.Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides. Ketones.
479	BSB 141	Structure, development & reproduction in flowering plants	2012	UNIT : I The Root system. UNIT II : The Shoot system. UNIT III : The Leaf system. UNIT IV : The Flower system. UNIT V : Double Fertilization, Development and types of Endosperm and its morphological nature, Development of Embryo in Monocots and Dicots.
480	BSZ 141	ECOLOGY & EVOLUTIONARY BIOLOGY	2012	UNIT I : Abiotic factors of the Environment . UNIT II: Population : characteristics –Natality, Mortality, Density, and age distribution, population control, life- tables, Food chains, Food webs and Ecological pyramids. UNIT III: Pond as a Ecosystem, energy flow and ecological succession. Habitats . UNIT IV : History of Evolutionary thought - Origin of life –Chemical evolution. Evolution of self replicating system. UNIT V: Natural selection- Species and Speciation- Sympatric and allopatric speciation.Isolating mechanism- mutation and genetic drift. Adaptation and adaptive radiation, Colouration-mimicry-Darwins finches.Polymorphism-types and significance.Convergent-Divergent-parallel and co-evolution of Man and cultural evolution.
481	BBT-141	MOLECULAR IMMUNOLOGY & RECOMBINANTDNATECHNOLOGY	2012	UNIT I: Historicalperspectives, Antigen and antigenicity,Immunoglobulins. UNIT II: Organisation and expressions of immunoglobulingenes. UNIT III: Immuneregulation, autoimmunity, vaccines and immune response to infectious diseases- Immunodeficiency diseases(AIDS). UNIT IV: History of Recombinant DNA Technology.Isolation and Quantification of DNA and RNA . UNIT V: Gene transfer methods in animals: Micro injection, Electroporation, Microprojectile bombardment, ShotGun method, Ultrasonication, Lipofection, Microlaser. Selection and Screening of Recombinants by genetic.
482	BCS-141	SOFTWARE DESIGNING	2012	UNIT 1 :Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model. UNIT 2 : Requirement, Analysis, and Specification Functional and Non functional requirements, Object oriented software development. UNIT 3: The Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function oriented Design. UNIT 4 :Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing Fundamentals, Software Test Process, Testing Levels, Black-Box Testing, White-Box Unit Testing . UNIT 5: Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering.
483	BEC141	MICROPROCESSOR AND ITS APPLICATIONS	2012	UNIT I : Architectureof8085microprocessor-Registers-Flags-ALU-Addressanddatabuses-Demultiplexing the address / data bus- Control and status signals-I0nstruction set of 8085- Addressingmodes . UNIT II : Stackand stackrelated instructions-Subroutines-Advanced programmingtechniques. UNIT III : Semiconductor memories- Classification- Instruction cycle, Machine cycle and Tstate UNIT IV :Interrupts- Hardware and software interrupts- Interrupt priorities- SIM and RIM instructions- PolledI/OandinterruptcontrolledI/Odatatransfer- Interfacingprogrammabledevices. UNIT V : Interfacing D/A converter and waveform generation- Interfacing A/D converters-Keybaord / DisplayController 8279- Internal architecture and working

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
484	BMM-141	Analysis	2012	UNIT I : Group automorphisms, inner automorphism, Group of automorphisms, Conjugacy relation and centraliser, Normaliser, Counting principle and the class equation of a finite group, Cauchy's theorem for finite abelian groups and non-abelian groups. UNIT II: Introduction to rings, subrings, integral domains and fields, simple properties and examples, ring homomorphism, ideals and quotient rings. Divided differences and Newton's divided differences formula for interpolation and Lagrange's formula for interpolation. UNIT III : Laplace Transformation (LT) - definitions, LT of the function $t, e^{at}, \cos at, \sin at, e^{at} \cos bt, e^{at} \sin bt$ , Transform $f'(t), f''(t)$ - inverse LT relating to the above standard functions. Convolution theorem based problem Maxima, Minima and saddle points of functions of two variables, Improper integrals and their convergence, Comparison test, Abel's and Dirichlet's tests. UNIT IV: Partial Differential equations of the first order, Lagrange's solution, Some special types of equations which can be solved easily by methods other than general methods, Charpit's general method of solution, Partial differential equations of second and higher orders, Partial differential equations reducible to equations with constant coefficients. UNIT V : Continuity and differentiability of Complex functions. Analytical function. Cauchy Riemann equation. Harmonic
485	BMB 141	IMMUNOLOGY & MEDICAL MICROBIOLOGY	2012	UNIT I : I Infection Normal flora of human body, Infection and its types, Mechanism of pathogenesis. Immune System, Organs of Immune system. UNIT II : Immune Response Immunity- Innate and acquired, Host defense mechanism, Antigens and Antibodies Antigens- Properties and types, Adjuvants, Immunoglobulins, UNIT III : Antigen and Antibody Reactions Agglutination and precipitation reactions, Hemagglutination and PHA, Immunofluorescence, ELISA, RIA, Coombs test (Direct and Indirect), Complement. UNIT IV : Epidemiology of Infectious Diseases Epidemiological study, Transmission of diseases, Types of diseases- Epidemic, pandemic and sporadic, Nosocomial infections. Antimicrobial Agents Antibiotics- Mode of action, Development of resistance. UNIT V : Hypersensitivity, Hypersensitivity- Immediate and delayed type, Autoimmune diseases, Skin tests. Microbial Diseases- I-Gram Positive Cocci- Staphylococcus aureus and Streptococcus pneumoniae, Gram Negative Bacilli- Salmonella typhi and Vibrio cholerae, Acid fast bacteria- Mycobacterium tuberculosis. Virus- Hepatitis and HIV
486	BFS 141	BIOCHEMISTRY	2012	UNIT I : Carbohydrates: classification, monosaccharides, oligosaccharides, polysaccharides, structure and configurations. UNIT II: Lipids: classification of lipids, fatty acids, essential fatty acids, triglycerols, phospholipids, glycolipids, lipoprotein, sterols, amphipathic lipids, digestion absorption transportation and utilization, functions source and requirement, effect of deficiency. UNIT III: Proteins and amino acid: amino acid, classification, properties, essential amino acid, structure of proteins. UNIT IV : Enzymes: Nomenclature and classification, kinetics of enzymic reactions, types of enzymes, enzyme inhibition, reversible inhibition, irreversible. UNIT V: Vitamins: classification, functions, requirement and deficiency conditions, vitamin A, D, E, K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Pantothenic acid.
487	BCH-151	BASED ON INORGANIC, ORGANIC & PHYSICAL CHEMISTRY	2012	Unit 1 : Limitations of valence bond theory, an elementary idea of crystal-field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, Magnetic Properties of Transition Metal Complex Unit 2 : Black-body radiation, Planck's radiation law, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance of Postulates of quantum mechanics, quantum mechanical operator, commutation relations, Hamiltonian operator, Hermitian operator, average value of square of Hermitian as apposite quantity, Role of operators in quantum mechanics Unit 3 : Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, Rotational Spectrum Diatomic molecules. Energy levels of rigid rotator (semi-classical principles), selection rules. Vibrational spectrum. Unit 4 : Classification and nomenclature. Monosaccharides, mechanism. Unit 5: Organomagnesium compounds
488	BSB 151	Plant physiology and biochemistry	2012	UNIT I : Plant Water Relations. UNIT II: Photosynthesis: . UNIT III : Respiration: . UNIT IV Definition, classification and chemical structure. UNIT V Genetic Engineering

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
489	BSZ 151	MICROBIOLOGY AND BIOCHEMISTRY	2012	UNIT I : Classification of microorganisms- General characteristics of Bacteria, Virus, Yeast.Bacteria. UNIT II : Morphology of water, air soil and sewage.Water-Microorganisms of water, total bacterial count. Air- Microorganisms in soil. UNIT III: Food borne diseases- Microbial food poisoning by Salmonella and Clostridium botulinum (Botulism).Measures to prevent microbial food poisoning. Food infection. UNIT IV: Biochemistry- Definition and its importance, Physio- chemical forces acting on the living body –a) Definition of pH and its determination, Maintenance of pH of blood UNIT V: Carbohydrates, lipids, Amino acids & proteins.
490	BBT-151	INSTRUMENTATION & BASICBIOSTATISTICS	2012	UNIT I : GeneralBiophysicalmethods. UNIT II : Centrifugation UNIT III : Spectroscopy . UNIT IV : Introduction and Definition of Biostatistics, Tabulation and classification of data, Frequencydistribution and Graphical distribution of data, Measures of central tendencies Mean, Median,Mode and their properties. Computation of mean, variance and standard deviation, t-test,correlation coefficient. UNIT V : Measures of dispersion: range, Mean deviation, Standard deviation and coefficient of Variation.Student T and Chi-square test.
491	BCS-151	COMPUTER NETWORK	2012	UNIT I : Computer Network. UNIT II : Data Link Layer. UNIT III : MAC Sub layer: Static & Dynamic channel allocation, Media access control for LAN & WAN UNIT IV : Network Layer. UNIT V : Processes to Processes Delivery-Transmission Control Protocol (TCP)
492	BEC151	COMMUNICATION	2012	UNIT I : Advanced mobile phone service. UNIT II: Wireless application protocol . UNIT III : Television transmitters. UNIT IV: Colour Television receivers.UNIT V : Power Semiconductor Devices: Power diode, Power transistor, TRIAC, MOSFET and IGBT - turn onmethods, driver circuits.
493	BMM-151	Real Analysis - I	2012	UNIT : I Sets and functions , Sequences of Real Numbers . UNIT II : Series of Real Numbers , Limits and metric spaces . UNIT III : Approximations, Errors and its types, Solution of Equations. UNIT IV : Linear Equations. UNIT V : Ordinary Differential Equations
494	BMB 151	BIOINFORMATICS , BIOSTATISTICS & INDUSTRIAL MICROBIOLOGY	2012	UNIT I :Introduction to Bioinformatics, Databases. UNIT II: Measure of central tendency, Basic idea of probability. UNIT III: Fundamentals of Industrial Microbiology,Fermentor Design. UNIT IV : Scale up and DSP. UNIT V: Production of antibiotics,Production of solvent.
495	BFS 151	FOOD MICROBIOLOGY	2012	UNIT I: Introduction to microbiology. UNIT II: Cultures & Media. UNIT III: Contamination and spoilage of different foods. UNIT IV: Food borne illness . UNIT V: Beneficial microorganisms.
496	MCA - 302	Web Technology	2012	UNIT I : BASIC INTERNET CONCEPTS : Connecting to the Internet – Domain Name System - Exchanging Email– Sending and Receiving Files - Fighting Spam, Sorting Mail and avoiding e-mail viruses – Chatting and Conferencing on the Internet – Online Chatting - Messaging – Usenet Newsgroup ,Internet Relay chat (IRC) – Instant Messaging - Voice and Video Conferencing. UNIT II :WORLD WIDE WEB : Overview – Web Security, Privacy, and site-blocking – Audio and Video on the web ,Creating and Maintaining the Web – Web site creation concepts – Web Page Editors ,Optimizing Web Graphics – Web Audio Files – Forms, Interactivity, and Database- Driven Web sites – File Transfer and downloading – FTP – Peer to Peer – Downloading and Installing software. UNIT III :Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability, Distributed objects, object request brokers, component technology, Web services, Web application architecture, Proxies, Search engines. UNIT IV: Introduction to building blocks of Electronic commerce, Internet and
497	BCH-161	BASED ON INORGANIC, ORGANIC & PHYSICAL CHEMISTRY	2012	Unit 1 : Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases, Concept of Hard and Soft Acids & Bases. Symbiosis, electronegativity and hardness and softness. Bioinorganic Chemistry. Unit 2 : Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry Unit 3 : Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system . Unit 4 :Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution . Unit 5: Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids,sulphonamides and sulphaguanidine. Synthetic detergents alkyland aryl sulphonates.Amino Acids, Peptides& Proteins

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
498	BSB 161	Plant ecology, biodiversity and phytogeography	2012	UNIT I : Ecosystems.UNIT II: Ecological adaptations . UNIT III :Population Ecology:. UNIT IV Soil. UNIT V Phytogeography
499	BSZ 161	BIostatistics AND COMPUTER APPLICATIONS & BASIC ANIMAL BIOTECHNOLOGY	2012	UNIT I : Introduction-definition, data types – primary and secondary. UNIT II : Measures of central tendency. UNIT III: Fundamentals of Computer. UNIT IV: History of animal cell culture, Laboratory requirements for animal cell culture, Sterilization techniques UNIT V: Cryopreservation of cell cultures, application of animal cell cultures in production of <u>therapeutics proteins</u> .
500	BBT-161	BIOINFORMATICS & TISSUE CULTURE TECHNOLOGY	2012	UNIT I : Bioinformatics. UNIT II : Introduction to Techniques - Introductory history, Laboratory organization, Maintaining Aseptic environment, Basic concepts in cell culture - cell culture, Cellular Totipotency, Somatic Embryogenesis.In vitro culture UNIT III : Tissue nutrition . UNIT IV : Tissue culture methodologies . UNIT V :Cloning & Selection of specific cell types .
501	BCS-161	INFORMATION STORAGE AND MANAGEMENT	2012	UNIT I : Introduction to Storage Technology. UNIT II :Storage Systems Architecture. UNIT III : Introduction to Networked Storage UNIT IV : Hybrid Storage solutions. UNIT V : Information storage on cloud
502	BEC 161	ELECTRONIC INSTRUMENTATION, DIGITAL SYSTEM DESIGN & MICROCONTROLLER	2012	UNIT I : DC and AC indicating Instruments: Accuracy and precision . UNIT II: Instrumentation Amplifiers and Signal Analysers: Instrumentation amplifier -Electronic Voltmeter and Multimeter . UNIT III : Pointers UNIT IV: Boolean Function, Disjunction and Conjunction Normal Forms, Bools Expansion, Theorem. Binary Relations, Equivalence Relations, Partitions and Partial Order Relation.UNIT V : Graphs, Multigraphs, Weighted Graphs, Paths and Circuits.
503	BMB 161	Programming Language with "C" Theory	2012	UNIT : I Bioassays, Quality Control. UNIT II : Colorimetry and Spectrophotometry, Chromatography . UNIT III : Electrophoresis. UNIT IV : Microorganisms in Agriculture. UNIT V : Pharmaceutical Biotechnology
504	BFS 161	BIOPROCESS ENGINEERING AND TECHNOLOGY	2012	UNIT I :Isolation, preservation and maintenance of industrial microorganisms. UNIT II: Types of fermentation process, analysis of batch fed batch and continuous bioreactions, biotransformation UNIT III: Downstream processing. UNIT IV : <u>Industrial production of chemicals</u> . UNIT V: <u>Food Biotechnology</u> .
505	MCA -103	Mathematical Foundation of Computer Science	2012	UNIT I : Sets, Relations and Functions: Sets, Subsets, Power sets, Complement, Union and Intersection, Demorgan's law Cartesian products,Relations, relational matrices, properties of relations, equivalence relation, functions ,Injection, Surjection and Bijective mapping, Composition of functions, the characteristic functions and Mathematical induction. UNIT II : Proportions & Lattices : Proposition & prepositional functions, Logical connections Truth-values and Truth Table, the algebra of prepositional functions-the algebra of truth values-Applications (switching circuits, Basic Computer Components). Partial order set, Hasse diagrams, upper bounds, lower bounds, Maximal and minimal element, first and last element, Lattices, sub lattices, Isotonicity , distributive inequality, Lattice homomorphism, lattice isomorphism ,complete lattice ,complemented lattice distribution lattice. UNIT III: Groups and Fields : Group axioms ,permutation group, sub group, co-sets, normal subgroup, semi group, Lagrange theorem,fields, minimal polynomials, reducible polynomials, primitive polynomial, polynomial roots, applications UNIT IV: Graphs : Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, walk, paths and circuits,Eulerian graphs, tree
506	BC-202	Business Mathematics	2012	Unit 1: Graphical Representations, Height and Distances.Unit 2:Transformation of Matrices, Sparse Matrices.Unit 3:Standard DeviationUnit 4:Commission,Profit & Loss.Unit 5:Addition, subtraction & multiplication.
507	BC-203	Desktop Publishing(DTP)	2012	Unit 1: Microsoft Word.Unit 2: Preparation of Document Using DTP Package..Unit 3:Text Formatting.Unit 4: Creation of Indian Language Fonts.Unit 5: Documents created by other Word Processors.
508	BC-204	Programming in " C "	2012	Unit 1: Flowchart.Unit 2:Decision control structure:- if statement, if-else statement.Unit 3:"C" programs using loops.Unit 4: programs using Arrays.Unit 5: Union.
509	BC-205	Accounting Management	2012	Unit 1:Process of Accounting, Journal, Ledger Book – Keeping.Unit 2:Valuation of Assets and Depreciation Methods.Unit 3:Cash Book, Sales & Purchase of Goods.Unit 4: Statement of Financial Position (Balance Sheet) and Adjustment.Unit 5: <u>Analysis of Financial Statements – Financial Ratio</u> .
510	BC-302	Operating System	2012	Unit 1: multitasking.Unit 2:FCFS.Unit 3:Memory Management Concepts: Address Binding, logical and physical address space dynamic loading .Unit4: file management system.Unit5:Authentication,protection and access control.
511	BC-303	Database Management System	2012	Unit 1: DBMS terminology, Data Dictionary.Unit 2: ER-Model, ER-Diagram, ER-concepts.Unit3:Concept of SQL ,Sublanguages – DDL, DML, DCL, TCL, SCLUnit4:DML commands: Insertion, updation, deletion operations, oracle functions.Unit5: looping structures.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
512	BC-304	Object Oriented Programming Using C++	2012	Unit 1: Control structures.Unit 2: function overloading, friend functions.Unit3:Constructors and Destructors.Unit4:Inheritance.Unit5:Pointers, virtual functions and polymorphism.
513	MCA -104	Communication Skills	2012	UNIT I : Communication Meaning and process of communication, importance of effective communication, communication situation, barriers to communication. Objectives of communication, types of communication, principles of communication, essentials of effective communication. UNIT II : Media of Communication Written, oral, face-to-tace, visual, audio-Visual, merits and demerits of written and oral communication. UNIT III : Communication Skills: Developing communication skills; Listening; Speaking; Reading-Writing (Oral & Written). Body language; Utility of aids in Communication. UNIT IV : Spoken Skills Preparing for oral presentation, conducting presentations; Debates; Seminar; Speeches; Lectures; Interviews; Telephonic Conversation; Negotiations; Group Discussions. UNIT V: Written Skills: Preparing of bio-data, seminar, paper, bibliography, and official correspondence; Mechanics of writing; Formal & Informal writings, letters; paragraphing, precise, report writing, technical reports, length of written reports, organizing reports, writing technical reports; Creative writing; Common Errors in Language.
514	BC-402	Computer Oriented Numerical Methods	2012	Unit 1: Solutions of Algebraic, Transcendental & Simultaneous Algebraic Equations.Unit 2:Newton's Interpolation formule.Unit3:Numerical Integration.Unit4: Picard's method.Unit5:Coefficient of Correlation.
515	BC-403	System Analysis & Design	2012	Unit 1: SDLC.Unit 2:Cost Benefit Analysis (CBA).Unit3:Process of Design.Unit4: Quality Assurance.Unit5:Hardware/Software .
516	BC-404	Web Design	2012	Unit 1: UDP & TCP.Unit 2: Documents layout.Unit3: Layers-concept of layers.Unit4:Concept of Forms, <FORM> element, attributes.Unit5:Scripting access.
517	BC-405	Data Structure &Algorithms	2012	Unit 1: Basic operations in Data Structures.Unit 2:Applications of queues.Unit3:Linked implementation of Stacks and queues.Unit4:binary search tree.Unit5:Sorting.
518	BC-502	Data Communication and Networking	2012	Unit 1: Types of networking- LAN,WAN.Unit 2:OSI Reference Model-Layered architecture.Unit3:TCP/IP- Overview, Architecture, functions of each layer and protocol, IP addressing.Unit4:ATM network.Unit5:Cryptography.
519	BC-503	Visual Basic	2012	Unit 1: VB Controls.Unit 2:Control Arrays.Unit3:Accessing Database files – Data Bound Control (DAO & ADO) objects.Unit4:Components of SQL, DDL, DML, Query Language.Unit5:Joins,Equi-join Self-join, Sub-Queries, Views.
520	BC-504	Marketing Management	2012	Unit 1: Marketing research and information system.Unit 2:advertising management.Unit3:Marketing performance and control.Unit4:Global marketing.Unit5:Hi-end audio products.
521	BC 505	Marketing Management	2012	Unit 1: MIS trends.Unit 2:Production & design.Unit3:Database and Database Query Systems for Planning.Unit4:Organizing information system resource.Unit5:Quality control and Quality assurance.
522	MCA -105	Data Structure	2012	UNIT I : Stack and Queue: contiguous implementations of stack, various operations on stack, various polish notations-infix, prefix, postfix, conversion from one to another-using stack; evaluation of post and prefix expressions. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various operations on queue; linked implementation of stack and queue-operations. UNIT II : General List: list and it's contiguous implementation, it's drawback; singly linked list-operations on it; doubly linked list-operations on it; circular linked list; linked list using arrays. UNIT III : Trees: definitions-height, depth, order, degree, parent and child relationship etc; Binary Trees- various theorems, complete binary tree, almost complete binary tree; Tree traversals-preorder, in order and post order traversals, their recursive and non recursive implementations; expression tree- evaluation; linked representation of binary tree-operations. Threaded binary trees; forests, conversion of forest into tree. Heapdefinition. UNIT IV :Searching, Hashing and Sorting: requirements of a search algorithm; sequential search, binary search, indexed sequential search, interpolation search, hashing.
523	BC-602	Software Engineering	2012	Unit 1: waterfall model.Unit 2:Validation, Metrics.Unit3:Project Scheduling,Software Configuration management plans.Unit4:Verification,Coding practice.Unit5:Quality Assurance .
524	BC-603	Java	2012	Unit 1: Boolean,identifiers and reserved words.Unit 2:String, Arrays.Unit3:Initialization by constructors. Creation of Objects, access methods.Unit4:Method overloading.Unit5:Applets Life Cycle,Passing Parameters to Applets.
525	BC-604	Entrepreneurship	2012	Unit 1: Economic Development.Unit 2:Project Formulation and Project Evaluation (Organizational, Commercial and Legal Aspects).Unit3:Preparation of Business Plan.Unit4:Commercial Banks.Unit5:Nation Small Industry Corporation Ltd.



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526	HBC-101	An Introduction to Statistics	2014	Unit 1: graphic diagrammatic presentation. Unit 2: Measurement of Central Tendency and Variation. Unit 3: Moments, skewness and kurtosis (with Sheppard's corrections), Index Numbers. Unit 4: Probability and Expected Value
527	HBC-102	Business Communication	2014	Unit- 1 : Business Communication. Unit-2 : Project Report. Unit-3 : E-Correspondence. Unit-4 : Spoken english for Business communication
528	HBC-103	Business Organisation	2014	Unit- 1 : Manufacturing and service Sectors, globalization, liberalization and privatization, Indian transnational, Enterprises. Unit- 2 : Networking marketing, Franchising, Business Process Outsourcing, E-commerce and M-commerce. Unit-3 : Starting and operating small venturing enterprises Operations, customization, productivity, quality and logistics. Unit-4 : consumer behaviour, Product and pricing decisions, Distribution and promotional decisions, Finance: Money and banking, financial management and securities markets, risk management and insurance , human resources
529	HBC-104	An Introduction to Accounting	2014	Unit 1: entity, money measurement, cost, realization, accruals, periodicity, prudence (conservatism), Financial accounting standards. Unit 2 : recording of business transactions to preparation of trial balance , Journal, Ledger, Cash Book and other subsidiary books. Unit-3 : business income, accounting concept of depreciation, Methods of computing depreciation: straight line method and diminishing balance method. Unit-4 : Capital and revenue expenditures and receipts , non-corporate business entities from a trial balance; not-for-profit organizations
530	HBC-105	Fundamentals of Economics	2014	Unit-1 market demand curve, Elasticity of demand: price, income ,Revenue. Unit-2 : Consumer Behaviour. Unit-3 : Revealed Preference. Unit-4 : law of variable proportions
531	HBC-106	Business Law-I	2014	Unit-1: The Indian Contract Act 1872. Unit-2: Void agreements. Unit-3: Consumer Protection Act. Unit-4 : Sale of Goods Act 1932
532	HBC-201	Financial Accounting for Business	2014	Unit-1 : Lease accounting. Unit-2 : branch final accounts. Unit-3 : Partnership Accounts. Unit-4 : Accounting for insurance claims
533	HBC-202	Business Economics	2014	Unit-1 : Long run and short run costs of Production. Unit-2 : Perfect competition. Unit-3 : Monopoly. Unit-4 : Role of Technology
534	HBC-203	Business Statistics	2014	Unit-1 Correlation Analysis. Unit-2 Regression analysis. Unit-3 Time series. Unit-4 Statistical Decision Theory
535	HBC-204	Business Management	2014	Unit-1 : Development of Management Thought. Unit-2 : Process of Managing: Planning, Decision-making. Unit-3 : Organizing and Staffing, Motivation, Leadership. Unit-4 : Communication
536	HBC-205	Business Law-II	2014	Unit-1 Indian Partnership Act 1932. Unit-2 : The Foreign Exchange Management Act. Unit-3 : Industrial Dispute Act, 1947. Unit-4 : The Factories Act-1948
537	HBC-301	Business Mathematics	2014	Unit-1 : Algebra of Matrices. Unit-2 : Compound Interest. Unit-3 : Differentiation. Unit-4 : Linear Programming: Graphic Method
538	HBC-302	Corporate Accounting-I	2014	Unit-1 : Issue and forfeiture of shares. Unit-2 : Valuation of Goodwill. Unit-3 : Amalgamation and Internal Reconstruction of Companies as per AS-14. Unit-4 : Holding Companies Accounts
539	HBC-303	Cost Accounting	2014	Unit-1 : Cost Accounting, Pricing of issue of inventory/material. Unit-2 : Labour Cost. Unit-3 : Unit Costing. Unit-4 : Contract Costing
540	HBC-304	Company Law- I	2014	Unit-1 : Concept of corporate body; Advantages of company, features of company, types of company, Formation of company. Unit-2 : Memorandum of Association, Articles of Association. Unit-3 : Prospectus, Share Capital, Share and Stock. Unit-4 : Application and Allotment of Shares
541	HBC-305	Principles of Marketing	2014	Unit-1 : Marketing concepts: -traditional and modern, Consumer Behaviour. Unit-2 : Market Segmentation & Product: Branding, trade-mark and product life cycle. Unit-3 : Pricing & Distribution channel. Unit-4 : Promotion, Advertising
542	HBC-401	Corporate Accounting-II	2014	Unit-1 : Final Accounts of a company , Investment Accounts. Unit-2 : Accounts of Banking Companies. Unit-3 : Accounts of Insurance Companies. Unit-4 : Accounts of Electricity Companies
543	HBC-402	Business Ethics	2014	Unit-1 : Politics , Business Ethics and Corporate Social Responsibility. Unit-2 : Market and Globalization. Unit-3 : Corporate Social Responsibility. Unit-4 : Advertising, Consumer Rights
544	HBC-403	Company Law -II	2014	Unit-1 : Company Meetings and Resolution. Unit-2 : Directors: meaning, numbers of directors, Position, appointment, qualification, disqualification, restrictions on the number of directorship, managerial remuneration; powers and duties, liabilities of directors. Unit-3 : Company Secretary. Unit-4 : Winding Up

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545	HBC-404	Money and Banking	2014	Unit-1 : money, economic systemsUnit-2 : InflationUnit-3 : Functions of commercial Banks & Central Banks, process of credit creation and its limitations.Unit-4 : Control of money supply, Reserve Bank of India
546	HBC-405	Financial Institutions	2014	Unit-1 : Indian Financial InstitutionsUnit-2 : Money Market, Commercial Bills Market,Commercial Paper, Certificate of Deposit, Inter Bank Participation Certificate, Repo Instrument.Unit-3 : Capital MarketUnit-4 : Venture Capital, Hire Purchase and Leasing
547	HBC-406	Auditing	2014	Unit-1 : AuditingUnit-2 : Audit ProcedureUnit-3 : Audit of Public companyUnit-4 : Audit Report and Investigation
548	HBC-501	FINANCIAL MANAGEMENT	2014	Unit-1 : Financial Management, Financial PlanningUnit-2 : Cost of capital, Leverage analysisUnit-3 : Capital Structure, Working CapitalUnit-4 : Working Capital Management
549	HBC-502	INVESTMENT ANALYSIS	2014	Unit-1 Investment, Identification of Investment OpportunitiesUnit-2 : Technical AnalysisUnit-3 :Company Analysis, Industry Analysis and Economy AnalysisUnit-4 : Indian capital market
550	HBC-503	INDIAN ECONOMY: GROWTH AND MANAGEMENT	2014	Unit-1 : Unemployment problem in India; Problem of PovertyUnit-2 : Industrial sickness, money supply, prices and InflationUnit-3 Monetary policy of India, Fiscal policy of India, EXIM policyUnit-4 : Privatization, Liberalization, Globalization
551	HBC-504	RETAIL MANAGEMENT & SALES PROCEDURE	2014	Unit-1 : Future of retailing in IndiaUnit-2 : Types of RetailingUnit-3 : Management of Retailing Operations, Functions of retail managementUnit-4 : Retail planning
552	HBC-505	INCOME TAX	2014	Unit-1 : Income TaxUnit-2 : Income from Salaries, Income from House PropertyUnit-3 Profits and Gains from Business or ProfessionUnit- 4 : Income from other sources
553	HBC-506	INSURANCE AND RISK MANAGEMENT	2014	Unit-1 : Risks, Process of risk managementUnit-2 : Insurance, WarrantyUnit-3 : life Insurance Policies, Annuities, Premium Determination under life Insurance.Unit-4 :General Insurance, Marine Insurance, Fire Insurance, Types of Policies.
554	HBC-601	Accounting for Managers	2014	Unit-1: Management Accounting, Ratio AnalysisUnit-2: Fund Flow Statement, Cash flow StatementUnit-3: Marginal CostingUnit-4: Capital Budgeting
555	HBC-602	International Business	2014	Unit-1: International BusinessUnit-2: Modes of entering into international businessUnit-3: Role of WTO , IMFUnit-4: International Logistics
556	HBC-603	Income Tax Law and Administration	2014	Unit-1: Filing and Filing of return (ITR – I and II)Unit-2:Assessment of firms & Association of persons.Unit-3:Income Tax Authorities & their powersUnit-4:Recovery & Refund of Tax
557	HBC-604	Human Resource Management	2014	Unit-1:Human Resource ManagementUnit-2:Recruitment, Selection, Training and Management Development RecruitmentUnit-3:Wage and Salary AdministrationUnit-4:Human Resources Development
558	HBC-605	Business Environment	2014	Unit-1:Agriculture in IndiaUnit-2:Economic TrendsUnit-3:Problems of GrowthUnit-4:Role of Govt. in Indian Economy
559	HBC-606	Computer Programming	2014	Unit-1: 'C' LanguageUnit-2:C Programming OperatorsUnit-3:Input/Output FunctionsUnit-4:Data Structures
560	MCA -203	Operating System	2012	UNIT I : Introduction: Evolution of operating systems (History of evolution of OS with the generations of computers), Types of operating systems, Multitasking, Timesharing, Multithreading, Multiprogramming and, Real time operating systems, Different views of the operating system, System Programmer's view, User's view, Operating system concepts and structure, Layered Operating Systems, Monolithic Systems. Processes: The Process concept, The process control block, Systems programmer's view of processes, Operating system services for process management, Scheduling algorithms, First come first serve, Round Robin, Shortest run time next, Highest response ratio next, Multilevel Feedback Queues, Performance evaluation of scheduling algorithms stated above UNIT II : Memory Management : Memory management without swapping or paging, Concepts of swapping and paging, Page replacement algorithms namely, Least recently used, Optimal page replacement, Most recently used, Clock page replacement, First in First out (This includes discussion of Belady's anomaly and the category of Stack algorithms), Modeling paging algorithms, Design issues for paging system, Segmentation, Segmented Paging, Paged Segmentation UNIT III : Inter-process Communication and Synchronization: The need for inter-process synchronization, Concept of mutual exclusion, binary and counting semaphores, hardware support for mutual exclusion, process synchronization, process synchronization

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561	MCA -204	Design And Analysis of Algorithm	2012	UNIT I : Pre-requisites: Data structure & Discrete structures, models of computation, algorithm analysis, order architecture, time space complexities average and worst case analysis. UNIT II : Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations. Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search). UNIT III : Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths. Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem, searching & sorting algorithms. UNIT IV :Dynamic programming: Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling salesman Problem, longest Common sequence.Back tracking: Overview, 8-queen problem, and Knapsack problem. UNIT V: Computational Complexity: Complexity measures: Polynomial Vs non-polynomial time complexity.
562	MCA -205	System Software	2012	UNIT I : INTRODUCTION :Introduction – System software and machine architecture – The Simplified Instructional Computer (SIC) – Machine Architectures (SIC and SIC/XE) – Data and Instruction Formats – Addressing Modes –Instruction sets – I/O Programming. UNIT II :ASSEMBLERS :Basic assembler functions – A simple SIC assembler – Assembler algorithms and data structures – Machine dependent assembler features, Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions– Program Blocks – Control Sections and Program Linking – One Pass Assembler and Multipass Assemblers – Implementation examples MASM assembler. UNIT III: LOADERS AND LINKERS: Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine dependent loader features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-independent loader features – Automatic Library Search – Loader Option Loader design options – Linkage Editors – Dynamic Linking – Bootstrap Loaders. Implementation examples: MSDOS linker. UNIT IV :MACRO PROCESSORS :Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures – Machine – independent macro processor features
563	MCA -303	Artificial Intelligence	2012	UNIT I : General Issues and Overview of AI: The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP programming: Syntax and numeric functions, Basic list manipulation functions, predicates and conditionals, input output and local variables, iteration and recursion, property lists and arrays. UNIT II :Problem Solving, Search and Control Strategies: General problem solving, production systems, control strategies forward and backward chaining, exhaustive searches depth first breadth first search. Heuristic Search Techniques Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem reduction & AO* algorithm, constraint satisfaction problems. UNIT III :Knowledge Representations: First order predicate calculus,skolemization, resolution principle & unification, interface mechanisms, horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency. UNIT IV :Natural Language processing: Parsing techniques, context free grammer, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammars, semantic analysis, Case playing, Minimax search procedure, alpha beta cutoffs.
564	BCC-104/2	PC Package	2013	Unit-1:Microsoft Disk Operating SystemUnit-2:Introduction To WindowsUnit-3:Introduction To Word ProcessingUnit-4:Application SoftwareUnit-5:Single user, Multi-user, Real time, Time sharing and Batch processing, Multiprocessing, Multiprogramming, Multitasking, Distributed processing.
565	MCA -304	Software Engineering	2012	UNIT I :INTRODUCTION Software Engineering paradigms – Waterfall Life cycle model – Spiral Model – Prototype Model – fourth Generation Techniques – Planning – Cost Estimation Organization Structure – Software Project Scheduling. – Risk analysis and management – Requirements and Specification – Rapid Prototyping UNIT II :SOFTWARE DESIGN Abstraction – Modularity – Software Architecture – Cohesion – Coupling – Various Design Concepts and notations – Real time and Distributed System Design – Documentation – Dataflow Oriented design – Jackson System development – Designing for reuse – Programming standards. UNIT III :SOFTWARE METRICS Scope – Classification of metrics – Measuring Process and Product attributes –Direct and Indirect measures – Reliability – Software Quality Assurance – Standards. UNIT IV :SOFTWARE TESTING AND MAINTENANCE :Software Testing Fundamentals –Software testing strategies – Black Box Testing –White Box Testing – System Testing – Testing Tools – Test Case Management –Software Maintenance Organization – Maintenance Report – Types of Maintenance. UNIT V :SOFTWARE CONFIGURATION MANAGEMENT (SCM) & CASE TOOLS :Need for SCM, Version Control, SCM process, Software Configuration Items, Taxonomy, Case Repository, Features

  
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566	MCA -305	Computer Graphics & Multimedia	2012	UNIT I :Computer Graphics : definition, classification & Applications, Development of Hardware & Software for Computer Graphics. Display devices, Hard copy devices. Interactive Input devices, display processor, Line drawing; various algorithms and their comparison, circle generation- Bresenham's mid point circle drawing algorithm, mid point ellipse drawing algorithm. UNIT II :Attributes of output primitives, line style, color and intensity, Area filling algorithms, Scan line algorithm, boundary fill flood fill algorithm, Antialiasing techniques. Two dimensional transformations; translation, scaling, rotation, reflection sheering, composite transformation, transformation commands, character generation. UNIT III: Viewing coordinates, Window, view port, clipping, Window to view port transformation, line clipping algorithm; Cohen Sutherland, polygon clipping; Sutherland hodgman algorithm, 3D clipping : Normalized view volumes, view port clipping, clipping in homogeneous coordinates. Illumination model: Light sources, diffuse reflection specular reflection, reflected light, intercity,local, surface shading,ground shading,mode like,PCR, VIO
567	BCC-204/2	PC Software and Data Processing	2013	Unit-1:Introduction To SpreadsheetUnit-2:Introduction to MS - power pointUnit-3:Introduction to Business OrganizationUnit-4:Business and Technology trends-specializationUnit-5:Introduction to Database Management System
568	MCA-101	Computer Organization	2012	UNIT-I: Representation of Information: Number systems, integer and floating-point representation, character codes(ASCII, EBCDIC), Error detection and correction codes : parity check code, cyclic redundancy code, Hamming code . Basic Building Blocks: Boolean Algebra, Simplification of Boolean Function. Combinational blocks: gates, multiplexers, decoders, Implementation of Boolean Function in form of gates etc. Sequential building blocks: flip-flops, Registers: Buffer register, Right & Left Shift register, Bidirectional Shift register. Counters : Ripple counter, Binary Counter,MOD-10 Counter, Ring Counter. UNIT-II: Register Transfer Language and Micro-operations: concept of bus, data movement among registers, a language to represent conditional data transfer, data movement from/to memory. Design of simple Arithmetic & Logic Unit & Control Unit, arithmetic and logical operations Along with register transfer, timing in register transfer. Functional units – Basic operational concepts – Bus structures – Performance and etrics – Instruction and instruction sequencing – Hardware – Software Interface – Addressing modes – Instructions – Set, BISC and CISC – ALU design – Fixed point and Floating point operation. UNIT III: Architecture of a simple
569	MCA-201	Core Java Program	2012	UNIT I : FUNDAMENTALS: Object-Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types – Functions and Pointers – FunctionInvocation – Overloading Functions – Scope and Storage Class – Pointer Types –Arrays and Pointers – Call-by-Reference – Assertions – Standard template library. UNIT II : IMPLEMENTING ADTS AND ENCAPSULATION: Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs. UNIT III :POLYMORPHISM: ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading , Binary Operator Overloading , Function Selection , Pointer Operators, Visitation , Iterators – containers – List – List Iterators. UNIT IV : TEMPLATES: Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors. UNIT V : INHERITANCE: Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run-Time Type Identifications – Exceptions – Handlers –Standard Exceptions.
570	BCM - 304/2	Desk Top Publishing (DTP) and Multimedia	2013	Unit-1:DTP Software and Word Processing SoftwareUnit-2:Computer GraphicsUnit-3:Introduction to PageMakerUnit-4:Introduction to MultimediaUnit-5:Multimedia and Hypermedia
571	MCA-301	Computer Networks	2012	UNIT I : Introduction: Computer Network, Layered Network Architecture-Review of ISO-OSI Model., Transmission Fundamentals-, Communication Media-Conductive Metal (Wired Cable), Optical Fiber links, Wireless Communication-Radio links, Setellite Links, Communication Services & Devices, Telephone System., Integrated Service Digital Network (ISDN), Cellular Phone., ATM, Modulation & Demodulation-, Digital to Analog Conversion-Frequency Modulation (FM), Amplitude, Modulation (AM), Phase Modulation (PM), Analog to Digital Conversion-Pulse Amplitude Modulation(PAM), Pulse Code Modulation (PCM), Differential Pulse Code Modulation, (DPCM), Modem & Modem Types., Multiplexing-, Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), Statistical Time Division Multiplexing (STDM), Contention Protocol-, Stop-Go-Access Protocol, Aloha Protocol- Pure aloha & Slotted aloha, Carrier sense multiple access with collision detection (CSMA/CD). UNIT II :Data Security and Integrity: Parity Checking Code, Cyclic redundancy checks (CRC), Hemming Code, Protocol Concepts, Basic flow control, Sliding window protocol, Co. Back N.protocol and selective repeat protocol, Protocol correctness, Finite state machine. UNIT III: Local
572	BCM-404/2	Internet and E-Commerce	2013	Unit-1:Internet ServicesUnit-2:E-CommerceUnit-3:Electronic Data Interchange (EDI)Unit-4:Marketing concepts in e-commerceUnit-5:Security Technologies in E-commerce Security problems in E-commerce
573	BCM-504/2	RDBMS & VB	2013	Unit-1:DBMSUnit-2:SQLUnit-3:Visual BASICUnit-4:Debugging VB ProjectsUnit-5:Handling Data Files
574	BCM-604/2	Web Design	2013	Unit-1:Introduction to Internet & World Wide WebUnit-2:HTML Media TypesUnit-3:Cascading Style sheets(css)Unit-4:Web PublishingUnit-5:DHTML,XML

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
575	CC	Sanskrit	2013	Unit 1: Contributions of Sanskrit to other Indian Languages to Indian culture and tradition.- Skill DevelopmentUnit 2: teaching Sanskrit with reference to three language formula.- Skill DevelopmentUnit 3: Planning lesson plans in prose, poetry, grammar and composition.- Skill DevelopmentUnit 4: Transaction of curricular/ co-curricular activities <u>curriculum construction of Sanskrit-Activities</u>
576	BCM-104/1	Micro Economics	2012	Unit-1:Micro EconomicsUnit-2:Economic LawsUnit-3:Elasticity of DemandUnit-4:Factors of productionUnit-5:Laws of <u>variable proportions</u>
577	FC 201/2	Environment	2012	Unit- 1 : Study of Environmental and ecologyUnit-2 : Environmental PollutionUnit-3 : Environment and social problemsUnit-4 : Role of mankind in conserving natural resourcesUnit- 5:Environment conservation laws
578	BCM-204/1	Macro Economics	2012	Unit-1:Macro economicsUnit-2:National IncomeUnit-3:Interest and employmentUnit-4:Monitory TheoriesUnit-5: <u>Banking and credit Management</u>
579	BCM - 304/1	Indian Company Act	2012	Unit-1:Commencement of BusinessUnit-2:Memorandum of Association, Articles of Association and ProspectusUnit-3:Shares, DebenturesUnit-4:Introduction to MultimediaUnit-5:Multimedia and Hypermedia
580	MEC-303	Labour Economics	2013	unit 1: Labour – Meaning peculiarities, types.unit 2: Demand and supply theory of wages various concepts of wages.unit 3: Problems of Bonus in India.Society security – Meaning origin growth Aims and Methods.unit 4: Industrial Disputes- Meaning Types, Causes.Trade Union Definition.Industrial Dispute Act. 1947.unit 5: Problem of Housing if <u>industrial workers in India.Labour Act. 1948.</u>
581	BCM-404/1	Banking Law & Practice in India	2012	Unit:1: Structure of Commercial Banks in India.Unit:2: Indian Banking SystemUnit:3: Government Securities. <u>Procedure of E-Banking.Unit:4: Banking Regulation Act 1949Unit:5: Management of Finance :</u>
582	AR316	BUILDING SCIENCE II	2016	1. Types, sources, availability and reserves of conventional and non-conventional energy, Role and importance of Energy in Buildings.2. Assessment of energy consumption in a building and methods of energy conservation:- (a) Through minimizing wastages. (b) Through appropriate use of climatology. (c) Through appropriate design and planning of buildings.3. Introduction to Bio-Climatic architecture, Study of solar radiation on earth's surface, Measurement, angles, estimation and analysis, Orientation of building, with reference to solar radiation. Special design and planning detailing. Active solar architecture. Passive solar architecture.4. Introduction to wind oriented architecture, study and analysis of micro level wind. Design and planning of building considering winds5 Study of energy efficient building material and construction techniques. Case study of national and international examples. <u>Studio problem.</u>
583	BCM-504/1	Public Finance	2012	Unit-1:Role of State in public financeUnit-2:Sources of RevenueUnit-3:Effects of public expenditure on production and distributionUnit-4:budget, Fiscal Deficit, Deficit financing and Deficit BudgetUnit-5:Constitution and function of finance <u>commission</u>
584	CE.- 6031(B)	Entrepreneurship Development and Management	2018	Unit-1 : Role of entrepreneurship in economic development, agencies in entrepreneurshiUnit-2: Business Opportunity Identification: Business ideasUnit-3: Choosing the legal form of new venture, protection of intellectual propertyUnit-4: Characteristics of high growth new venturesUnit-5: Exit strategies for entrepreneurs
585	BCM-604/1	International Marketing	2012	Unit-1:International MarketingUnit-2:Product Planning for International Market,Unit-3:International PricingUnit-4: <u>Selection and appointment of Foreign Agent.Unit-5:Exporting Pricing and Export finance.</u>
586	MC-101	Management Concepts	2014	Unit-1: Management, Behavioural and System approach.Unit-2: Planning, decision-makingUnit-3: OrganizationUnit-4: <u>Direction, CommunicationUnit-5: Control , Management Education in India</u>
587	MC-102	Business Environment	2014	Unit-1: Business EnvironmentUnit-2: Economic Environment of Business, Government policiesUnit-3: Political and Legal Environment of BusinessUnit-4: Socio, Cultural & International EnvironmentUnit-5: Technological Environment
588	MC-103	Advanced Accounting	2014	Unit-1: Final AccountsUnit-2: Bank Reconciliation StatementUnit-3: Accounting for Insurance Claim.Unit-4: Investment <u>A/c, Voyage A/cUnit-5: partnership firm</u>
589	MC-104	Cost Analysis and Control	2014	Unit-1: Methods and techniques of CostingUnit-2: Process AccountingUnit-3: Marginal CostingUnit-4: Budgetary <u>Control, Cost AuditUnit-5: Standard Costing and Variance Analysis</u>
590	MC-201	Corporate Legal Frame Work	2014	Unit-1 : The Companies Act, 1956Unit-2: The Negotiable Instruments Act, 1881Unit-3: MRT P Act 1969Unit-4: The <u>consumer protection Act, 1986Unit-5: Regulatory Environment for International Business</u>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
591	MC-202	Organizational Behaviour	2014	Unit-1 : Organization, Organization BehaviourUnit-2: Personality, Perception, LearningUnit-3: Motivation, Attitudes and ValuesUnit-4: Interpersonal BehaviourUnit-5: Organizational Conflicts
592	MC-203	Advanced Statistical Analysis	2014	Unit-1 : Theory of ProbabilityUnit-2: Theory of Sampling and Test of SignificanceUnit-3: Analysis of Variance, Chi-square TestUnit-4: Association of AttributesUnit-5: Regression Analysis, Statistical Decision Theory
593	MC-204	Functional Management	2014	Unit-1 : Financial ManagementUnit-2: CapitalizationUnit-3: Marketing ManagementUnit-4: Personnel ManagementUnit-5: Production Management
594	MC-301	Tax Planning and Management	2018	Unit-1 : Tax PlanningUnit-2: Areas of Tax PlanningUnit-3: Tax Planning and Srting up New BusinessUnit-4: Financial DecisionUnit-5: Tax Assessment
595	MC-302	Entreprenurship Skill Development	2018	Unit-1 : EntrepreneurUnit-2: Promotion of a VentureUnit-3: Entrepreneurial BehaviourUnit-4: Entrepreneurial Development ProgramUnit-5: Entreprenurship and Industrial Development
596	MC-303	Accounting for Managerial Decision	2018	Unit-1 : Management AccountingUnit-2: Financial AnalysisUnit-3: Cash Flow Fund Flow AnalysisUnit-4: Capital BudgetingUnit-5: Management Reporting SystemS
597	MC-304	Managerial Economics	2018	Unit-1 : Role and Resposibilities and fundamental EconomicsUnit-2: Demand AnaysisUnit-3: Production FunctionUnit-4: Business CyclesUnit-5: Profit Management
598	MCSDT-304	Direct Taxation-I	2018	Unit-1 : Fundamental of Direct taxationUnit-2: Deduction from Salary Income Under Sec. 80 CUnit-3: Incxome From House PropertyUnit-4: Income from Profit and Gains from Business and ProfessionalsUnit-5: Income from Capital Gains
599	MCSBF-304	Banking & Finance -I	2018	Unit-1 : Banking SystemUnit-2: Technology in Bank, Retail Banking Treasury ManagementUnit-3: Types of BanksUnit-4: Managemnet of financial ServicesUnit-5: Procedures of Management Financing
600	MCSM-304	Marketing-I	2018	Unit-1 : Marketing ManagementUnit-2: Product DesignUnit-3: Marketing MixUnit-4: Pricing DecisionsUnit-5: Channels of Distribution
601	MCSBM-304	Business Management-I	2018	Unit-1 : Business PolicyUnit-2: Environmental and Internal Analysis, SWOT AnalysisUnit-3: Competitive AnalysisUnit-4: Strategic Choice and ImplementationUnit-5: Indusrtrial Analysis Concept of Value Chain
602	MCSAEA-304	Advanced Economic Analysis -I	2018	Unit-1 : General Introduction to Micro/ Macro EconomicsUnit-2: Curve AnalysisUnit-3: Law Of Demand And SupplyUnit-4: Revealed Preference theoryUnit-5: Production and Cost Function
603	MCSEC-304	E-Commerce-I	2018	Unit-1 : E-CommerceUnit-2: Developing E- Business FrameworkUnit-3: Planning Implementing and Controlling Of E-BusinessUnit-4: Understanding of Key term of E-CommerceUnit-5: Network Infrastructure for E-Commerce
604	MCSAF-304	Accounting and Finance-I	2018	Unit-1 : Final AccountsUnit-2: Advance Problem of Bank Reconcillation statementUnit-3: Accounting for Non- Profit OrganisationUnit-4: Introduction to Modern BusinessUnit-5: Managemnet Information System
605	MC-401	Consumer Behaviour	2018	Unit-1 : consumer behaviourUnit-2: Organisational Buying Behaviour and Consumer ResearchUnit-3: Consumer Needs and MotivationsUnit-4: Personality & Consumer BehaviourUnit-5: Social Class
606	MC-402	International Marketing	2018	Unit-1 : International MarketingUnit-2: Product Development, Method of PricingUnit-3: Direct Trading and Indirect TradingUnit-4: The Export-Import Bank of IndiaUnit-5: Export and Import Procedure
607	MC-403	Indian Financial System	2018	Unit-1 : Financial SystemUnit-2: Money Market in IndiaUnit-3: Depositories and CustodiansUnit-4: Credit RatingUnit-5: Mutual Funds
608	MC-404	Project Planning and Management	2018	Unit-1 : Project , Project life cycleUnit-2: Project feasibility analysis: Market analysis, Technical analysis, Financial analysis and economic analysis.Unit-3: Project financeUnit-4: Project implementation , project management system , project management information systemUnit-5: Project audit
609	MC-404/1	Taxation-II (Indirect Taxation)	2018	Unit-1 : Indirect taxesUnit-2: Goods and service tax (GST) lawsUnit-3: GST : Input tax credit , registration, Tax InvoiceUnit-4: Customs taxUnit-5: The Central Excise Tariff Act,1985
610	MC-404/2	Accounting & Finance	2018	Unit-1 : Accounting for insurance claimUnit-2: Investment A/C, Voyage A/C , Inflation AccountingUnit-3: Management of financial markets , Financial Database System, Operation MangementUnit-4: Management Information SystemUnit-5: Commercial Bank Management, Financial & Commodity Derivatives
611	MC-404/3	Banking & Finance	2018	Unit-1 : Reserve Bank of India-Legal framework , Commercial BankingUnit-2: Online payment systems, Debit and Credit payment system.Unit-3: Debt SecuritizationUnit-4: Mechanism of security trading, NSE, OTCEI, scripless trading, depository system and custodial servicesUnit-5: SEBI



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
612	MC-404/4	Marketing	2018	Unit-1 : International Marketing+D79:D95D82D79:D93Unit-2: Export Organization, pricing , Methods of pricing, price quotation.Unit-3: Payment in International Marketing.Unit-4: Export Credit, the Export-Import Bank of IndiaUnit-5: Export-Import Procedure, SAARC, Role of WTO in Foreign Trade
613	MC-404/5	Business Management	2018	Unit-1 : supply chain managementUnit-2: Demand forecasting in supply chain, forecasting methodsUnit-3: Aggregate planning strategies, managing supply and demand in supply chain.Unit-4: Inventory ManagementUnit-5: Inventory Control Techniques
614	MC-404/6	Advanced Economics Analysis-II	2018	Unit-1 : Perfect competition short run and long run , Monopoly, short run and long run equilibrium, price discriminationUnit-2: Monopolistic competitionUnit-3: – Marginal productivity theory; Elasticity of technical substitution, technical progress and factor sharesUnit-4: Wages theories marginal productivityUnit-5: Welfare Economic
615	MC-404/7	E-Commerce	2018	Unit-1 : Business Communication, Business Economics, Introduction to MarketingUnit-2: Business Accounting,Oral & Visual CommunicationUnit-3: Marketing for the Digital Economy, E-Commerce Technologies, Human Resource ManagementUnit-4: Supply Chain ManagementUnit-5: International Business, Digital Consumer Search and Marketing, Marketing and Retail Analytics
616	BSW-103	Integrated Social Work Practice	2015	Unit 1:Concept of Social System, Units of Social Work Intervention and DynamicsUnit 2:Approach to Integration-Unit 3: Social Work Roles and actionsUnit 4: Process of Social WorkUnit 5: Social Work Profession and Practice
617	BSW-104	Basic Sociological Concepts for Social Work	2015	Unit 1:Significance of Sociology in Social WorkUnit 2: Social Groups and Social ProcessUnit 3: Social institutionsUnit 4: SocializationUnit 5: Social Change,Social Stratification,Social Control. Social Disorganization
618	BSW-201	English	2015	Unit 1:CompositionUnit 2: One word for a group of wordsUnit 3: Idioms and ProverbsUnit 4: Voices: Active Voice and Passive VoiceUnit 5: Infinitives, Participles and Gerunds.
619	BSW-202	Social Problems In India	2015	Unit 1:Social ProblemsUnit 2: Poverty and unemploymentUnit 3: Substance Abuse:-Causes, Types, preventive measures AIDS; psychosocial & medico legal aspectsUnit 4: Crime: Violence against women and prostitution,Human Trafficking, Migration and DisplacementUnit 5: Juvenile Delinquency,Child Labour: causes, remedial programmes
620	BSW-203	Fields of Social Work	2015	Unit 1:Family & Child Welfare,Adoption Services,Child Guidance Clinics,Sex Education, Premarital CounsellingUnit 2: Medical & Psychiatric Social Work ,Role of medical social worker, role of psychiatric social workerUnit 3: Rural & Urban Community DevelopmentUnit 4: Criminology & Correctional administrationUnit 5: Disaster Management,Crisis Intervention
621	BSW-204	History and Ideologies of Social Work	2015	Unit 1:History and Evaluation of Social WorkUnit 2: Profession in IndiaUnit 3: Developmental Orientation in Social WorkUnit 4: Ideologies for Social Change-IUnit 5: Ideologies for Social Change -II
622	BSW-205	Sociology for Social Workers in India	2015	Unit 1:Sociology and its relationship to other DisciplinesUnit 2: Society and CultureUnit 3: Indian SocietyUnit 4: Social Groups, Social Institutions and Social ControlUnit 5: Social Movements
623	BSW-301	Environmental Studies	2015	Unit 1:Study of Environmental Science and EcologyUnit 2: Environmental PollutionUnit 3: Environment and Social ProblemsUnit 4: Role of Manking in Conserving Natural ResourcesUnit5:Environment Conservation Laws
624	BSW-302	Fields of Social Work	2015	Unit 1:Child and Youth WelfareUnit 2: Women and Family WelfareUnit 3: Urban and Rural Community WelfareUnit 4: Tribal Community WelfareUnit 5: Labour Welfare
625	BSW-303	Human Growth and Development	2015	Unit 1:Life Span, Heredity and EnvironmentUnit 2: Theories of Human DevelopmentUnit 3: Human Development and HealthUnit 4: Adulthood, Ageing and Special Focus,Moral Development and Personality DevelopmentUnit 5: Moral Development and Personality Development
626	BSW- 304	Working with Individuals (Case Work)	2015	Unit 1:Introduction to Social Case Work,Unit 2: Principles of Social Case Work,Components of Social Case Work MethodsUnit 3: Theories underlying Social Case WorkUnit 4: Understanding the client system- The PersonUnit 5: Understanding the client system- The Person, Role of a Social Case Worker
627	BSW-401	Environmental Studies	2015	Unit 1:Problems of Natural ResourcesUnit 2: Bio-Diversity and its ProtectionUnit 3: Human Population and Environment

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
628	BSW-402	Social Problems and Services	2015	Unit 1:Introduction to Social ProblemsUnit 2: Crime , Juvenile Delinquency and Domestic ViolenceUnit 3: HIV/AIDS- Concept, Causes and Consequences.Unit 4: Child Trafficking, Child Abuse, Female Foeticide and InfanticideUnit 5: Government Programmes and Intervention of Social Work
629	BSW-403	Management of Developmental and Welfare Services	2015	Unit 1: Welfare Administration and TasksUnit 2: Organizations, Environment, Services and DeliveryUnit 3: Organisational Policies and PracticesUnit 4: Programme Management, Work Process and TasksUnit 5: Social action,Some major Social Action Programmes
630	BSW-404	Working with Groups (Group Work)-	2015	Unit 1:Introduction (History and Evaluation of GroupsUnit 2: Types of Groups:Classification of Groups, Phases of Group Work Practice.Unit 3: Group Dynamics and Processes, Leadership,Decision making,Transactional AnalysisUnit 4: Identifying Group WorkUnit 5: Dealing with Group Problems,Study, Diagnosis and treatment of Group Problems.
631	BSW-502	Tribal Anthropology and Social Work	2015	Unit 1:Tribal CommunityUnit 2: Social Institution and Social Structure of Tribal CommunityUnit 3: Illustrative ReformsUnit 4: Government Initiatives for Tribal UpliftmentUnit 5: Problems Pertaining to Tribal Communities and Social Work Intervention
632	BSW-503	Legal Systems in India	2015	Unit 1:Introduction to Rights,Human Rights,Rights of Vulnerable sections of SocietyUnit 2: Law in IndiaUnit 3:Criminal Justice systems and ComponentsUnit 4: Legal Aid and Public Interest Litigation(PIL)Unit 5: Social Legislations and Role of Social Workers in Legal Systems
633	BSW-504	Community Organisation	2015	Unit 1:Community OrganisationUnit 2: Analyzing CommunityUnit 3:Models of Community Organisation,Role of Community OrganiserUnit 4:Current Issues in Community Organisation,Panchayati Raj and DecentralizationUnit 5: Methods of Community Organisation
634	BSW-601	Computer Science	2015	Unit 1: Microsoft WindowsUnit 2: MS WordUnit 3:MS ExcelUnit 4: Power Point Presentation
635	BSW-602	Disaster Management	2015	Unit 1:Disaster and DevelopmentUnit 2: Classification and types of DisastersUnit 3:Issues in relation to and impact of DisastersUnit 4: Managing Disasters-Post-disaster, Rehabilitation, Mitigation of negative effects.Unit 5:Government Organisations-Voluntary Organisations,Local Groups and Community Participants and Social Workers.
636	BSW-603	Social Policy and Social Development	2015	Unit 1:Social Policy in IndiaUnit 2: Social Development theories and Models for Social Development in CommunityUnit 3:Perspectives on Social Development-Political Economy of Social Structure, Change and DevelopmentUnit 4: Models of Human Development: Freud, Erickson and PiagetUnit 5: Contemporary Concern related to social and human development
637	BSW-604	Working with Communities	2015	Unit 1:Community DevelopmentUnit 2: Application to Social Phenomena ,Methods and tools of Data CollectionUnit 3:Methods of Data CollectionUnit 4: Tools of Data CollectionUnit 5: Data Presentation-Content Analysis,Graphs and Tabulation
638	MSW-103	Social Work with Groups	2013	Unit-1: Social Group Work as a Method of Social WorkUnit-2:Social Group Work Process and ProgrammesUnit-3:Fiction by WomenUnit-4:19th Century Realistic NovelUnit-5:Walter Allen: History of English Novel.
639	MSW-104	Fundamentals of Human Growth and Behaviour	2013	Unit-1: Determinants of Human Behaviour: Heredity and EnvironmentUnit-2:Emotion and MotivationUnit-3:Mental HygieneUnit-4:Therapeutic process: Crisis intervention and CounsellingUnit-5:Mass communication: Public opinion and Propaganda
640	MSW-105	Social Work Research and Statistics	2013	Unit-1: Nature of Scientific method and its application to social phenomenaUnit-2:Data Processing and Analysis, interpretation and report writingUnit-3:Research Design: Meaning amd Importance, Basic Research questions, Organisational designUnit-4:Evaluative Research in Social Work: Organisation and AdministrationUnit-5:Graphic and Diagrammatic Presentation
641	MSW-201	Methods and Fields of social work in India	2013	Unit-1: Professional Social Work- Concept.Unit-2:Changing concepts and practices of social welfareUnit-3:Social planning and Social AdministrationUnit-4:Social welfare and sarvodaya movement in IndiaUnit-5:State action : Scope, need limitations of Social Welfare Programmers' in India
642	MSW-202	Health, Personality and Behavioral Problems	2013	Unit-1:Determining the various factors of Health and illness.Unit-2:All ports Personality Traits: Criteria, Types and ConclusionUnit-3:Counseling: Definition, Meaning and Areas of counselingUnit-4:Mental Retardation and InterventionUnit-5:Psychological Testing's- Personality Tests, Intelligence Tests and Aptitude Tests

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
643	MSW-203	Social Case Work	2013	Unit-1: Social Case Work as a Method of Social WorkUnit-2:Professional SelfUnit-3:Techniques of InterventionUnit-4:Specific Skills and basic Rules of InterviewingUnit-5:Scope and Practice of Social Case Work in Different Setting
644	MSW-204	Social Work Research and Statistics	2013	Unit-1: Social Work research: Nature, Objectives, Scope, and Status in IndiaUnit-2:Qualitative Research: Case Study and Concept AnalysisUnit-3:Graphic and Diagrammatic PresentationUnit-4:Measures of Dispersion: Range quartile deviationUnit-5:Measures of correlation: karl-Pearson's Correlation and Rank Correlation.
645	MSW-205	Social Work and Human Rights	2013	Unit-1:Human Rights and DutiesUnit-2:Human Rights and Social JusticeUnit-3:International Covenant of Economic Social and Culture RightsUnit-4:Human Rights Commission: Woman , Children, Scheduled Castes & Schedule Tribes, Minorities,Differently Able, Displaced.Unit-5:Human Rights Violation & Constitutional Remedies in India
646	MSW-301	Social Policy and Administration	2013	Unit-1:Fundamental Rights and Directive Principles of state policy and role of JudiciaryUnit-2:Social Welfare Planning in India, Planning process and MachineryUnit-3:Social Welfare Administration at different levels : Central , State , and DistrictUnit-4:Social Legislation for Religious Communities-Hindu, Muslim and Christians.Unit-5:State action : Scope, need limitations of Social Welfare Programmers' in India
647	MSW-302	Social Work With Communities	2013	Unit-1:Tribal Community : Tribal Culture and OrganizationUnit-2:Role of Community Organizer and Skills neededUnit-3:Leadership: Type and Functions and the Emerging patterns of Rural LeadershipUnit-4:Community Development: Concepts, Philosophy and MethodsUnit-5:Community Development in Different Settings
648	MSW-303	Development Management	2013	Unit-1:Organizational AnalysisUnit-2:Entrepreneurship developmentUnit-3:HRD System and Strategies for NGO'SUnit-4:Communication Theory and PracticesUnit-5:Project Planning and Logical Framework Analysis (LFA), Goal Setting <u>Information of Objective, Identification of Activities and Strategies.</u>
649	MSW-304	Community Development Setting	2013	Unit-1: Community Development, its Need, Principles and MethodsUnit-2:Early Experiment in Rural Community development in IndiaUnit-3:Urban Development Policies and Programs of Government of IndiaUnit-4:Urban Rural Local Self-GovernmentUnit-5:Community Development in the NGO Sector
650	MSW-401	Social Development Or Computer Application	2013	Unit-1: Social Development Alternative and Social WorkUnit-2:Strategies of a Social Development: Rural and Urban Development, Population and Development, Poverty and Development, Social Integration and Development.Unit-3:Social Development and PlanningUnit-4:Development Administration: Concept and fieldUnit-5:Socio Development and Voluntary Sector
651	MSW-402	Training and Development	2013	Unit-1:Need of training and Development in the Social Welfare sector.Unit-2:Training System: Concept and ComponentsUnit-3:Identification of training needsUnit-4:Designing training sessions and learning sessions. Lesson plan, Course material, visual aids. Room lay out and Facilities. Delivery Skill
652	MSW-403	Development Management in Urban Community Development	2013	Unit-1:Recruitment and SelectionUnit-2:Training and DevelopmentUnit-3:CommunicationUnit-4:Role of co-operative movement as a strategy of working with urban and rural poor.Unit-5:Municipal Administration in India
653	MSW-404	Urban Community Development band Municipal Administration	2013	Unit-1: Urbanization and Urban ProblemsUnit-2:Urban Community DevelopmenUnit-3:Social EducationUnit-4:Welfare Programmes and ServicesUnit-5:Institutional and Non-Institutional Services
654	MAH-101	HISTORIOGRAPHY, CONSEPTS, METHODS AND TOOLS-I	2013	Unit 1 : Collection of the data, evidence and its transmission .unit 2: History and other Discipline.Archaeology ; Geography ; Authropology ; Literatrue, Economies, Political Science, Sociology.unit 3: Ancient Indian tradition of Historiography ; Baan Bhatt and Kalhan Historiography.unit 4: Medieval Indian Historiography. Main features of Historiography of Minhaj-us-siraji. zia-ud-din Barni ; Abdul Qadir Badayuni, Abul-fazalUnit 5:Modern trends of Historiography – Posivist, Classical Marxist and Annals. Historical Writing in renaissance period- voltairs. Ranke. Toynbee.

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655	MAH-102	TWENTIETH CENTURY WORLD-I	2013	unit 1: Growth of capitalism and Imperialismunit 2: Socialism and Marxism : Socialism –Meaning Schools of socialism : Fabian Socialism, Syndicalism,Guild Socialismunit 3: Establishment of a socialist State, It's economic and political aspects : it's world-wide effects and reaction in the west.unit 4:World between the Two wars .working of League of Nations and Collective Security. Crisis in Capitalism- The Great Depression of 1929-1931Unit 5: Origins nature and results of the Second World War. National liberation Movements in Colonial Countries and Decolonization. Communist Revolution in China (1949) and its impact on world politics.
656	MAH-103	HISTORY OF INDIA FROM EARLIEST TIMES TO 650 A.D.	2013	unit 1 :Sources and interpreting historiographical trendsunit 2:Paleolithic and Mesolithic cultures and rock art and Neolithic culture.unit 3:Harappan Cultureunit 4:Vedic Cultureunit 5:Iron Age Culture, Economic development
657	MAH-104	HISTORY OF MADHYA PRADESH	2013	unit 1 : Tripuri, Paramaras of Malwa and the chadellas.unit 2:Muslim invarsion of Malwa and bundelknan and resistance to their dominance mughal attack.unit 3:Malwa Post the Mughalsunit 4:resistance to mughal ruleunit 5: Chhartrasal and mughals relations
658	MAH-201	HISTORIOGRAPHY, CONSEPTS, METHODS AND TOOLS -II	2013	unit 1: Approaches to history – Theoloigcal ; Imperialist ; Nationalist ; Marxistunit 2:Historical objectivity- Problems of Historical objectivityunit 3:Major theories of History-Cyclicalunit 4:Debate in History : representative study of major debates of History :Position of women in Indian societyunit 5:World Economic Crisis of 1929 A.D.
659	MAH-202	TWENTIETH CENTURY WORLD -II	2013	unit 1 :Cold war and its effectsunit 2:UNO and the conceot fo world peaceunit 3:Non-Alignmenunit 4:Changes in the world political Order –from Biopolar to Unipoar World system.unit 5:Globalization and its economic and political impact on Third World
660	MAH-203	HISTORY OF INDIA FROM EARLIEST TIMES TO 650 A.D.	2013	unit 1:Janapadas and Maharjanadas and republican statesunit 2:Mauryan empire Polity Economy. Art and Architecture.unit 3:Sungas, Satavahanas and kushanas, Polity, Society, Economy, Art And Architecture.unit 4:The Gupta Polity, Economy, Religion, Literature.unit 5: Harsha. Chalukyas and Pallavas : Polity, Economy, Society, Religion, Art and Architecture.
661	MAH-204	HISTORY OF MARATHAS	2013	unit 1: Rise of Shivaji concept of Hindvisawaraj.unit 2: Shivaji's and mughal Relations.unit 3 : Shivaji, administration, presonality.unit 4 : Marathas Strggle for independence.unit 5 : history of Peshwas.
662	MAH-301	HISTORY OF INDIA 650 A.D. TO 1200 A.D	2013	unit 1: Source-Archaeology, Epigraphy and Numijsmatics.unit 2:Historicography approchaes.unit 3:Political Structrue of northen India.unit 4: Westermes and Central India Deccan and South Indiaunit 5: Urban economy trade and trade routes. Inter regional and maritime trad.
663	MAH-302	STATE IN INDIA	2013	unit 1: Chiefdoms of later vedic times and Territororial State in the age of Buddha. The Mauryan State.unit 2: Gupt ,Gurjar Pritihar, Kalchuries, Chandelas, and Permaras.unit 3: Nature and Functions of the state under the Sultans of Delhi.unit 4: The Mughal States Administration .unit 5: The Maratha Administration under Shivaji
664	MAH-303	ECONOMIC HISTORY OF INDIA	2013	unit 1: Introductory Issues and Problems of Indian Economic Historyunit 2: Indian Economy in the Mid-Eighteenth Century, Nature and Structure of economy.unit 3: Early Phase of Colonial Economy, Mercantilism and European economic interests in Indiaunit 4: Ryatwari and Mahalwari System.unit 5: East India Company and its rule in Bengal India manufactures for external market & commerce .
665	MAH-304	HISTORY OF IDEAS	2013	unit 1: Ideas of polity- monarchy, oligarchunit 2: Rights and duties of Raja and Prajaunit 3:Colonialism, liberalism in democracyunit 4: Nationalism and Socialism Communalism and Secularismunit 5: Rationalization and justification of hierarchy
666	MAH-401	HISTORY OF INDIA -650 A.D. TO 1200 A.D.	2013	unit 1:Society- Social Strtification , prolifercation of castes.unit 2: Religion and Philosophy-Bhakti Movement.unit 3: Vedanta and Minamsa.unit 4 : Vaishestic Philosophy.unit 5: Literature, Art and Architecture.Temple architecture

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
667	MAH-402	WOMEN OF INDIAN HISTORY	2013	unit 1: Approches- Liberal, Marxist, Socialist, Radical.unit 2: Religon of Women Brahmanical and non Brahmanical Jainism Buddhism Islam Christianityunit 3: women Bhakti movement,unit 4: Customary and legal status in India,unit 5: , Property rights ,Problems of working women.
668	MAH-403	WORLD HISTORY (18 AND 19 CENTURY)	2013	unit 1: The emergence of the Scientific view of the world.unit 2: Industry Revolution Industry Revolution in England and its expansion in Europe .unit 3: The French Revolution of 1789 A.D.unit 4: The Age of Napoleon his Rise and Fall.unit 5: f Liberalism and Democracy in western Europe.
669	MAH-404	HISTORY OF ARCHITECTURE OF INDIA	2013	unit 1: Harappan town planning.unit 2: Literary and Archaeological Source.unit 3: Stupa architecture from Early B.C. to 4th B.C.unit 4: Stupa architecture form 4th .B.C. to 7th .A.Dunit 5: Development of rock. Cut arhitecture
670	MEC-101	Advanced Economics Analysis – I	2013	unit 1: General Introduction to Micro/Macro/Positive and Normative Economicsunit 2: Utility analysis, cardinal Utility The Law of Diminishing Marginal Utilityunit 3: Law of Demand & Supply .unit 4: Revealed preference theory consumerunit 5: Production and cost function- Law of variable proportion.
671	MEC-102	Macro Economics	2013	unit 1: Nature of Macro Economics.unit 2: Macro Economics Equilibrium Income Determination.Public Expenditure, Export tax, Balanced Budgetunit 3: The component of Money supplyunit 4: Theories of Employment classical theory.Keynes Vs the classics.unit 5: Theories of consumption and investmen.measurement in Indian Economy.
672	MEC-103	Public Economics	2013	unit 1: analysis the growth of government significanceunit 2: Role of government in organized society.Theory of maximum, social advantages.unit 3: Public Expenditure.economic stability & economic development.unit 4: Economics of taxation.Theories of taxation Benefit theory the cost services theory and ability.unit 5: Dabt- Public Debt & Economic Growth.
673	MEC-104	Quantitative Techniques	2013	unit 1: Definition importance & scope of statistics.unit 2: Linear and simulaaneous Eauations up to three variable and its application in economics .unit 3: Simple Differentiation and its application in economics .unit 4: Regression analysis concept regression lines finding regression coefficients.unit 5: Index Numbers,conceptual frame work, uses, types, problems.
674	MEC -201	Advanced Economics Analysis – II	2013	unit 1:Perfect competition short run and long run equilibrium.unit 2: Monopolistic competition ,price and output determination under monopsony and bilateral monopolyunit 3: Distribution,theory of distribution in imperfect product .unit 4: theories of interest – liquidity preference IS- LM curve theories of profit.unit 5: Welfare Economic, Walrasian and marshall condition of the txistence of the general equilibrium.
675	MEC -202	Monetary Economics and Banking	2013	unit 1: Theories of value of money, modern quantity theory of money.unit 2: Measures of money stock,monetary policy its role and effectiveness.unit 3: Inflation measurement and types of inflatio0n demand and supply.unit 4: Banking systems in India. Types of banks. Bank as depositaries.unit 5: Business cycles meaning and nature theories of trade cycle monetary theory.
676	MEC -203	Research Methods and Statistical Inference	2013	unit 1: Meaning and concept of research, types of research steps in scientific research.unit 2 : Analysis of time series, Measurement of trend.unit 3: Probability and its theories.unit 4: Test of Hypothesis.unit 5: Chi square test & goodness of Fit.
677	MEC -204	International Economics	2013	unit 1: Distinguishing features of interregional and international trade.unit 2: Mill's theory of reciprocal demand.unit 3: Haberler's theory of opportunity cost.unit 4: International trade and factor prices.unit 5: Types,objectives and effects of dumping
678	MEC -301	History of Economic Thought	2013	unit 1: Mercantilism, Physiocrats ,Classical school.unit 2: J.S. Mill, Sismondi.unit 3: Karl Marx, Historical schoolunit 4: Marshall, J.B. Clarkunit 5 : Indian Economic Thinker
679	MEC -302	India's Foreign Trade and International Institution	2013	unit 1: Foreign Trade and Economic development.unit 2 : Adjustment mechanisms of balance of payments under gold standards.unit 3: Concept of foreign exchange rate determination of equilibrium exchange .unit 4: Exchange control meaning features objectives.unit 5: World trade organization functions structures objectives.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
680	AR514	ELECTIVE I A	2019	INTERIOR DESIGN1. Understanding the need for design of interiors. Effect of build spaces/interior spaces on human psyche. Historical background of interior design and international perspective.2. Interior space character, classification categories and quality. Elements of interior space. The built environment, the living interiors in today's context.3. Space, form, colour, abstract, spatial expression. The base plane, the overhead plane, the verticals, the intermediates. Visual aspects, visual control, illusions. Visual art appreciation: A brief look of Major Art Movements that have affected design.4.Interior climate, orientation of interior space with respect to outdoor climatic forces. Outdoor climate study, study of micro climate. Spatial layout for best comfort in doors with respect to natural climate. Air movement, natural illumination, natural heating/cooling, artificial interior environment-artificial illumination, artificial climate, air conditioning etc.5. Elements of interior design: A study of the latest available, materials, furniture/fittings, past, present and future and international perspective. Water and plants in interior design. <u>Drainage plant species plant care etc Sound modulation in interior spaces</u>
681	MEC-401	Economics growth & Development	2013	unit 1: Concept of growth and development.unit 2: Schumpeter's Model Keynesian Model of Employment and Incomeunit 3: Theory of balanced growth-nurkse & Lewis model.Big-push theory.unit 4: Leibenstines Model of critical minimum effort.Theories of dualism, Bocke, Higgins and Myintunit 5: The Mahalanobis Model-Two sector & four sector.Kaldor Model of distribution.
682	MEC-402	Indian Economic Policy & Issues	2013	unit 1: Framework of Indian economy.Employment and Unemployment: policy implications.unit 2: Development strategies in India.Economics Reforms in India.unit 3: Sectoral performance – I Agricultural Growth, Productivity Trends and crop patterns Issues and Concerns in Indian Agricultureunit 4: Sectoral performance – II Capital Market in India and Working of SEBIunit 5: Sectoral performance – III Government finance : Union and States.
683	MEC-403	Regional Economics	2013	unit 1: . Definition and Scope of Regional Economics; Types of regions; Methods of regionalization.unit 2: Export base theory and regional economic base.unit 3: Weber's theory of Industrial location.unit 4: Regional income its components and Estimation.unit 5: Construction of composite index for regionalization. Regional development and disparities.
684	MEC-404	Computer Application in Economics	2013	unit 1 : Concept of computer, and its functioning.unit 2: Introduction to operating system and their uses different types of operating systems.unit 3: OPERATING SYSTEM OF COMPUTERunit 4: PRESENTATIONS THROUGH COMPUTERunit 5: Use of Computer Software in Education.
685	MAE-101	Poetry	2013	unit 1: Annotations (Any two out of the four given passages. At least one from each unit)unit 2: Epic Poetry : John Milton ,Valmikiunit 3: Narrative Poetry : Geoffrey Chaucer , S.T. Coleridge .unit 4: Renaissance Poetry : William Shakespeare , John Drydenunit 5: Satirical Poetry: John Dryden , Alexander Pope
686	MAE-102	DRAMA	2013	unit 1 : Annotations (Any two out of the four given passages. Selection At least one from each unit)unit 2 : Non English Drama: Sophocles , Kalidas .unit 3: Shakespearean Tragedy : Hamlet King Learunit 4 : Other Shakespearean Plays : Twelfth Night, The Tempest.unit 5 : Renaissance Drama : (Non- Shakespearean) Christopher Marlowe : Dr. Faustus.
687	MAE-103	FICTION	2013	unit 1 : Early Prose Narrative : Bana Bhatt ,Cervantes.unit 2 : Picaresaque Novel : Henry Fielding , Daniel Defoe.unit 3 : Historical Novel : Walter Scott , Thackeray.unit 4 : Fiction by Women : Georgy Eliot ,Charlotte Bronte .unit 5 : 19th Century Realistic Novel : Charles Dickens , Zola .
688	MAE-104	PROSE	2013	unit 1 : Annotations (Any two out of the four given passages. Selection At least one from each unit)unit 2 : Biography and Autobiography : J.L. Nehru , Kamala Das .unit 3 : Political and Social Writings : Plato , Bacon .unit 4 : Philosophical Writings : J. Krishnamurti , Lala Hardayal .unit 5 : Bertrand Russell : William Hazlitt .
689	MAE-201	Poetry	2013	unit 1 : Per-Romantic Poetry : Thomas Gray , William Blake .unit 2 : Romantic Poetry : W. Wordsworth , John Keatsunit 3 : Victorain Poetry : Alfred Tennyson , Matthew Arnold .unit 4 : Symbolist Poetry : T.S. Eliot ,W.B. Yeatsunit 5 : Modern Poetry: W.H. Auden , Dylan Thomas.



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
690	MAE-202	Drama	2013	unit 1 : Annotations : (Any two out of four given passages selecting at least one from each unit)unit 2 : Restoration Drama : John Dryden , Congreve .unit 3 : Victorain Drama : G.B. Shaw , Galsworthy .unit 4: Modern Drama : Ibsen , Brecht .unit 5 : Indian Drama : Girish Karnad , Mahesh Dattani .
691	MAE-203	FICTION	2013	unit 1 : 19th Century Fiction : Flaubert , Geogy Meredith .unit 2 : Rural Novel : Thomas Hardy , Premchandunit 3 : Psychological Novel : Virginia Woolf , D.H. Lawrence.unit 4 : Naturalist Novel : Joseph Conrad , Hemingway .unit 5 : Post Naturalist Novel : William Golding , Saul Bellow .
692	MAE-204	PROSE	2013	unit 1 : Annotations.unit 2 : Boswell , Addison .unit 3 : Goldsmith , Charles Lamb .unit 4 : A.G. Gardiner , Robert Lynd .unit 5 : G.K. Chesterton , Hilarry Bellock ,
693	MAE-301	Indian Writings in English	2013	unit 1 : Annotations .unit 2 : Sri Aurobindo .unit 3 : APJ Abdul Kalam.unit 4 : Asif Currimbhoy.unit 5 : Anita Desia .
694	MAE-302	American Literature	2013	unit 1 : Annotations .unit 2 : Prose Emersonunit 3 : Poetry Walt Whitmanunit 4 : Drama Eugene O'Neilunit 5 : Fiction: Mark Twain Huckleberry Finn
695	MAE-303	English Language	2013	unit 1 : Characteristics, Development of English Language.unit 2 : Language varietiesunit 3 : Definition of Phonetics & phonology.unit 4 : symbols for sounds in RP.unit 5 : Basics of Transformational generic grammar.
696	MAE-304	Critical Theory	2013	unit 1 : Natyashastraunit 2 : Longinus - On the Sublimeunit 3 : John Dryden , Dr. Johnsonunit 4 : Wordswidth .unit 5 : Mathew Arnold .
697	MAE-401	Critical Theory	2013	unit 1 : Anand Vardhan . Ferdinand Sausure .unit 2 : I.A. Richards , J.C. Ranson .unit 3 : F.R. Leavis , J. Derrida .unit 4 : Edward Saidunit 5 : I.A. Richard's book on Practical Criticism and David Daiches Critical Approaches.
698	MAE-402	English Literature	2013	unit 1: Morphology.unit 2 : Linguistic Analysis.unit 3 : Phonology Sound sequenceunit 4 : Grammer Sentence types and their transformation relationsunit 5 : Grammer , Syntax coordination, subordination, Relative Clauses, Adverbials.
699	MAE-403	English Literature Indian Writings in English	2013	unit 1 : Six passages selecting at least two Unit II, III and IV will be given and two to be attempted.unit 2 : Sarojini Naidu . Kamala Das .unit 3 : M.R. Anand , R.K. Narayan.unit 4 : Vishnu Sharma . Munshi Premchand .unit 5 : Amitav Ghosh . Shashi Deshpande
700	MAE-404	American Literature	2013	unit 1 : Annotations : (Six) passage selecting at least two form Units II, III and IV each to be set two to be attempted.unit 2 : Prose Emerson , Thoreau .unit 3 : Pottery Emily Dickinson .unit 4 : Drama: Tennessee Williams ,Edward Albec .unit 5 : Fiction : Ernest Hemingway .
701	MAP-101	Modern Indian Political Thought	2013	unit 1 : Indian Political Thoughtunit 2 : Influences on the ideas of Mahatma Gandhi.unit 3: Political Ideas of Pandit Jawahar Lal Nehru. Sir Sayyad Ahmad Khan, Moh. Ali Jinnaunit 4: Views of Ram Manohar Lohia , Jai Prakash Narayanunit 5 : Views of Dindaval Upadhyay , M.N. Rai.
702	MAP-102	Comparative Politics	2013	unit 1 : Comparative Politics- Meaning, nature and Scope .unit 2 : Political system approach and Analysis.unit 3 : Political Development approach and analysis. Political Modernisation .unit 4 : Significance of Marxist-leninist approach in comparative politics .unit 5 : Political Elites (views of Pareto, Mosca, Michels, Laswell) 2. Political Socialization (views of Apte, Almond, Powell)
703	MAP-103	International Politics & Contemporary Political Issues	2013	unit 1 : Meaning, Nature and Scope of International Politicsunit 2 : The Elements of National Power and Limitations, Balance of Power and Collective Securityunit 3 : The concept of Non-Alignment: Bases, Role and Relevanceunit 4 : North- South Diloge and south-south Diloge and their major issues Globalization.unit 5 : Environmental Issues: Rio-Declaration 1992
704	MAP-104	Major Ideas and Issues in Public Administration	2013	unit 1 : Meaning nature and scope of public Administrationunit 2 : Developmental Administration Approach..unit 3: Liberal Democratic Approach.2. Marxist Leninist Approach..unit 4 : Political and Aministrative interaction in Economic-Developmentunit 5 : 1. Neutrality of Civil services. 2. Downsizing of Bureaucracy.
705	MAP-201	Western Political Thought	2013	unit 1 : Political Thought of Plato Political Thought of Aristotleunit 2 : Medieval political thought -Hobbes, Locke, Rousseau.unit 3 : Bantham, J.S. Mill- Hegel, Green.unit 4 : Marx, lenin, Mao-Tse-Tungunit 5 : Nozic and communitarians Zio Pal Satra

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
706	MAP-202	Politics of South Asian Countries	2013	unit 1 : A brief history and general informations about the economy and polity of Pakistan.unit 2 : A brief history and general informations about the economy and polity of Bangladesh.unit 3 : A brief history and general informations about the economy and polity of Sri Lanka.unit 4 : A brief history and general informations about the economy and polity of Nepal.unit 5 : Indo- Pak -Bangladesh -Shri lanka -Nepal Relations
707	MAP-203	International Organisation	2013	unit 1 : Nature and Evolution of International Organisation.unit 2 : The united Nations.unit 3 : International Disputes and Enforcement Action.unit 4 : UN as peace keeper & Politics within UN.unit 5 : UN"s role in Disarmament
708	MAP-204	Research Methodology	2013	unit 1 : Nature of social Researchunit 2 : Hypothesis, Concepts and Variables.unit 3 : Tools and Techniques of Data collection.unit 4 : Nature of study: Case study, technique, Role and importance of case studiesunit 5 : Theory formation in social sciences, Survey Analysis.
709	MAP-301	Indian Government & Politics	2013	unit 1 : Making of the Indian Constitution.unit 2 : Preamble; Fundamental Rights and Duties.unit 3 : President, Prime Minister and Council of Ministers.unit 4 : Lok Sabha and Rajy sabha; Union Judiciary.unit 5 : Political Process : 1. Nature of Indian Politics 2. Nature of Indian Party System
710	MPS-302	State Politics in India	2013	unit 1 : Governor, Chief Minister and Council of Ministers.unit 2 : Vidhan Sabha and Vidhan Parishad.unit 3 : High court and Subordinate Courts.unit 4 : Problem Areas 1. Increasing Demand for state Autonomy 2. Demand for the creation of new states 3. State politics in the era of Globalization and coalition politicsunit 5 : 1. Inter-state council 2. State planning commission 3. State finance commission
711	MAP-303	International Law	2013	unit 1 : Origin and Development of International law.unit 2 : Relationship between international law and national law.unit 3 : International legal principles.unit 4 : Law of Newtrality, Rights and duties of newtral powers.unit 5 : 1949 Geneva Convention.
712	MAP-304	Indian Foreign Policy	2013	unit 1 : Foreign policy : Meaning, nature and determinants.unit 2 : India and the USA. India and Russiaunit 3 : 1. India and Pakistan 2. India and Bangladeshunit 4 : SAARC and Indiaunit 5 : Challenges before Indian Foreign policy in ther 21 century.
713	MAP-401	Federalisam In India and Local Self Government	2013	unit 1 : Center State Relations in Indiaunit 2 : Sarkaria Commission Reportunit 3 : 73rd and 74th constitutional amendments.unit 4 : Rural-urban local self governmentunit 5 : Finance and local self Govt; Bureaucracy and local self Govt.
714	MAP-402	Govt and Politics of Madhya Pradesh	2013	unit 1 : Determinants and Characteristics of Madhya Pradesh Politics.unit 2 : Governor : Powers, Position and Role. Chief Minister and Council of Ministersunit 3 : Administration in Madhya Pradesh : Secretariat, Chief Secretary, Secretary, Commissioner. District Administrationunit 4 : Importance of finance, Bureaucracy and Autonomy in Local Self-Government.unit 5 : Emerging Trends in Madhya Pradesh politics.
715	MAP-403	Advance Political Theory	2013	unit 1 : Interpretation in Political Theory and Problems.unit 2 : Decline of Political Theory and Modern Political Theory.unit 3 : Leo Straus about Revival of Political Theory.unit 4 : New Trends in Political Theory.unit 5 : Democracy, Idealism, Marxism, Socialism.
716	MAP-404	Diplomacy and Human Rights	2013	unit 1 : Meaning & Objectives of Diplimacy.unit 2 : Types of Diplomacy, functions & Duties of a diplomat.unit 3 : Diplomacy as an Instrument of National Policy Organisation.unit 4: UNO and Human Rights, provisons in UN charter Universal Declaration of Human Rights.unit 5 : International protection of Human Rights Civic Political Social and Economics Rights.
717	MAS-101	Urban Society in India- I	2013	unit 1 : Concept of Urban Sociologyunit 2 : Emerging trends and factors of Urbanizationunit 3: Classification of Urban centers :- Cities and Town.unit 4 : Migration & poverty, Urban environmental problemsunit 5 : Problems of Urban management in India.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
718	MAS-102	Rural Society in India- I	2013	unit 1 : Rural Society – Meaning Definitions characteristics.unit 2 : Rural Social Institution Family Religion Marriage caste systemunit 3 : Agrarian Relation in Rural India.unit 4 : Rural political life ; Rural Elite and Leadership.unit 5 : Rural problems : Rural poverty Land less Labour.
719	MAS-103	CLASSICAL SOCIOLOGY TRADITION-I	2013	unit 1 : Brief history of development of social thought.unit 2 : Karl Marx-Marx's theory of social change.unit 3 : Emile Durkheim :- Intellectual background.unit 4 : Max Weber- intellectual background analysis of modern capitalism.unit 5 : <u>Theory of conspicuous consumption</u>
720	MAS-104	Methodology of Social Research - I	2013	unit 1 : Concept of Method and Methodology technique of research.unit 2 : Types of social Research Research design Basic steps inSocial Research.unit 3 : Nature of Social Reality and Approaches.unit 4 : Inductive and Deductive theory building.unit 5 : Techniques and Methods of Qualitative research.
721	MAS-201	CLASSICAL SOCIOLOGY TRADITION II	2013	unit 1 : Impact of industrial Revaluation.unit 2 : Future of capitalism & Alienation in capitalism society.unit 3 : Theory of suicide :- Emile Durkein.unit 4 : Max Weber- Theory of Bureaucracy. Modern bureaucracy.unit 5 : Vilfredo Pareto :- <u>Intellectual background.</u>
722	MAS-202	Methodology of Social Research- II	2013	unit 1 : Quantative Methods and survey research Assumptions.unit 2 : Sampling desing questionnaire construction.unit 3 : Case study method, content analysis.unit 4 : Statistics in Social research ,Measures of central tendencyunit 5 : Co relation analysis : Tests of Significance.
723	MAS-203	Rural Society in India - II	2013	unit 1 : Rural Development Meaning and Significance.unit 2 : Rural Reconstruction and Planning.unit 3 : Issues and Strategies for Rural Development.unit 4 : Significance of village studies in India.unit 5 : Social change in Rural India. Sanskritization Moderization, Globalization
724	MAS-204	Urban Society in India - II	2013	unit 1 : Changing occipational structure.unit 2 : Indian city and its growth, megapolis.unit 3 : Differences between town, city, metropolis and megapolis.unit 4 : Problems of Urban cities.unit 5 : Politics in Indian cities, Educational centres in <u>Urban India.</u>
725	MAS-301	Sociology of Kinship, Marriage & family	2013	unit 1 : Kinship : definitionunit 2 : Marriage : Defination, types.unit 3 : Family ,unit 4 : Problems (A) distances in kinship behavior (B) Divorce and windowsunit 5 : (A) Changing attitudes towards kinship (B) <u>Recent changes in marriage &amp; family system</u>
726	MAS-302	Indian Society and Culture	2013	unit 1 : Components of Indian society.unit 2 : Definition attributes and Components of culture.unit 3 : Organization and Institution .unit 4 : Groups : (a) Rural India (b) Tribal India (c) Urban Indiaunit 5 : Monographs : (Basics) An Indian Village
727	MAS-303	Sociological Essay	2013	unit 1 : Women Impowermentunit 2 : Child Labour.unit 3 : Domestic Violence.unit 4 : Human Rights.unit 5 : <u>Environment</u>
728	MAS-304 (A)	Industrial Sociology	2013	unit 1 : Industrial Sociology : Nature and Scope.unit 2 : Industrial Bureaucracy.unit 3 : Labour Migration.unit 4 : <u>Women and Child Labourunit 5 : Power Industry and Capitalism.</u>
729	MAS-304 (B)	CRIMINOLOGY	2013	unit 1 : Criminology – meaning, scope subject mather.unit 2 : Sociological theories of crime.unit 3 : Human Rights & prision management.unit 4 : Theories of punishmentunit 5 : Role of police in crime prevention open prision after care.
730	MAS-304( C)	Sociology Demography	2013	unit 1 : Demography and social sciences.unit 2 : Methods of finding and analyzing birth & death rate.unit 3 : Biological Economical socio- cultgural theories.unit 4 : Critical evaluation of family welfare programme in India.unit 5 : Govt policies regarding polulahan population control. <u>In Indian context.</u>
731	MAS-401	Theoretical Perspective in Sociology	2013	unit 1 : Meaning and nature of Sociological theory.unit 2 : The idea of social structure-Radcliffe Brown and S.F. Nadel.unit 3 : Functionalism (Early theories) – Malinowaski and Emile Durkheim.unit 4 : Critique of Marxism by Ralf Dahrendorf.unit 5 : Phrenomenological sociology (A. Schutz and Edmund Husserl)
732	MAS-402	Sociology of Change and Development	2013	unit 1 : Theories of social change : cyclical and diffusionism.unit 2 : Concept of Modernization and secularization.unit 3 : Approaches and strategies of planning and development.unit 4 : Role of NGO's in the process of Development.unit 5 : <u>Social impact of IT revolution.</u>
733	MAS-403	Political Sociology	2013	unit 1 : Political Development, Political Sociolization.unit 2 : Political Elite : Pareto, Mosca & Mills.unit 3 : Totalitarian System :- Definition Types : cephalic and and accphalic.unit 4 : Pressure and group Political Parties.unit 5 : <u>Decentralization of Polity and Panchavati Raj.</u>
734	MAS-404	Industrial Sociology	2013	unit 1 : Industrial Sociology : Nature and Scope.unit 2 : Industrial Bureaucracy.unit 3 : Labour relation in India.unit 4 : <u>Women and Child Labour.unit 5 : Labour Security and Social Welfare.</u>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
735	BA - 101	Political Theory	2012	Unit- 1 : Relations with other social sciences : Sociology, history, economics, psychology and geography.Unit-2 : Power and Authority, StateUnit-3 : Rights: Theories of Rights,Liberty, Equality and Justice. <u>Democracy</u> Unit-4 : <u>Legislature, Executive and Judiciary, Constitution</u> Unit- 5: <u>Types of Government</u>
736	BA - 102	Introduction to Sociology	2012	Unit- 1 : The scientific and humanistic orientations to sociological studyUnit-2 : Society, Social structure, Religion, Education, Politics.Unit-3 : Culture, Socioalization, Social Stratification and mobilityUnit-4 : Social Change, Evaluation and revolutions, progress and DevelopmentUnit- 5: Sociology and Professions.
737	BA - 103	Micro Economics	2012	Unit- 1 : Methods of Economic Analysis, Inductive & Deductive, Law of Demand and SupplyUnit-2 : Elasticity of Demand – Price, Income & Cross ElasticityUnit-3 : <u>Production, Cost and Revenue</u> Unit-4 : <u>Market, Monopoly</u> Unit- 5: <u>Factor Pricing</u>
738	BA - 201	Indian Government and Politics (Political Science)	2012	Unit- 1 : The Making of Indian Constitution and its sources,Unit-2 : Fundamental Rights and DutiesUnit-3 : Union Parliament,Loksabha, RajyaSabha. Supreme CourtUnit-4 : The State Government Executive GovernorLegislative AssemblyUnit- 5:Political Parties
739	BA - 202	Indian Society (Sociology)	2012	Unit- 1 : The textual and the field view of Indian SocietyUnit-2 : The structure of Indian societyUnit-3 : Cultural diversityUnit-4 : Basic institutions of Indian SocietyUnit- 5:Change and transformation in Indian society
740	BA - 203	Indian Economy (Economics)	2012	Unit-1 : Structure of Indian Economy,Natural ResourcesUnit-2 :Human Infrastructure of Indian Economy, Demographic FeaturesUnit-3 : Agriculture Marketing and <u>Machanisation</u> Unit-4 : <u>Small Scale and Cottage Industries</u> Unit- 5: <u>Planning in India</u>
741	BA - 205	Prose (English Literature)	2012	Unit- 1 : AnnotationsUnit-2 : Francis BaconUnit-3 : AddisonUnit-4 : E.V. Lucas : Unbirthday and other presents, On <u>Finding things</u> Unit- 5:A.G. Gardiner- <u>On the Rule of the Road, on saying please</u>
742	BA - 206	Mid 15th Century of 1870 (History)	2012	Unit- 1 : The rise of modern era-RenaissanceUnit-2 : Economic revolution of the modern western worldUnit-3 : Glorios Revolution of 1688 A.D., American Revolution (1776 A.D.),French Revolution (1789)Unit-4 : Age of Napoleon his rise and fallUnit- 5:Age of Conservatism, European exploitation of Asia and America
743	BA - 301	Representative Political Thinkers and Isms	2012	Unit- 1 : Salient features of Ancient Indian and western political thoughtsUnit-2 : Main features Medieval Political thoughts in IndiaUnit-3 : Contractualists: Hobbes, Locke and RousseauUnit-4 : Socialism: Utopian and ScientificUnit- 5: <u>Thoughts of Mahatma Gandhi</u>
744	BA - 302	Sociology	2012	Unit- 1 : Rural Sociology,Urban SoicologyUnit-2 : Migration, Agrarian relation in IndiaUnit-3 : Rural Leadership, Panchayati Raj InstitutionUnit-4 : Problems related with Urban Development, Urban Local self governmentUnit- 5: <u>Changing dimensions of Urban life</u>
745	BA - 303	Macro Economics and Money and Banking (Economics)	2012	Unit- 1 : Macro Variables, National Income, National Income and Economic WelfareUnit-2 : Demand and Supply FunctionsUnit-3 : Saving Function & Sources of Saivng, Mobilisation,Theories of InterestUnit-4 : Demand Pull and Cost Push inflation,Measure to Control Inflation, Deflation and Recession.Unit- 5: <u>Bank,Central Bank and its Function with Reference to R.B.I. Credit Control</u>
746	BA - 305	Drama (English Literature)	2012	Unit- 1 : ypes of Drama : Tragedy, Comedy, Historical Play, One – Act PlayUnit-2 : William ShakespeareUnit-3 : Richard Brinsley SheridanUnit-4 : <u>John Galsworthy</u> Unit- 5: <u>J.M. Synge</u>
747	BA - 306	History of India (From 1200 Ad to 1739 Ad) (History)	2012	Unit- 1 : Survey of sources of medieval Indian historyUnit-2 : Invasion of the Mughals, Babur and Humayun, Sher Shah Suri.Unit-3 : Consolidation and territorial expansion of Mughal empire – AkbarUnit-4 :The Sultanate Period, <u>Administrative system</u> .Unit- 5: <u>The Mughal Period</u>
748	BA - 401	(Political Science)	2012	Unit- 1 : Executive, Legislature, Judiciary and Political PartiesUnit-2 : Salient Features of American ConsititutionUnit-3 : Salient Features of Swis ConstitutionUnit-4 : Salient Features of the Constitution of People"s Republic of ChinaUnit- 5: <u>Comparative Study of the Constitutions of Britain</u>
749	BA - 402	Sociology of Tribal Society (Sociology)	2012	Unit- 1 : Schedule Tribe,Status of Tribal WomenUnit-2 : Socio Cultural IntroductionUnit-3 : Tribal Economy and PovertyUnit-4 : Tribal ProblemsUnit- 5:Scenario in Madhya Pradesh,Scenario in Chhattisgarh
750	BA - 403	International Economics and Public Finance (Economics)	2012	Unit- 1 : Public Finance and Public EconomicsUnit-2 : Principles of Public Expenditure, Principles of Public Debt and Methods of RedemptionUnit-3 : International TradeUnit-4 : Terms of TradeUnit- 5: <u>Trends and Directions of India"s Foreign trade,Theories of Exchange Rate</u>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
751	BA - 405	Fiction (English Literature)	2012	Unit- 1 : Forms of FictionUnit-2 : John BunyanUnit-3 : Charles DickensUnit-4 : George OrwellUnit- 5:Somerset Maugham
752	BA - 406	Main Currents of World History, From 1871 to 1945 Ad (History)	2012	Unit- 1 : Internal and foreign policy of BismarckUnit-2 : Young Truk Movement and the Balkan warsUnit-3 : Wilson"s fourteen points.Unit-4 : Imperialism and colonialism in China and JapanUnit- 5:World politics FROM 1919 to 1939, Causes
753	MCA102	Programming with C & C++	2020	UNIT I : Fundamentals of C Programming: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do- while; Case switch statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary Operator; Type conversion & type casting; Priority & associativity of operators. UNIT II: Modular Programming: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursion-direct, indirect, tree and tail recursion, when to avoid recursion, examples. UNIT III : Advanced Programming Techniques: Special constructs – Break, continue, exit(), go to & labels; Pointers - & and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(); String; Pointer v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as parameter: Structure – basic declaration, membership operator, pointer to structure, referential operator
754	BA - 501	Indian and International Politics (Political Science)	2012	Unit- 1 : International Politics Post 1945 : Non alignment, Cold War, Detente and New Cold War.Unit-2 : Nuclear Armament and Disarmament : NPT, CTBT, START and PNE.Unit-3 : ASEAN and European Union.Unit-4 : India and Foreign Relations : USA, Russia, China and Pakistan.Unit- 5:India and UN
755	BA - 502	Main Sociological Thinker (Sociology)	2012	Unit- 1 : Auguste Comte,Emile DurkhiemUnit-2 : Max Weber,Talcott ParsonsUnit-3 : R.K. Metron,Vilfredo ParetoUnit-4 : Mathatma Gandhi,Radhakamal MukerjeeUnit- 5:M.N. Srinivas,A.R. Desai
756	BA - 503	Development and Environmental Economics (Economics)	2012	Unit- 1 : Economic growth and developmentUnit-2 : Development and underdevelopmentUnit-3 : Theories of developmentUnit-4 : Need for investment criteria in LDCsUnit- 5:Environment- economy linkage,Population environment
757	BA - 505	English Literature (English Literature)	2012	Unit- 1 : Poetry,The Love song of J. Alfred PrufrockUnit-2 : Poetry,At Grass, The Whitsun weddingsUnit-3 : Drama:R.N. TagoreUnit-4 : Prose:APJ Abdul KalamUnit- 5:Short Stories:Ruskin Bond
758	BA - 506	History of India 1740-1857 A.D. (History)	2012	Unit- 1 :Advent of EuropeansUnit-2 : Growth of colonial administrationUnit-3 : Maharaja Ranjeet Singh and AngloUnit-4 : Indian Renaissance, Socio-Religious movementUnit- 5:British Land Revenue, Settlement
759	MCA202	Mobile Computing	2020	UNIT I : Overview of OSI Model: Significance of layered Model, PDUs, SDUs, IDUs, Higher layer Protocols. Switching and Components. Introduction, Applications, history, of wired & wireless Communication Systems. Radio Transmission: Frequencies, signal propagation, antenna, types of modulation, FHSS, DSSS. Multiple Access technology for Wireless Communication: FDMA, TDMA, CDMA Cellular System: Introduction, types. UNIT II: Mobile Data Communication: Cellular Telephony, Structure, Fading, Small scale fading, Multi-path Fading, Speech Coding, Error Coding and Correction, Hand off Management, Switching and authentication, MTSO interconnections, frequency hopping, frequency reuse. Circuit Switched Data Services & Packet Switched Data Services on Cellular Networks, Personal Communication Systems (PCS) Architecture, Digital Enhanced Cordless Telecommunications (DECT,) Personal Access Comm. System (PACS). UNIT III : Digital Cellular Systems and Standards: GSM System overview, Architecture, GSM Protocol Model, GSM Mobility Management, SMS security aspects. Broadcast System overview. General Packet Service (GRPS)Architecture, GRPS Network, Interfaces and Procedures (2.5 G), 3G Mobile Services: UMTS and International Mobile Telecommunications (IMT-2000) W-C DMA and CDMA 2000 Quality of service in3G. UNIT IV WLAN.
760	BA - 601	Public Administration (Political Science)	2012	Unit- 1 : Public AdministrationUnit-2 : Principles of OrganizationUnit-3 : Personnel AdministrationUnit-4 : Financial AdministrationUnit- 5:Development Administration
761	BA - 602	Method of Social Research (Sociology)	2012	Unit- 1 : Social ResearchUnit-2 :Research MehtodologyUnit-3 : Scaling TechniquesUnit-4 : Meaning of Statistics, Utility and LimitationsUnit- 5:Presentation of Data Diagrammatic and Graphic Presentation Sociometry Use of Computer
762	BA - 603	Quantative Techniques (Economics)	2012	Unit- 1 : Basic Concedpts and LinearAlgebra Concept of variableUnit-2 : Measures of central tendenciesUnit-3 : Use and Application of RegrassionUnit-4 : Time series analysis.Concept and components Additive and MultiplicativeUnit-5:Probability: Concept Rules of Probability
763	BA - 605	Special English (English Literature)	2012	Unit- 1 : Concept of Rasa in Indian poetry.Unit-2 : Poetry:R.N. TagoreUnit-3 : Prose :M.K. GandhiUnit-4 : Drama:Grish KarnadUnit- 5:Drama:Grish Karnad

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
764	BA - 606	History of India From 1858 AD to 1950 AD With Emphasis on the National Movement (History)	2012	Unit- 1 : Queen Victoria's Proclamation and The Act of 1858, Indian Council Act 1861 Unit-2 : Lord Curzon and the partition of Bengal, Swadeshi movement Unit-3 : Gandhian Era, Khilafat and Non Cooperation Movement Swarajists Unit-4 : Cripps Mission, Shimla Conference Unit- 5: Indian agriculture, British famine policy
765	BA - 607	Hindi Literature	2012	Unit- 1 : O; k[; ka'k% ^va/ksjh uxjh^ vFkok /kzqo Lokfeku vkSj ,dkdh Unit-2 : ^va/ksjh uxjh^ vFkok /kzqo Lokfeku vkSj fu/kkZfjr ,dkadh rFkk fu/kkZfjr fuca/kksa ls vkykspukRed iz'uA Unit-3 : ukVd ,oa ,dkadh dk bfrgkl ,oa ize'fRr;kaA Unit-4 : ifBr dfo;ksa ij vkykspukRed iz'u lfgR cqansyh Hkk"kk vkSj mldh mi cksfy;ksa dk ifjp;]Unit- 5 : nzqr ikB&y{ehukj;k,k fe]
766	EC 3021	Electronic Devices	2018	Unit 1: Semiconductor intrinsic and extrinsic, p-type and n-type, energy band diagrams, majority and minority carrier, charge density in semiconductor. V-I characteristics, cut in voltages of Si and Ge diode, Transition and Diffusion Capacitance, Power Dissipation. Unit 2: Characteristics and application of p-n junction diode, Zener diode, avalanche diode, Varactor diode, Schottky diode, Tunnel Diode, PIN diode, LED, photodiodes, phototransistors, p-n junction. Clipping at two independent levels, Comparators, Sampling Gate, Rectifiers Unit 3: Construction, basic operation, current components and equations, CB, CE and CC-configuration, input and output characteristics, Early effect, region of operation, active, cutoff and saturation region. Uni-junction Transistor (UJT) : Principle of operation, characteristics. Unit 4: Transistor as an amplifier, load line, Q-point and its selection criteria, designing of fixed bias and self-bias, stability of biasing circuits, calculation of stability factor. Transistor at high frequency, high frequency model (hybrid- $\pi$ ), Parameters and their definition, Miller capacitance and its effect on voltage gain. Unit-5 Construction, channel and p-channel characteristics, parameters, Equivalent model and voltage gain, Enhancement and depletion MOSFET and
767	EC-3031	Digital Electronics	2018	UNIT-I : Decimal, Binary, Octal and Hexadecimal systems, conversion from one base to another, Codes-BCD, Excess-3, Gray Reflected ASCII, EBCDIC. Map method – four and five variable map methods – Products of Sums Simplification - Don't care conditions Quine -McCluskey Method. UNIT-II: Half adder – Full Adder – Half subtractor - Full subtractor. Multiplexer/Demultiplexer – decoder -encoder – parity checker – parity generators – code converters - Magnitude Comparator. UNIT-III : Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts, Clock generation. UNIT-IV: Asynchronous Ripple or serial counter. Asynchronous Up/Down counter -Synchronous counters – Synchronous Up/Down counters – Programmable counters – Design of Synchronous counters. Implementation -Modulo-n counter, Registers – shift registers -Universal shift registers. Shift register counters – Ring counter – Shift counters – Sequence generators \
768	EC-3041	Network Analysis	2018	UNIT-I: Introduction to circuit theory: basic circuit element R,L,C and their characteristics in terms of linearity & time dependent nature, voltage & current sources, controlled & uncontrolled sources KCL and KVL analysis, Steady state sinusoidal analysis using phasors. UNIT-II : Network Graph theory: Concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices, dual network. UNIT-III: Kirchoff's voltage law, Kirchoff's current law, Voltage division and current division, Series parallel Network reduction, Superposition theorem and its application, Thevenin's and Norton's theorem and its application. Application of Tellegen's theorem, Millman's theorem, Substitution theorem with proof, Compensation theorem. UNIT-IV: Transient analysis: Transients in RL, RC&RLC Circuits, initial & final conditions, time constants. Steady state analysis, Laplace transform: solution of Integro-differential equations, transform of waveform synthesized with step ramp, Gate and sinusoidal functions, Initial & final value theorem, Network Theorems in transform domain. UNIT-V: Relationship of two port variables, Short circuit admittance parameters, open circuit impedance parameters, Transmission parameters, the hybrid parameters, Relationship
769	EC-4021	Electronic Instrumentation and Measurement	2018	UNIT-I: Accuracy and Precision, Sensitivity, Linearity, Resolution, Hysteresis, Loading Effect. Measurements of Current, Voltage, Power and Impedance: DC and AC Ammeter. UNIT-II : Different parts of CRO, Block diagram, Electrostatic focusing, Electrostatic deflection, Post deflection acceleration. UNIT-III: Maxwell's bridge (Inductance and Inductance-Capacitance), Hay's bridge, Schering bridge (High voltage and Relative permittivity), Wein bridge, Wagner earth detector, Impedance measurement by Q-meter. Optical Transducer- Photo emissive, Photo conductive, Photo voltaic, Photo-diode, Photo Transistor, Nuclear Radiation Detector. UNIT-IV : Signal and Function Generators, Sweep Frequency Generator, Pulse and Square Wave Generator, Beat Frequency Oscillator, Digital display system and indicators, Classification of Displays, Display devices, Light Emitting diodes(LED), Liquid Crystal Display(LCD). UNIT-V : Analog-to-digital Conversion (ADC) –Ramp Technique, Dual Slope Integrating Type, Integrating Type (voltage to frequency), Successive Approximations, digital voltmeters and multi-meters, Resolution and sensitivity of digital meter, PLC structure, principle of operation, response time and application.



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
770	EC-4031	Analog Communication	2018	UNIT 1: Frequency domain representation of signal: Fourier transform and its properties, condition of existence, Fourier transform of impulse, step, signum, cosine, sine, gate pulse, constant, properties of impulse function. UNIT 2: Introduction: Overview of Communication system, Communication channels Need for modulation, Baseband and Pass band signals, Amplitude Modulation: Double side band with Carrier (DSB-C). UNIT 3: Types of angle modulation, narrowband FM, wideband FM, its frequency spectrum, transmission BW, methods of generation (Direct & Indirect), detection of FM (discriminators: balanced, phase shift and PLL detector), pre emphasis and de-emphasis. UNIT 4: AM transmitter & receiver: Tuned radio receiver & super heterodyne, limitation of TRF, IF frequency, image signal rejection, selectivity, sensitivity and fidelity, Noise in AM, FM. UNIT-5: Figure of merit for various AM and FM, effect of noise on AM & FM receivers.
771	EC-4041	Analog Circuits	2018	UNIT-I: Transistor as an amplifier, load line, Q-point and its selection criteria, designing of fixed bias and self-bias, stability of biasing circuits, calculation of stability factor. UNIT-II: RC phase shift, LC (Hartley and Collpit) Oscillators, Wein Bridge, Negative resistance (Tunnel diode and UJT) oscillators, crystal oscillators. UNIT III: Operation, analysis and design of Class A, Class B, Class-AB, Class C, transformer coupled, push pull and complementary symmetry amplifiers, power dissipation in transistors (P <sub>dmax</sub> rating) and efficiency calculations. UNIT IV: Differential amplifier and analysis, Configurations-Dual input balanced output differential amplifier, Dual input Unbalanced output differential amplifier, Single input balanced output differential amplifier, Single input Unbalanced output differential amplifier. Effect of variation in power supply voltage. UNIT V: IC-555 Timer concept, Block pin configuration of timer. Monostable, Bistable and Astable Multivibrator using timer 555-IC, Schmitt Trigger, Voltage limiters, Clipper and clampers circuits, Absolute value output circuit, Peak detector, Sample and hold Circuit, Precision rectifiers, Voltage-to-current converter, Current-to-voltage converter. Fixed and Adjustable Voltage Regulators, Dual Power supply, Basic Switching Regulator and characteristics of standard regulator ICs such as linear regulator, Switching
772	EC-4051	Control Systems	2018	UNIT 1: Terminology and classification of control system, examples of control system, mathematical modeling of mechanical and electrical systems, differential equations, transfer function, block diagram representation and reduction, signal flow graph techniques. UNIT 2: Concept of stability of linear systems, effects of location of poles on stability, necessary conditions for stability, Routh-Hurwitz stability criteria, relative stability analysis, Root Locus concept, guidelines for sketching Root-Locus. UNIT 3: Nyquist stability criterion, assessment of relative stability using Nyquist plot and Bode plot (phase margin, gain margin and stability). UNIT 4: Design problem, types of compensation techniques, design of phase-lag, phase lead and phase lead-lag compensators in time and frequency domain, proportional, derivative, integral and Composite Controllers. UNIT 5: State space representation of systems, block diagram for state equation, transfer function decomposition, solution of state equation, transfer matrix, relationship between state equation and transfer function, controllability and observability.
773	EC-5011	Digital Communication	2018	UNIT-I: Model of a digital communication system; Mutual information and channel capacity of a discrete memory less channel, Calculation of channel capacity of a discrete memory less channel, of a BSC, of a continuous AWGN Channel, Hartely- Shannon law, Bandwidth-S/N tradeoff. UNIT -II : Discretization in time and amplitude, Linear quantizer, Quantization noise power calculation, Signal to Quantization noise ratio, Non-uniform quantizer, A law & Mu-law, companding. UNIT -III: Line Coding & its properties. NRZ & RZ types, signaling format for unipolar, Polar, bipolar (AMI) & Manchester coding and their power spectra (No derivation), HDB and B8ZS signaling, ISI, Nyquist criterion for zero ISI & raised cosine spectrum. UNIT-IV : Types of digital modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying, Method of generation and detection of coherent & non coherent binary ASK, FSK & PSK, Differential phase shift keying, Quadrature modulation techniques, M-ary FSK, Minimum Shift Keying (MSK). UNIT-V: Simulation of Digital Communication Systems like PCM, DPCM, ADM, DM, ASK, FSK, PSK, QPSK and Multiplexing using ComSim and Matlab.
774	EC-5021	Electromagnetic Theory	2018	UNIT-I: Electric potential: Potential field due to different types of charges-Potential gradient-The dipole field due to dipole-Energy density in electrostatic field. UNIT-II: Biot Savart Law: Its applications. Ampere's circuital law: Its applications-Curl of magnetic field intensity- Magnetic flux and magnetic flux density-The scalar and vector magnetic potentials-Steady magnetic field laws. UNIT-III: Maxwell's equations in point form and integral form for time-varying fields-Comparison of field and circuit theory. Poynting Theorem: Poynting vector. UNIT-IV: Transverse electric waves-Transverse magnetic waves-characteristic of TE and TM waves-TEM waves. UNIT-V: TE waves and TM waves in Rectangular waveguides-Dominant mode-cutoff frequency in wave guides-Impossibility of TEM waves in waveguides.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
775	EC 5031 (A)	MICRO PROCESSOR AND MICRO CONTROLLER ( $\mu$ p and $\mu$ c)	2018	UNIT-I: Architecture of 8086 Microprocessor BIU and EU, register organization, pin diagram, memory organization, clock generator 8284, buffers and latches, 8288 bus controller, maximum and minimum modes.UNIT-II: 8086 based multiprocessor systems Interconnection topologies, coprocessors 8087 NDP, I/O processors 8089 IOP, bus arbitration and control, lightly and tightly coupled systems. UNIT-III:Peripheral devices and their interfacing Memory interfacing, Programmable input/output ports 8255, Programmable interval timer 8253, keyboard/ display controller 8279, CRT controller 8275, Programmable communication interface 8251 USART. UNIT IV: Programmable interrupt controller 8259. DMA in 8086 Basic DMA operation, modes of DMA transfer, DMA controller 8257. UNIT V: 8051 Microcontroller Features, architecture, Pin Diagram, memory organization, external memory interfacing, instruction syntax, data types, subroutines, addressing Modes, instruction set, ALP of 8051. Applications of 8051
776	EC 5041	INDUSTRIAL ELECTRONICS (IE)	2018	UNIT -I: UJT and characteristics, UJT as a relaxation oscillator, turn off methods, fast recovery diodes, schottky diodes, Series and parallel connections of SCR, DIAC, TRIAC, Power MOSFETS.UNIT-II: Classification of voltage regulators, short period and long period accuracy of voltage regulator, D.C. voltage regulators, complete series voltage regulator circuit with ICs, SMPS basic principles, step up and step down circuits.UNIT-III: Constituents of industrial timers, classifications, thermal timers, Electronic timers, SCR delay timer, I.C. electronic timers. UNIT-IV: Introduction, control of D.C. shunt motor, full wave D.C. shunt motor control overload projection, universal motor control, electronic control for reversing motor control using SCR, choppers, their classifications and applications.UNIT-V: Instability of D.C. motors, variable speed induction motor drives, T.N. characteristics of I.M. invertors for driving the motor, speed control of I.M. using various methods, cyclo-converters, their classifications and applications.
777	EC-6011	Wireless Communication	2018	UNIT-I: Standards: AMPS, GSM, CDMA (IS-95). Cellular Concept and Frequency Reuse, Overview of Multiple Access Schemes, Channel Assignment and Hand off, Interference and system capacity. UNIT-II: Radio wave propagation issues in Personal wireless systems, Elementary treatment of Propagation Models, Multipath fading and base band impulse response models, Parameters of mobile multipath channels.UNIT-III: Digital modulation techniques for mobile communications: BPSK, DPSK, QPSK, OQPSK - GMSK. Equalization, Diversity -Rake receiver concepts-Speech coding (LPC, CELP).UNIT-IV: IEEE 802.11 Architecture and Services - IEEE 802.11 Medium Access Control- IEEE 802.11 Physical layer, BLUETOOTH.UNIT-V: Overview-Radio specifications-Base band specifications-Link Manager Specification-Logical Link Control and Adaptation Protocol.
778	EC-6021	Antenna & Wave propagation	2018	UNIT-I: Isotropic Radiation, Power density and Intensity, Gain, Directive gain, Directivity, Effective area, Reciprocity theorem, Antenna efficiency, Radiation resistance, Terminal impedance, Beam width and Bandwidth. UNIT-II: Various forms of antenna arrays – Broadside, End fire, Collinear, Parasitic arrays, Array of two point sources, Pattern Multiplication, Array of "N" sources – analysis of End fire and Broadside case, phased arrays, Binomial arrays.UNIT-III: Traveling wave, Loop, Dipole and Folded dipole antennas, Horn antenna, Reflector antenna, Yagi- Uda antenna, Log periodic antenna, Helical and Micro strip antenna and applications of all types of antennas.UNIT-IV:Impedance, Gain, Radiation pattern, Beam width, Radiation resistance, Antenna efficiency, Directivity, Polarization and phase Measurements.UNIT-V:Magnetic field on Radio wave propagation. Virtual height, MUF, Skip distance, OMF, Ionosphere abnormalities, Multi-hop propagations, Space wavepropagation, Super refraction.
779	EC-6031	VLSI FABRICATION AND TECHNOLOGY (VLSI)	2018	UNIT-I: Crystal Growth and Wafer preparation: Wafer terminology, Different crystalline orientations, CZ method. CMOS IC Design flow, Crystal Defects. Fabrication processes of FETs, MOSFETs, and BIMOS etc. UNIT-II:Layering: Epitaxial growth methods, Oxidation; Kinetics of oxidation, Thin film fabrication, Metallization; Physical Vapor Deposition, Sputtering. UNIT-III: Patterning: Lithography; Optical Lithography, Electron Lithography, X-ray Lithography, Ion Lithography. Photo masking steps, Resists. Doping: Diffusion; Diffusion Models, Ion Implantation; Implantation Equipment, Channeling. UNIT-IV: VLSI process techniques and Integration: Floor planning, layout, Design rules, stick diagrams, Test generation, Logic simulation, Introduction to EDA tools. UNIT-V: Subsystem Design: Data-paths; adder, Shift registers ALU, Memory; NVRWM, Flash memories, 6-Transistor RAMs. Latch up in CMOS Circuits.
780	EC 6041	OPTICAL FIBER AND COMMUNICATION (OFC)	2018	UNIT-I: basic optical laws and definitions, optical fiber modes and configurations, mode theory for circular waveguides, single mode fibers, graded-index fiber structure, fiber materials, photonic crystal fibers, fiber fabrication, fiber optic cables.UNIT-II: Light emitting diodes (LEDs): structures, materials, quantum efficiency, LED power, modulation of an LED. single mode lasers, modulation of laser diodes. UNIT-III: Pin photo detector, avalanche photodiodes, photo detector noise, detector response time, avalanche multiplication noise.UNIT-IV: Attenuation: units, absorption, scattering losses, bending losses, core and cladding losses. Signal distortion in fibers: overview of distortion origins, modal delay, factors contributing to delay, group delay, material dispersion, waveguide dispersion, polarization-mode dispersion. UNIT-V:Optical technologies Wavelength division multiplexing (WDM) concepts: operational principles of WDM, passive optical star coupler, isolators, circulators, Active optical components: MEMS technology, variable optical attenuators, tunable optical filters, dynamic gain equalizers, polarization controller, chromatic dispersion compensators.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
781	EC-7011	VLSI Design	2018	UNIT-I: Practical Consideration and Technology in VLSI Design Introduction, Size and complexity of Integrated Circuits, The Microelectronics Field, IC Production Process, Processing Steps, Packaging and Testing, MOS Processes, NMOS Process, CMOS Process, Bipolar Technology, Hybrid Technology, Design Rules and Process Parameters.UNIT-II:Device Modeling Dc Models, Small Signal Models, MOS Models, MOSFET Models in High Frequency and small signal,Short channel devices, Sub threshold Operations, Modeling Noise Sources in MOSFET's, Diode Models,Bipolar Models, Passive component Models.UNIT-III: Circuit Simulation Introduction, Circuit Simulation Using Spice, MOSFET Model, Level 1 Large signal model, Level 2 Large Signal Model, High Frequency Model, Noise Model of MOSFET, Large signal Diode Current,High Frequency BJT Model, BJT Noise Model, temperature Dependence of BJT.UNIT-IV:Structured Digital Circuits and Systems Random Logic and Structured Logic Forms, Register Storage Circuits, Quasi Static Register Cells, AStatic Register Cell, Micro coded Controllers, Microprocessor Design, <del>Systemic Areas: Bit Serial Processing Elements, Electronic</del> UNIT-V: CMOS Processing Technology, Basic CMOS Technology, A Basic Magnetron, TWT, Backward wave oscillator etc.UNIT-II: Solid state microwave sources, transferred electron devices, Tunnel diode Gunn diode and oscillators, IMPATT diode, TRAPATT diode, Pin diode, Varactor diode, Schottky diode, Parametric amplifiers, Crystal diode, Frequency multipliers, Microwave BJT & FET.UNIT-III:Scattering matrix, S-parameters & its applications in Network analysis, Matching Network, Detector diodes, detector mounts, detector output indicator, slotted line, measurement of power, impedance & S-parameter, measurement of frequency & VSWR.UNIT-IV:Impedance transformer, Microwave filters, Power dividers and directional couplers, E-plane Tee, H-plane tee, Matched hybrid Tee., Wave propagation in ferrite medium, Isolators, Circulators, YIG resonators, Simulation Techniques for design of Microwave Components.UNIT-V:Mixer and converter design, diode phase shifters, attenuators, Design of hybrid and monolithic, microwave and millimeter wave integrated circuits.
782	EC-7021	Microwave Engineering	2018	UNIT-I: Microwave tubes like Two cavity klystron and Reflex klystron, Magnetron, TWT, Backward wave oscillator etc.UNIT-II: Solid state microwave sources, transferred electron devices, Tunnel diode Gunn diode and oscillators, IMPATT diode, TRAPATT diode, Pin diode, Varactor diode, Schottky diode, Parametric amplifiers, Crystal diode, Frequency multipliers, Microwave BJT & FET.UNIT-III:Scattering matrix, S-parameters & its applications in Network analysis, Matching Network, Detector diodes, detector mounts, detector output indicator, slotted line, measurement of power, impedance & S-parameter, measurement of frequency & VSWR.UNIT-IV:Impedance transformer, Microwave filters, Power dividers and directional couplers, E-plane Tee, H-plane tee, Matched hybrid Tee., Wave propagation in ferrite medium, Isolators, Circulators, YIG resonators, Simulation Techniques for design of Microwave Components.UNIT-V:Mixer and converter design, diode phase shifters, attenuators, Design of hybrid and monolithic, microwave and millimeter wave integrated circuits.
783	EC-7031	I.O.T	2018	UNIT-I: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.UNIT-II:Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services. UNIT-III:Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, MQTT, CoAP, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.UNIT-IV: Sensor Technology, Participatory Sensing, Industrial IOT and Automotive IOT, Actuator, Sensor data Communication Protocols, Radio Frequency Identification Technology, Wireless Sensor Network Technology.UNIT-V: IOT Design methodology: Specification -Requirement, process, model, service, functional & operational view.IOT Privacy and security solutions, Raspberry Pi & arduino devices.IOT Case studies: smart city streetlights control & monitoring.
784	EC-8011	TV and RADAR	2018	UNIT-I: MONOCHROME TELEVISION TRANSMITTER AND RECEIVER TV transmitter – TV signal propagation – Interference – TV transmission Antennas – Monochrome TV receiver – RF tuner – UHF, VHF tuner- Digital tuning techniques- AFT-IF subsystems - AGC – Noise cancellation Video and sound inter carrier detection- vision IF subsystem- video amplifiers requirements and configurations.UNIT-II:Three colour theory- luminance, hue and saturation-colour television cameras- values of luminance and colour difference signals- colour television display tubes- delta – gun62 precision – in-line and Trinitron colour picture tubes- purity and convergence. UNIT-III: NTSC colour TV system- NTSC colour receiver- limitations of NTSC system – PAL colour TV system – cancellation of phase errors- PAL –D colour system- PAL coder – Pal-Decolour receiver- chromo signal amplifier- separation of U and V signals- colour burst separation – Burst phase Discriminator.UNIT-IV: Block Diagram & operation- RADAR Frequencies- RADAR Equation- Detection of signals in Noise RADAR cross section of targets- RADAR cross section fluctuations- transmitter power- pulse repetition frequency- system losses and propagation effects. MTI AND PULSE DOPPLER RADAR Introduction to Doppler & MTI RADAR- Delay Line canceller- Moving Target Detector- Pulse Doppler RADAR- Non-Coherent MTE- CW RADAR- FMCW RADAR- Tracking RADAR- Monopulse Tracking – Conical Scan and Sequential Lobing.UNIT-V: RADAR TRANSMITTER AND RECEIVER Linear beam power tubes- Solid state RF power sources- solid state devices used in RADAR Magnetroncrossed field amplifiers- other aspects of radar transmitter- RADAR Receiver- Receiver



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
790	AR114	HUMANITIES	2014	1. Grammar- Tenses, Types of sentences, clause analysis, reported speech, models, punctuation with emphasis on spoken expression with proper language command.2. Precise, essay and paragraph writing.3. Technical report and letter writing.4. Aesthetic and critical writing.5. Communication skills in architecture through write up and graphics, graphs, sketches audio presentation supplemented by drawings, transparencies, photographs, epidioscope, slides, video presentation, script writing dubbing, que sheet, ending vision mixing.SOCIOLOGY1 . Introduction: Man, his social and physical environment, social groups and social structure and problems, cultural heritage, rituals and community gatherings etc.2.` Urbanisation: Trends and characteristics, dynamics of urban growth and social changes, urban attitudes, values and behaviour, review of commission's report etc.
791	AR115	STRUCTURE I	2014	1. Statics of a particle, composition and resolution of forces, moment of a force, parallel forces,couples,general conditions of equilibrium.2. Center of gravity and moment of inertia of composition and cut out sections, parallel and perpendicular axes theorem, stability of equilibrium3. Simple stresses and strains, direct stresses, compound stresses4. Shear force and bending moments for strained beams subjected to concentrated load and distributed loadings (Simply supported and cantilever only) support reactions.5. `Stress in beams: Direct, bending and shearing stress in beams.
792	AR116	WORKSHOP I	2014	The aim of the subject is to introduce to the students to the various tools used in carpentry, metal work, masonry painting etc. and get a reasonable skill in handling the materials and tools there off.1. BRICKS: Bonds, ends and junctions, attached or detached pier, jointing, pointing, cavity walls.2. STONE: Types and dressing, walling and joints, facing of brick or stone or brick work.3. CARPENTARY: Understanding the structure of timber, varieties of Indian timber, commercial boards, handling different carpentry tools, carpentry process, carpentry joints and wood working machines.4. SHEET METAL WORK: Cutting, bending and jointing of (ferrous / non ferrous metals) sheets, flats, bars, wires etc. Exercises in simple welding of angles, pipes sheets, flats.5. PLUMBING: Introduction to various pipes and fittings screwed joints, threads bending and plumbers tools.6. MASONARY: Handling the bricks, mixing the mortar, bond work of bricks, stones and masonry tools7. PAINTING & POLISHING: Preparation of timber and metal surfaces, priming, painting by brush, spray guns, polishing of timber surfaces, lamination to timber surfaces.
793	AR121	DESIGN II	2015	1. Introduction of Architectural design with an approach of functional understanding and analysis of problems with studies of space requirements for different furniture (objects), activities and circulation. Relationship between occupied and unoccupied spaces.2. Anthropometric study and analysis. Study of single units Viz / living area, sleeping area, cooking area, study area, toilet etc.3. Design of small shelters and study of multi units involving max. 3 to 4 functional spaces natural and man made objects of functional and aesthetic value. Aspects of area determination in conjunction with relevant building Bye Laws and area relationship.4. Colour theories and colour schemes and its effect on the users.5. Case studies for measured drawing of small buildings and furniture. Introduction to draw presentation drawings. Small views (isometric and perspective) of the studied buildings.6. Study and design of small structures like ceremonial gates, temporary exhibition stalls, drinking water fountains, milk booths etc.
794	AR122	GRAPHICS II	2015	PERSPECTIVE: 1. Introduction to basic terms, principles, types and techniques of perspective drawing: realistic expression of ideas. Two point perspective of simple objects (drafted & free hand)2. `Presentation of interior and exterior views in one point perspective (drafted and free hand) An idea of development of surfaces is also to be given to the students.SCIOGRAPHY: 1. Introduction to basic principles of sciography and it's application to the field of architecture2. Sciography of two dimensional objects in plan and elevation.3. Sciography of three dimensional objects in plan, elevation and views, (Isometric, Axonometric and Perspective)4. Sciography of simple building elements.5. Complex Projections: Interpenetration of solids, development of surfaces with or without sections.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
795	AR123	BUILDING CONSTRUCTION I	2015	1. FOUNDATION: Brick, stone, plinth filling, entrance, steps/ramps plinth protection D.P.C. & coping, timbering.2. ARCHES and LINTEL: Brick, stone lintels, centering materials and methods.3. PRECAST UNIT MASONRY: Concrete block, decorative brick work, compound, mud wall (C.B.R.I) other bonds4. DOORS (TIMBER): Ledged braced and battened door, panel door, glazed door, flush door.5. WINDOWS (TIMBER): Side and Top hung, pivoted, louvers, ventilators and fixed fanlight.6. DOORS (METAL) PRESSED STEEL AND 'Z' SECTION: With and without fanlight.7. WINDOWS (METAL) PRESSED STEEL AND 'Z' SECTION: Top and side hung, fixed, pivoted, louvers, ventilators and fanlight.8. MISCELLANEOUS: Jamb casing, architrave, pelmet, mouldings, skirting and window boards, door and window fixtures.
796	AR124	HISTORY OF ARCHITECTURE I	2015	1. Pre historic, vedic, Indus Valley civilization.2. Buddhist and Jain period.3. Egyptian, West Asiatic4. Chinese, Japanese5. Pre Colombian, Mayan Civilization
797	AR125	STRUCTURE II	2015	1.Fixed and continuous beams: Relation between free B.M. diagram fixed B.M. diagram, slope deflection, fixed beam subjected to couple, continuous beam, Clapeyron's theorem of three moments.2. Moment distribution methods: fixed and continuous beams only3. Study of types of structures: load bearing framed, rigid jointed, pin jointed, determinate, indeterminate.4. Loads of stresses: Dead load, live load, wind load, earth quake forces, soil and hydrostatic pressure, load combinations, factor of safety, permissible stresses, standard specification and codes of practice.5. Analysis and stability of retaining walls: rectangular and trapezoidal only.
798	AR126	WORKSHOP II	2015	1. Models made of paper, thermo cole, wires, plaster of Paris, cardboards, Acrylic sheets and other soft materials based on the program of design.
799	AR211	DESIGN III	2015	1. The aim of the course is to emphasis and evolve the methodology for architectural design with reference to the previous knowledge of function and aesthetics. The design should highlight the clear approach to the design with idea (concept), analysis, synthesis and clarity of details and architectural expression with use of appropriate graphic presentation techniques.2. The design should be done with a sensitivity towards surroundings i.e. traditional and vernacular architecture, construction techniques and environment3. The problems should include the small design exercises of nursery school, restaurants, small nursing homes, small offices, exhibition pavilions, canteens, kiosks etc.4. One time problem is to be attempted of 12 hrs. duration in class other than regular design problems
800	AR212	GRAPHICS III	2015	1. Introduction to basic understanding of application software, such as Auto cad, Revit, Archicad.2. Advance Computer Aided Architecture Drafting (in various projections).3. Architecture or allied project presentation technique.4. Graphical analysis of development project through computer.5. 3-D modeling, animation and advance rendering techniques with the help of computers
801	AR213	BUILDING CONSTRUCTION II	2015	1 Timber floor : Single , double, and triple2 Timber Roof : flat , lean to roof , couple , close couple3 Trussed roof : ( timber ) King Post , Queen Post , builtup truss ( timber and concrete as per C. B. R. T )4 Balconies , Stairs and canopies ( timber )5 Built in fittings & furniture: Wardrobe , Cupboardf , Shelf , Showcases in houses.
802	AR214	HISTORY OF ARCHITECTURE II	2015	1 Greek , Roman2 Early Christian , Byzantine3 Medieval ( Romanesque , Gothic )4 Renaissance5 Impact of industrial revolution ( upto 1942 )
803	AR215	STRUCTURE III	2015	1. Steel work connections: Riveted connections, Bolted and pinned connections, Welded connections.2. Design of Tension members: Types of tension members, permissible stresses, Design of members subjected to axial tensions and bending. Tension splices, lug angles3. Design of compression members: Types of compression members, failures, end conditions, effective length, design by I.S. Code method. Strength of compression members, splices, encased columns.4. Design of flexural members: Beams simple and built up, plate girder, criteria of design, design of laterally supported and laterally unsupported beams.web crippling and web buckling5. Design of roof trusses: To determine the forces in members due to various loads, types of roof trusses, components of roof trusses, purling, lateral bracing of end trusses, roof covering.



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804	AR216	THEORY OF DESIGN	2015	1. Studies of folk art and crafts, indigenous architectural studies, influence of tradition, culture and socio-economic developments on art and architecture. Introduction to inquiries initiated by various Western and Indian philosophers.2. Understanding of determinants of physical form such as concepts of space, structure, organization, symbolism, mass, surface scale, order, proportion, rhythm, datum, axis, etc. in relation to place, time and society with due consideration for perceptual qualities as affected by colors, light conditions, vision angle etc.3. Communication and interpretations in architecture. The eloquence, aptness and style in architecture, their judgment and design.4. Development in world architecture, environmental design and technology with reference to trend setting works of architects, designers, ecologists, engineers etc.5. Design parameters, principles, process, methods and program formulation. Design, matrices and system integration. Process of design synthesis
805	AR221	DESIGN IV	2016	Study of natural environmental factors, their impact and consideration by human settlements of a town on a part of a city. Especially on housing forms, open spaces, their activities and construction methods including energy efficient structures. Emphasis on the following attitudes is important :- Detailed study of one or more of the following aspects - climatic considerations and relationship with life style. Emphasis on Consideration of constructional details, basic details of services like kitchen, toilets etc. and site planning of the scheme. Design problems with natural and manmade parameters dealing with independent bungalows, farm houses, combined units, duplex type their cluster or grouping etc. along with relevant Building codes.
806	AR222	BUILDING CONSTRUCTION III	2016	1. Shoring - Types and detailing2. Industrial steel floor (fire proof), jack Arch roofing, stone slab roofing, stone stairs, stone floor on girder.3. Steel roofs-types and detailing of simple trusses only4. Precast components (C.B.R.I.)5. Design & construction details of domestic furniture in timber & hollow tube sections, slab flooring, stone stairs.
807	AR223	BUILDING SCIENCE I	2016	1. Introduction to the elements of climate and its types with reference to tropical climate and site climate.2. Vernacular techniques of shelter design as per climatic regions (Rural and Urban).3. Principles of thermal design and control, ventilation and air movement illumination and day lighting, response to climate by man and building4. Elements of architecture design with climate by using different prediction tools and design aids.5. Study of building materials and construction techniques of energy efficient building design for tropical climate.
808	AR224	HISTORY OF ARCHITECTURE III	2016	1 Pre-Gupta Architecture i.e. up to 3rd century .A.D. 1. Gupta, Chalukayan, Indo Aryan.2. Dravidian & Rajput Architecture i.e. up to 11th century .A.D.3. Medieval Hindu & Jain architecture.4. Indo-Islamic architecture.5. Rajput palaces.6. Colonial Architecture in India.
809	AR225	STRUCTURE IV	2016	1. Introduction to R.C.C., Working Stress method, Limit State method2. Design of Beams :- analysis of beams, design of singly, doubly reinforced beam, T-beam, L-beam, (cantilever and simply supported ) lintel, chhajjas3. Design of Slabs :- analysis of slabs, design of One way, Two way, Continuous, Cantilever Slabs (simply supported and continuous)4. Design of Columns:- axially loaded, columns with Uni-axial and Bi-axial bending5. Design of Staircases :- dog-legged, and open well only
810	AR226	SURVEY AND LEVELING	2016	1. Aspects of surveying for the Architect. Surveying instruments classification by function. Useful data and formulae, basics of Mensuration.2. Scales-Plain scale, diagonal scale, comparative scale, shrunken scale, vernier scale.3. Study, test, degree of accuracy, use and care of surveying instruments and accessories.4. Site survey techniques: Chain surveying, compass surveying, plain table, theodolite.5. Leveling and contouring, Topographic Survey.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
811	AR311	DESIGN V	2016	Design of imaginative forms to develop the creativity in terms of built form. Design with application of principles and theory of architectural design and philosophies of contemporary architects. The attempt is towards developing ones own language and philosophy of architecture to guide towards exploring alternative building forms for different activities which help in understanding the relationship of structure and possibilities in building forms. Design problems should include problems of simple and complex nature i.e. temple, gathering places, exhibition pavilion, clubs, cafe, community hall, museums, art gallery, pavilion, sport complexes, nursing homes. Emphasis shall be given more on three dimensional studies to develop an understanding for man and space relationship and also relevant building bye-laws. There should be variety of problems in the studio work with changing focus for each problem from theory to construction techniques (local) and site lay outs, covering organisation and detailing of open spaces with the aim to learn to work with practical limitations.
812	AR312	BUILDING CONSTRUCTION IV	2016	1. Design and Constructional details of sliding, sliding folding, revolving doors, swing doors and sliding windows in timber2. Design and construction details of fix glazing, side hung doors, in aluminum, fully glass door, rolling shutter and collapsible shutter3. Study of metal and aluminium sectioned curtain wall.4. Study of steel railing, jalis, grills, staircase and ladders. Study of compound wall (advanced type) with security arrangement, study of wicket gate and large entrance gates rolling on wheels.5. Study of expansion joints, water proofing and roof light. Study of details of various methods of facade treatment and interior finishes.
813	AR313	BUILDING SERVICES I	2016	A) SANITATION 1 . Basic principles of sanitation, introduction to modern plumbing system. Study of Indian standards and plumbing bye laws. General introduction to various sanitary fitting & fixtures their placement and functions. Study of internal & external drainage system including study of duct for large verity of buildings including small residences, apartments, block of houses, public buildings etc.2. Study of various types of sanitary pipes, construction of joints and laying of pipes. Study of traps,inspection chamber, man hole, septic tanks, soak pit and public sewage line. Study of various stages of disposal of domestic effluent from fitting to sewer line. Study of "Sulabha" complex & other "CBRI" toilet details. Study of storm water disposal in various buildings and road side3. Importance of sanitary services in the economics of buildings, planning & design disposal of city effluent, various treatment methods of city effluent and recycle of waste water. Study of refuse chutes in multistoried buildings and collection of refuse and recycle of city solid wastes.B) PLUMBING: 4. Study of sources of water and water treatment for city domestic purpose. Study of quality of notable water 5. Study of Indian standards and water supply network Architectural approach to plan the domestic
814	AR314	STUDY TOUR, WORKING DRAWING AND MEASUREMENT DRAWINGS	2016	Measurement tour (local or out of station) to measure a building of historical or architectural importance and Study tour is compulsory.
815	AR315	STRUCTURE V	2016	1. Structures". Design of Flat Slab2. Design of continuous and isolated footings3. Design of combined footing :- types of combined footing, design of combined footing (rectangular and trapezoidal only)4. Appropriate methods for an analysis for frames by portal method, cantilever method (horizontal forces only)5. Pre-stressed concrete:- pre stress and prestressing methods, type and classification of prestressing, losses of prestress
816	MCA302	Unix and Shell Programming	2020	UNIT I : General Overview of the System: System structure, user perspective, O/S services assumption about Hardware The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer, Reading and writing disk block, Advantage and disadvantage of buffer cache. UNIT II: Internal Representation of Files: INODES, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks. System Calls for the System: Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES mounting and unmounting files system, Link Unlink. UNIT III : Structures of Processes and process control: Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination. The user Id of a process, changing the size of a process. The SHELL Interprocess Communication and multiprocessor system: Process tracing system V IPO network communication sockets problem of multiprocessors systems. solution

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
817	AR321	DESIGN VI	2017	This program gives special emphasis on role of technology in architecture. The design projects to be dealt in the studio should respond to the importance of structure and services including acoustical treatments. Course Content: • The range of design problems shall include projects of progressively increasing complexity. • Exercises related to public buildings i.e. Commercial centre, hospital, auditorium, cinema, sports complex & educational buildings on sloping/ flat sites. • Study and incorporation of building bye-laws should be complete in this Sem. • Simultaneously, stress should be given on the interior treatment of small and large spaces. • Freedom in design is to be given with preliminary introduction of importance and role of bye laws in building design.
818	AR322	BUILDING CONSTRUCTION V	2017	1. R.C.C Beams: Simply supported, continuous, cantilever L& T beams, lintels & chajjas, details at odd junctions. 2. R.C.C Slabs: One way, and continuous, two way slab, flat slab, waffle slab, R.C.C covered pathways, reinforced brick slab. 3. R.C.C Foundation: RCC column footings and setting out plan. 4. R.C.C Staircases & Ramps: Types of staircases, detail of RCC dog leg staircase, RCC ramps. 5. R.C.C Timber & steel form work for various RCC building components.
819	AR323	BUILDING SERVICES II	2017	1. Fundamentals of electricity, Principles of wiring. 2. Fitting and accessories used in electrical installation of buildings including water proof and spark proof installation. Schematic diagrams of installation for different building types, lighting conductors, earthing, distribution & calculation of loads. 3. Brief study of electrical appliances, Sub-station, location and space requirement, relevant electricity board rules for various types of buildings. 4. Illumination: Laws of illumination. Direct, indirect and semi direct lighting, reflectors, decorative lighting. Flood lighting and use artificial lighting as an element in architectural schemes particularly in exhibition, cinemas, theaters, concert, concert halls and stadiums. 5. Rules and layout for telephone wiring & connection with EPBX.
820	AR324	SPECIFICATION, ESTIMATING AND COSTING	2017	A) SPECIFICATIONS OF MATERIALS: 1. Importance of specifications in the building activities, method of writing correct order and sequence of use of materials, use of Indian Standard Specifications and P.W.D. specifications. 2. Primary consideration for selection of materials for various applications. Specifications of basic materials required in residential buildings, such as bricks, stones, concrete, RCC, plastering and various finishes, roofing material timber work, flooring materials, glazing, metals such as steel, brass, aluminum etc. SPECIFICATIONS OF WORKS: 3. Specifications of works for a residential building of load bearing type and or RCC/framed type. 4. Specifications of works of construction of steel and RCC structures, ceiling and partitions, paneling, insulation and water proofing. 5. Specifications for services such as drainage, water supply, electrical installations. B) ESTIMATING & COSTING : 1. Introduction to quantity surveying, methods of preparing estimates, data required for framing an estimate, types of estimates. 2. Mensuration, standard mode of measurements, schedule of rates commercial abbreviations. Methods and procedure of taking off abstractions, working up and billing. Examples and exercises in taking in all items from
821	AR325	SITE PLANNING AND LANDSCAPE	2017	SITE PLANNING 1. Site planning, its interpretations, scope its importance Natural & Man made environment. Ecosystem, Ecological balance, interaction between built environment & ecosystem Ecological approach to design. 2. Natural Resources, Land, Water & Plants their environmental & ecological considerations. Macro & Micro climate, Microclimatic analysis, climatic Elements & their modification. 3. Site selection criteria, site survey, inventory & analysis, site planning process. Site development, guidelines for excavation & grading, circulation, site drainage, water supply, vegetation cover & Landscape furnishings. 4. Circulation systems: Types, hierarchy & layout patterns, planning & design criteria for pedestrian movement, vehicular movement & parking areas. 5. Buildings & outdoor spaces, their relationship & composition, Elements of visual design- point, line, form, colour & texture. Site Volumes, enclosures, site structure expression.

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822	MCA103	Theory of Computation	2020	UNIT I : Review of Mathematical Preliminaries: Set, Relations and functions, Graphs and trees, string, alphabets and languages. Principle of induction, predicates and propositional calculus. Theory of Automation: Definition, description, DFA, NFA, Transition systems, 2DFA, equivalence of DFA & NDFA, Regular expressions, regular grammar, FSM with output (Mealy and Moore models), Minimization of finite automata. UNIT II : Formal Languages: Definition & description, Parse structured grammars & their classification, Chomsk classification of languages, closure properties of families of language, regular grammar, Regular set & their closure properties, finite automata, equivalence of FA and regular expression, Equivalence of two way finite automata, equivalence of regular expressions. UNIT III: Context-Free grammar & PDA: Properties unrestricted grammar & their equivalence, derivation tree Simplifying CFG, unambiguifying CFG, $\epsilon$ -productions, normal form for CFG, Pushdown automata, 2 Way PDA, relation of PDA with CFG, Determinism & Non determinism in PDA & related theorems, Parsing and pushdown automata. UNIT IV: Turing Machine: Model, design, representation of TM, language accepted by TM, universal turing Machine, determine & non-determinism in TM. TM as acceptor/generator/algorithms. multidimensional Multitracks. multitape. Two way infinite
823	AR411	DESIGN VII	2017	The aims of the course is to emphasize and evolve the methodology for architectural design with reference to the previous knowledge of functional aesthetics as well as present and future scenario of urban and rural development, their problems and prospects. Design with application of principles and theory of urban design, urban and regional planning aspects and philosophies of contemporary architects. The attempt is towards developing ones own language and philosophy of architect on guide towards exploring alternative building forms for different activities which help in understanding the relationship of structure and possibilities in building forms. Design of cost effective, sustainable structures for various economic and social groups to solve problem of efficient housing in urban India, post disaster rehabilitation & earth quake resistant structures, etc. Emphasis on consideration of advanced construction materials and techniques with CC framed structure, Steel structure for large span buildings, and use of lightweight prefabricated panels and other etc. Details of services like sanitary, water supply, electrical and fire mechanical, fire fighting, parking etc. Detailed Site planning of the scheme with the details of landscaping and site agglomeration. Design under
824	AR412	BUILDING CONSTRUCTION VI	2017	The aim of the subject is to introduce the students about Execution of building component with their constructional details and presentation of working drawing. 1. Steel North Light roof trusses. 2. Monitor type trusses and Industrial roofing in Steel. 3. Tubular trusses and built-in trusses in steel. Industrial glazing, industrial cladding. 4. Canopies in steel, covered path ways in steel. 5. Advanced foundation types such as pile, grillage etc.
825	AR413	ADV. BUILDING SERVICES III	2017	SECTION – A Acoustics:1. Definition of sound. Fundamental characteristics of sound.2. Behavior of sound in enclosed spaces in general and few enclosed functional spaces in particular without involving much of mathematical complexity. Need to study acoustics.3. Development of this science through different periods. Pioneers and their works.4. Properties of sound, its origin propagation and sensation. Behavior of sound with respect to various surfaces, openings and in an enclosed space.5. Study of various sound absorbing materials, single and in combination of various frequencies of sound, panel absorbers, porous materials and cavity resonators. [ Reverberation time, Sabine's formula. Criteria for acoustics environment for reverberation in spaces6. Sound application systems. Constructional and planning measures for good acoustical design m Acoustical defects and remedies. Sound application systems. Case studies for the above aspects.7. Noise and its on man. Physiological and psychological principles of noise control including acoustic lent insulation for various domestic services and industrial fitting and constructions. Structure borne and air borne noise. their effects and control SECTION – B Security Systems:1. Types of security systems and
826	AR414	ECOLOGY AND ENVIRONMENT	2017	Introduction, Structure and Function: Introduction to ecology, its meaning and growing importance in daily life. Basic terms used in ecology and their meanings. Fundamental concepts of ecology. Ecology – Environment relationship. Concept of spaceship earth. Structure and function of eco- system. Major biomes of the world. Bio-geo-chemical cycles: Energy flows in eco-system. Species diversity, dominance, natural selection, habitat, niche, evolution etc. Eco-system equilibrium. Importance of micro organisms. Succession and community development limiting factors and other concepts. Ecological cybernetics Relationship with Nature: Man's relationship with nature in the past: Food-collecting, hunting, fishing, farming and other developmental stages in human civilization. Man's relationship with nature in the present: Industrial activities, urbanization, de-forestation, mining and similar incursions on nature for technological progress. Environmental impacts of these activities. The ecological crisis. Relevant case studies from abroad and India Importance of Ecology: Relevance and growing importance of ecology in a highly urbanized and technological world with reference to dwindling resources, increasing demands and advancing technology. Adaptation of life styles, and

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
827	AR415	TOWN PLANNING	2017	1. Basic components of urban areas and regions.2. Role of urban & regional planning at national level, metro level concepts. Basic planning, settlements, theories, models etc.3. Socio - cultural and land use planning, general principles, survey techniques, utopian thoughts, models for planning and their relevance in Indian context.4. Planning norms and development norms for urban and regional approaches, techniques of development for existing areas and renewal schemes, conservation and development.5. Transportation modes, planning and development survey techniques etc m <u>Review of regional plans.</u>
828	AR416	DISSERTATION	2017	1. First phase of dissertation allows students to identify the broad area / field of Architecture of their interest in which they may intend to do the research. This is to be done by studying and reproducing the brief of technical papers in the form of report review.2. Second phase allows the students to do the study of sample example of research already done by choosing the specific aspect / area relevant to broader field they have selected in first phase. This exercise involves the writing of report / review of book / journal dedicated to that specific aspect or area. This review writing is aimed to understand the method of collecting data (survey methods), analysis of data (statistics and mathematical formulas), drawing inferences and conclusion as attempted by the author of the book.3. Third phase is the writing of detailed dissertation report. Students are expected to choose their own topic of research by referring the area / field already identified in other two phases
829	AR421	PRATICAL TRAINING	2018	1. The students' work will be evaluated through monthly progress report / diary in the end of each month under continuous Assessment.2. Monthly progress report/diary, duly signed by the Architect, shall be submitted to the department, by the student up to 7th date of each month positively, online or in hard copy.3. The students' performance during the training shall be evaluated by a Jury at the end of the semester along with the IX semester examinations.4. The constitution of jury shall be - two external examiners, one Academician & one professional and two internal examiners, at least one shall be Professor or Head.
830	AR511	PRATICAL TRAINING	2018	1. The students' work will be evaluated through monthly progress report / diary in the end of each month under continuous Assessment.2. Monthly progress report/diary, duly signed by the Architect, shall be submitted to the department, by the student up to 7th date of each month positively, online or in hard copy.3. The students' performance during the training shall be evaluated by a Jury at the end of the semester along with the IX semester examinations.4. The constitution of jury shall be - two external examiners, one Academician & one professional and two internal examiners, at least one shall be Professor or Head.
831	AR521	THESIS	2019	Thesis Project: Each student will select a subject of an architectural interest in consultation with the committee appointed by the Head / Principal of the Dept. /Institution. The subject will have to be approved at the beginning of the eighth semester. The evolution of the thesis project will be continuous and the student will have to give at least three seminars/ submissions before the final submission. The thesis project shall be submitted in the form of bound report, drawings, models etc. in a manner as stipulated in THESIS MANUAL on the date prescribed by the Department. The student, in consultation with the faculty, is expected to demonstrate through an imaginative approach, his expertise in effecting positive changes in our built environment.
832	AR522	URBAN DESIGN	2019	1. Definition of Urban Design, scope of urban design in Indian context and its integration with urban planning. [i Historical development and approaches to Urban Design, spatial design, classical, functional, ornamental etc. space orders.2. Urban form and its elements, visual order of forms, sequence, scale, visual space dynamics. Various surveys needed to document visual aspects of environments.3. Urban design concepts of Doxiadis, Sarinen, Kelvin Linch, Le Corbusier and others.4. Urban structure and design rational inter- relationship economic activities, public organization, communication systems. Urban conservation and land use structure.5. Review and designing of urban renewal and redevelopment projects for old and new towns.

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833	AR523	PROFF. PRACTICE	2019	1. Introduction to Architectural Profession, Role of Professional Bodies, the Architects Registration Act, 1972.2. The duties, liabilities and relationships of client, contractor and other technicians. The code of professional conducts and conditions of engagement of Architects. Scale of remuneration for Architectural services and mode of payments.3. Types of tenders, tendering process, Execution of contract, Problems in operation of contract.4. Architectural competitions, office organisation, administration & management, documentation & maintenance of accounts, Arbitration, Easement and laws relating works, Dilapidation and waste.5. Office organization and administration, nature of partnership, registration and dissolution of firms. Statutory obligations, office managements, filing of documents and drawings, accounts and audits, staff personals, their salaries, incentives etc.6. Valuation: Importance of valuation for rental, income/wealth tax, selling/ purchasing. Values, sinking fund, capitalized cost year purchase, methods of depreciation and valuation tables Mortgage/ lease, fixation of rent of private/ Govt., residential, commercial buildings etc. Different methods of valuation Valuation reports duties and responsibilities as registered
834	MCA104	Computer Networks	2020	UNIT I : Introduction: Computer Network, Layered Network Architecture-Review of ISO-OSI Model., Transmission Fundamentals- Communication Media- Conductive Metal (Wired Cable), Optical Fiber links, Wireless Communication- Radio links, Satellite Links, Communication Services & Devices, Telephone System., Integrated Service Digital Network (ISDN), Cellular Phone., ATM, Modulation & Demodulation, Digital to Analog Conversion-Frequency Modulation (FM), Amplitude Modulation (AM), Phase Modulation (PM), Analog to Digital Conversion-Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Modem & Modem Types, Multiplexing, Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), Statistical Time Division Multiplexing (STDM), Contention Protocol- Stop-Go-Access Protocol, Aloha Protocol- Pure aloha & Slotted aloha, Carrier sense multiple access with collision detection (CSMA/CD). UNIT II :Data Security and Integrity: Parity Checking Code, Cyclic redundancy checks (CRC), Hamming Code, Protocol Concepts - Basic flow control, Sliding window protocol-Go-Back-N protocol and selective repeat protocol, Protocol correctness- Finite state machine. UNIT III : Local Area Network- Ethernet- 802.3 IEEE standards. Token Ring- 802.5 IEEE standard. Token Bus- 802.4 IEEE standard
835	MCA105	Data Base Management System	2020	UNIT I : Introduction: Advantage of DBMS approach, various view of data, data independence, schema and subschema, Primary concepts of data models, Database languages, transaction management, Database Administrator and users, data dictionary, overall system architecture.ER model: basic concepts, design issues, mapping constraint, keys, ER diagram, weak and strong entity Sets, specialization and generalization, aggregation, inheritance, design of ER schema, reduction of ER Schema to tables. UNIT II : Domains, Relations and Keys: domains, relations, kind of relations, relational database, various types of Keys, candidate, primary, alternate and foreign keys. Relational Algebra & SQL: The structure, relational algebra with extended operations, modifications of Database, idea of relational calculus, basic structure of SQL, set operations, aggregate functions, null Values, nested sub queries, derived relations, views, modification of Database, join relations, DDL in SQL. UNIT III : Functional Dependencies and Normalization: basic definitions, trivial and non trivial dependencies, Closure set of dependencies and of attributes, irreducible set of dependencies, introduction to normalization, non loss decomposition, FD diagram, first, second, third Normal forms, dependency Preservation BCNE multivalued dependencies and fourth normal form Join dependency and fifth normal
836	MCA203	Statistics for Computer Application	2020	UNIT I : Variables & Graphs: Statistics, population & sample, discrete & continuous variables, graphs, logarithms, Frequency distributions: frequency distributions, histogram, frequency polygons. Frequency curve, cumulative frequency distribution, ogive curve. UNIT II : Measures of central tendency: The arithmetic mean, weighted arithmetic mean geometric mean, harmonic mean, mean power of numbers, root mean square, median, mode, quartiles, deciles & percentiles. Measures of dispersion: The range, mean deviation, semi inter quartile range for quartiles, deviation, absolute & related dispersion, coefficient of variation. UNIT III: Skewness & kurtosis: Moments of various types, relation between moments, sheppard's correction to moments, skewness & kurtosis, moment generating function. Elementary probability theory: sample space, events, classical definition of portability Independent & dependent event, mutually exclusive event, mathematical expectation. UNIT IV: Theoretical distributions discrete & continuous probability distribution. Basic concepts & applications of degenerate, Bernoulli, Binomial, geometric negative binomial. Hyper geometric & Poisson distributions, normal distribution Curve fitting & the method of last squares: curve fitting the method of least square the least square lines the least square parabola regression IUNIT V: Correlation theory :

  
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### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
837	MCA204	Design and Analysis of Algorithms	2020	UNIT I : Pre-requisites: Data structure & Discrete structures, models of computation, algorithm analysis, order Architecture, time space complexities average and worst case analysis. UNIT II :Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations. Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search) UNIT III : Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum Cost spanning tree), approximate solution (Knapsack problem), Single source shortest paths. Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem, searching & sorting algorithms. UNIT IV : Dynamic programming: Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling salesman Problem, longest Common sequence. Back tracking: Overview, 8-queen problem, and Knapsack problem UNIT V : Computational Complexity: Complexity measures Polynomial Vs non-polynomial time
838	LLB-101	Law of Crimes – I (IPC)	2014	UNIT- I Operation of the (ss 1-5), General explanations (ss 6 52A) Right of private defense (ss 96-106). UNIT-II Abetment (ss 107-120) criminal conspiracy (ss 120 A 7 120 B) UNIT- III Offences relating to army, navy and air force (ss 131- 140) offences against public tranquility (ss 141-160). UNIT- IV Offences relating to public servants (ss 161- 171), offences relating to elections (171A-171I) contempt of lawful authority of public servants (ss 172-190). False evidences and offences against public justice (ss191-229) UNIT- V Leading Cases:-  4. Mahboob Shah Vs King En. AIR 1945 P.C.118. 5. Paras Ram VsStste of Punjab (1981- 2SCC 508) 6. YogendraMogariVs State Guirat (AIR 1980 SC 660)
839	LLB-102	Law Of Torts Including M.V. Accident &Consumer Protection Law	2014	UNIT- I Legal concepts of tort, elements of liability (intention, motive, malice, carelessness. Kinds of liabilities, absolute, vicarious, fault, stator general defenses and remedies discharge of actions. UNIT- II Negligence as tort wrongs to physical interest, assault, battery may be loss of expectation of life, other kind of bodily harm including harm due to shock. UNIT-III Malicious prosecution. Wrongful conferment, wrongs to proprietary interest, Trespass, domestic quasi parental. UNIT- IV Consumer protection Act 1986 object, consumer protection council, consumer disputes redressed agencies miscellaneous. Defamation including defenses of truth privilege and fair comment, wrongs to other interest (Conspiracy, injuries, falsehood, abuse of legal process) UNIT- V Liability Insurance Claims of motor vehicles act 1939

**1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)**

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
840	LLB-103	Human Rights and International	2014	<p>UNIT- I</p> <p>1. Theoretical foundations of human rights &amp; international Law.</p> <p>1.1 Basic principles: Sovereign equality of states non- intervention non use of force international co-operation- peaceful settlement of disputes.</p> <p>1.2 Individuals as subjects of international law.</p> <p>1.3 Treatment of aliens.</p> <p>UNIT- II</p> <p>2. Historical development of concepts of human rights.</p> <p>1.15 Human rights in Indian tradition: ancient, medieval and modern.</p> <p>2.2 Human rights in western tradition.</p> <p>2.2.1 Concept of natural law.</p> <p>2.2.2 Concept of natural rights.</p> <p>2.3 Human rights in legal tradition: International law and National law.</p> <p>UNIT- III</p> <p>3. UN and Human rights.</p> <p>3.1 Universal Declaration of human rights (1948) individual and group rights.</p> <p>3.2 Covenant on political and civil rights (1966).</p> <p>3.3 Covenant on economic, social and cultural rights (1966).</p> <p>3.4 ILO and other conventions and protocols dealing with human rights.</p> <p>3.7 Mandates of States.</p> <p>3.8 Rights to development.</p> <p>UNIT- V</p> <p>5. Protection agencies and mechanisms.</p> <p>5.1 International commission of human rights.</p> <p>5.1.2 Non- Government organizations (NGOs)</p> <p>5.2 European commission on human rights /court of human rights.</p> <p>5.3 International labour organization.</p>

**1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)**

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
841	LLB-104	Law Of Contract- I	2014	<p>UNIT- I</p> <p>2. Agreement and contract: definitions, elements and kinds of contract.</p> <p>3. Proposal and acceptance.</p> <p>4. Consideration.</p> <p>UNIT- II</p> <p>Capacity to contract</p> <p>1. Free consent.</p> <p>2. Undue Influence.</p> <p>3. Misrepresentation.</p> <p>4. Fraud.</p> <p>5. Mistake.</p> <p>6. Unlawful considerations and objects.</p> <p>7. Fraudulent.</p> <p>UNIT- III</p> <p>1. Injurious to person or property.</p> <p>2. Immoral.</p> <p>3. Against Public policy.</p> <p>4. Void and void able agreements.</p> <p>5. Contract without consideration.</p> <p>6. Agreement in restraint of marriage.</p> <p>UNIT- IV</p> <p>1. Contractual obligation- remedies.</p> <p>2. Damages, remoteness of damages, ascertainment of damages.</p> <p>3. Government contracts.</p> <p>UNIT- V</p> <p>Specific Relief Act</p> <p>1. Specific performance of contract.</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
842	LLB-105	Family Law-I (Hindu Law)	2014	<p>UNIT-I 1. Nature of Hindu law.</p> <p>UNIT- II 1. Marriage. 2. Kinds, nullity of marriage. 3. Hindu marriage Act 1955. 4. Special marriage Act 1954. 5. Divorce. 6. Judicial separation, Restitution of conjugal rights. 7. Group for matrimonial remedies.</p> <p>UNIT- III 1. Joint family. 2. Coparcenaries, property under mitakshara and Dayabhag. 3. Partition and Re- union, women estate, stridhan.</p> <p>UNIT-IV 1. Gifts, wills. 2. Hindu adoption and maintenance Act 1956.</p> <p>UNIT- V 1. General rules of succession. 2. Disqualification relating to succession. 3. Hindu Succession Act 1956. 4. Religious Endowment</p>
843	LLB-106	Land Laws In M.P.	2014	<p>UNIT- I M.P. land revenue code 1959. Object and reasons and basic features of enacting Madhya Pradesh land revenue code, 1959. Definitions board of revenue, revenue offers and their classes &amp; powers. Procedure of revenue officer, revenue courts.</p> <p>UNIT- II Appeal, revision &amp; review, land &amp; land revenue, revenue survey &amp; settlement in non urban areas, assessment &amp; re- assessment of land in urban areas, land records, boundaries &amp; boundary marks, survey marks, realization of land revenue.</p> <p>UNIT-III Tenure holders, govt. lessee &amp; service land, occupancy tenant, allusion &amp; service land, consolidation of holding, village officers, rights in abadi&amp; unoccupied &amp; its procedure.</p> <p>UNIT-IV The M.P. ceiling on agricultural holding act 1960, Fixing of ceiling area; determination of surplus land and acquisition there of (section 6-16). Payment of compensation (se. 16-21). In- cumbrances on surplus land (sec. 22- 34). Disposal of surplus land (sec. 35- 37). Offences &amp; penalties (sec. 37- AC- 37.8). Miscellaneous (sec. 38- 50).</p> <p>UNIT- V M.P. accommodation control Act, 1961, Control of eviction of tenants. Eviction of tenants on grounds of "Bonafide" requirement. Deposit of rent, appointment of rent controlling authorities, their powers, functions and appeals. Provisions regarding special obligations of land lords and penalties</p>

**1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)**

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
844	LLB - 201	Law Of Contract- II	2014	<p>UNIT- I Indemnity:-</p> <ol style="list-style-type: none"> <li>2. Need for indemnity to facilitate commercial transactions.</li> <li>3. Method of creating indemnity obligations.</li> <li>4. Definition of indemnity.</li> <li>5. Nature and extent of liability of the indemnifier.</li> <li>6. Commencement of liability of the indemnifier.</li> <li>7. Situations of various types of indemnity creations.</li> <li>8. Documents/ agreements of indemnity.</li> <li>9. Nature of indemnity clauses.</li> <li>10. Indemnity in case of international transactions.</li> <li>11. Indemnity by governments during interstate transactions.</li> </ol> <p>UNIT- II Guarantee:-</p> <ol style="list-style-type: none"> <li>11. Definition of guarantee: as distinguished from indemnity.</li> <li>2. Basic essentials for a valid guarantee contract.</li> <li>3. The place of consideration and the criteria for ascertaining the existence of consideration in guarantee contracts.</li> <li>4. Position of minor and validity of guarantee when minor is the principal debtor, creditor or surety.</li> <li>5. Continuing guarantee.</li> <li>6. Nature of surety's liability.</li> <li>7. Duration and termination of such liability.</li> <li>8. Illustrative situations of existence of continuing guarantee.</li> <li>10. Creation and identification of continuing guarantee.</li> <li>11. Letters of credit and bank guarantee as instances of guarantee transaction.</li> </ol>
845	LLB-202	Law Of Crimes- II	2014	<p>UNIT- I Public health, safety and convenience, offences relating to weights and measures, offences relating decency and morals (ss 268- 294 A) offences relating to relating (ss 295-298).</p> <p>UNIT- II Offences relating to human body (ss 299- 377).</p> <p>UNIT- III Offences relating to property (ss 378- 462).</p> <p>UNIT- IV Offences relating to breach of contract of services (ss 490- 492) offences relating to manage (ss 499- 503) criminal intimidation, insult (ss 503- 510) attempt to commit offences (ss 511).</p> <p>UNIT- V Leading cases:-</p> <ol style="list-style-type: none"> <li>1. Rex V. Govinda(1876) I Bcom 342</li> <li>2. K.M.NanavatiVs. State, AIR 1962 SC 605.</li> <li>3. KulwantraiVs. State of Punjab (AIR 1982 SC 126)</li> </ol>

**1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)**

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
846	LLB-203	Indian Legal And Constitutional	2014	<p>UNIT- I History of Courts:- Law during Muslim period charter of 1600 administration of justice in the three presidency. Mayors courts admiralty courts development through charters of 1753, 1813, 1833 and 1853 formation of high court (1861) regulating act of 1773 Supreme Court of Calcutta. Act of settlement 1781 grant of diwani and adalat system plan of warren hastings, judicial reforms by various governor generals history of appeals from India to privy council (all charters from 1600).</p> <p>UNIT- II History of Legislation &amp; Legal Profession:- Legislation and compilation of laws history of civil &amp; criminal laws before Indian penal code, role played by principle of justice equity and good conscience, codification of laws history of legal profession comparison of vakils mukhtrs &amp; advocates in India history of laws reporting &amp; history of legal education in India.</p> <p>UNIT- III Early constitutional developments Indian council act 1861 Govt. of India Act 1909, 1919, 1935 cripps mission, cabinet mission small plan of 1945 formation of constituent assembly and provisional governments mount batton plan and Indian independence act 1947.</p> <p>UNIT-IV Drafting of constitution development in Indian states adoption of constitution salient features of Indian constitution need for review.</p> <p>UNIT- V Leading Cases:- 1. Nand Kumar Trial, 1775 2. Patna Case, (1777- 1779) 3. Cassius Mah 1770</p>
847	LLB-204	Family Law-II (Muslim Law)	2014	<p>UNIT-I who is Muslim, conversion to Islam nature and , school of Muslim law and sources of Muslim law Siya and Sunnie.</p> <p>UNIT-II Marriage, iddet, muta marriage, option of poverty divorce, dissolution of marriage act 1939.</p> <p>UNIT-III 1. Guardianship- elements, types. 2. Maintenance, liability mehar-types.</p> <p>UNIT-IV Wills, gift, doctrine of musha pre- emption, wakf.</p> <p>UNIT-V Parentage and acknowledgement, succession and death bed transaction.</p>



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
848	LLB - 205	Property Law And Easement	2014	<p>UNIT-I Introduction:- kinds of property- movable and immovable property- tangible and intangible property- intellectual property, copyright- patents and designs, trademarks.</p> <p>UNIT-II Law relating to transfer of property under transfer of property act, 1882. General principles of transfer of property whether movable or immovable (Sec. 5 to 37).</p> <p>UNIT-III General principles of transfer of immovable property sale, mortgage (Sec. 38 to 53 "A")</p> <p>UNIT-IV Gift, leases, exchange actionable claims.</p> <p>UNIT-V Easement nature, characteristics, definition and essentials creation of easements, kinds riparian right, extinction, suspension and revival of licenses.</p>
849	LLB- 206	Human Rights Law & Practice	2014	<p>UNIT-I concept of natural law and natural rights, human right in legal tradition: International law and national, UN and human rights, universal declaration of human rights (1948) individual and group rights, covenant on political and civil rights(1966).</p> <p>UNIT-II Convention on economic social and cultural right (1996), convention on the elimination of all forms of discrimination against women, convention on the rights of the child.</p> <p>UNIT-III Impact and implementation of international human rights norms in India, human rights norms reflected in fundamental rights in the constitution, directive principles: legislative and administrative implementation of international human rights norms through judicial process.</p> <p>UNIT-IV Human rights and disadvantage groups, enforcement of human right in India.</p> <p>UNIT-V Role of courts: the Supreme Court, high courts and other courts, statutory commissions- human rights, women's minority and backward class</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
850	LLB- 301	Code of Criminal Procedure	2014	<p>UNIT-I Introductory:- Pre- trial Process: Arrest</p> <ol style="list-style-type: none"> <li>1. The distinction between cognizable and non cognizable offence: relevance and adequacy problems.</li> <li>2. Steps to ensure accuser"s presence at trial: warrant and summons.</li> <li>3. Arrest with and without warrant (section 70- 73 and 41)</li> <li>4. The absconder status (section 82, 83 and 85)</li> <li>5. Right of the arrested person.</li> <li>6. Right to know ground of arrest (section 50(1) 55, 75)</li> <li>7. Right to be taken to magistrate without delay (section 56,57)</li> <li>8. Right to not being detained for more than twenty- four hours (section 57) 2.9 Article 22(2) of the constitution of India.</li> <li>9. Right to consult legal practitioner, legal aid and right to be told of rights to bail.</li> <li>10. Right to be examined by a medical practitioner (section 54)</li> </ol> <p>Pre- trail Process: Search and Seizure</p> <ol style="list-style-type: none"> <li>1. Search warrant( Section 83,94,97,98) and search without warrant ( section 103)</li> <li>2. Police search during investigation (Section 165,166,153)</li> <li>3. General principles of search (section100)</li> <li>4. Seizure (section102)</li> <li>5. Constitutional aspects of validity of search and seizure proceedings.</li> </ol> <p>UNIT-II Per-trail Process: Fir</p> <ol style="list-style-type: none"> <li>1. F.I.R. (section 154)</li> <li>2. Evidentiary value of F.I.R (Section 145 and 157 of evidence Act)</li> </ol> <p>Per- trail Process: Magisterial powers to take cognizance.</p> <p>Trial Process</p> <ol style="list-style-type: none"> <li>1. Commencement of proceeding: (section 200,201,202)</li> </ol>
851	LLB - 302	Jurisprudence (Legal Method And Basic Theory)	2014	<p>UNIT-I definition of law, kinds of law, justice &amp; its kinds</p> <p>UNIT-II Schools of Jurisprudence: Natural law school, analytical school, historical school, sociological school, realistic school.</p> <p>UNIT-III Source of law: Legislation, precedents concept of stare deices, customs.</p> <p>UNIT-IV Legal Rights: the concept: Rights, kinds, meanings, duty, meaning and kinds, relation between right and duty, personality, nature of personality, status of the unborn minor, lunatic, drunken and persons, corporate personality, dimension of the modern legal personality: legal personality of non- human beings.</p> <p>UNIT-V Possession and ownership: the concept: Kinds of possession, kinds of ownership, difference between possession and ownership, liability, condition of imposing liability, strict liability, vicarious liability, obligation nature and kind</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
852	LLB- 303	Constitutional Law Of India-I	2014	<p>UNIT-I Definition of constitution, constitution law, constitutionalism, salient features of Indian constitution, welfare states, preamble union and its territory formation of new states citizenship.</p> <p>UNIT-II State, fundamental rights, and their position under the constitution right to equality right to freedom, right against exploitation, right to freedom of religion cultural and educational rights, rights to constitutional remedies.</p> <p>UNIT-III Directive principles of state policy, their relevance, comparison with fundamental rights, fundamental duties, correlation between fundamental rights, fundamental duties and directive principles of state policy.</p> <p>UNIT-IV Parliament, union, executive, president and vice president, council of ministers; attorney general, legislative procedure, money bill &amp; other financial matters; union judiciary.</p> <p>UNIT-V Centre state relationship, services under union &amp; state tribunals, election. Emergency amendment of the constitution.</p>
853	LLB - 304	Administrative Law	2014	<p>UNIT-I droid administrative, rule of law and separation of powers, classification of administrative functions and distinction between them.</p> <p>UNIT-II Delegated legislation, administrative directions and distinction between delegated legislation and administrative directions, principles of natural justice.</p> <p>UNIT-III Administrative discretion and judicial control of discretionary powers, act of state, tortious and contractual liability of the state.</p> <p>UNIT-IV Government privileges in legal proceedings, Estoppel and waiver, official secrets and right to information, likpal, lokayukt and central vigilance commissions of inquiry.</p> <p>UNIT-V Administrative tribunal"s merits, demerits, reasons for growth, distinction between court and tribunals, public corporation, classification characteristics control remedies constitutional and ordinary.</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
854	LLB - 305	Code Of Civil Procedure, 1908	2014	<p>UNIT-I Introduction Concepts:- Affidavit, order, judgment, decree, plaint, restitution, execution, decree holder, judgmentdebtor, manse profits, written statement, distinction between decree and judgment and between decree and order. Jurisdiction:- Kinds, hierarchy of courts, suit of civil nature, res sub juice and res judicata, foreign judgment enforcement, place of suing, institutes of suit, parties to suit: joinder misjoinder or non-joinder of parties: representative suit, frame of suit: cause of action, alternative disputes resolution(ADR), summons.</p> <p>UNIT-II Pleading:- Rules of pleading, singing and verification, alternative pleading, plaints: particulars, admission, return and re junction, written statement: particulars, rules of evidence, set off and counter claim, distinction, discovery, inspection and production of documents, interrogatories, privileged documents, affidavits.</p> <p>UNIT-III Appearance, Examination and Trial:- Appearance, Ex-prate procedure, summary and attendance of witnesses, trial, adjournments, interim order: commission, arrest or attachment before judgment, injunction and appointment of receiver, execution, the concepts, general principles, power for execution of decrees, procedure for execution(section 52-54), enforcement, arrest and detection(ss 55-56),attachment(ss 65-64), sale (ss 65-97), deliver of property, stay of execution.</p> <p>UNIT-IV Suits in particular cases: - By or against government (ss 79-82), by aliens and by or against foreign rules or ambassadors (ss 83-87A), public nuisance (ss91-93),</p> <p>UNIT-V Appeals review, reference and revision: - Appeals from decree and order general provision relating to appeal, transfer of cases, restitution,caveat,inherent power of courts, law reform: law commission on civil procedure,amendments,law of limitation. Object:- Distinction with latches, acquiescence, prescription, extension and suspension of limitation, sufficient cause for not filling the proceedings, illness, mistaken legal advise, mistaken view of law, poverty minority and purdah, imprisonment, defective vakalatnama, legal liabilities, foreign rule of limitation: contract entered into under a foreien law. acknowledgement-essential requisites. continuing tort</p>
855	LLB - 306	Drafting of Pleading & Convincing (Clinical Course)	2014	<p>UNIT-I a. Drafting: - General principles of drafting and relevant substantive rules shall be taught. b. Pleading:- Civil : plaint, w/s; interlocutory application; original petition; affidavit; execution petition; memorandum of appeal and revision; petition under article 226 and 32 of constitution of India criminal complaints; misc. petition; bail application; memorandum of appeal and revision conveyance- sale deed; mortgage deed; lease deed; gift deed; promissory note; power of attorney; and will- drafting of writ petition &amp; PIL petition. 15 practical exercises in drafting carrying a total of 45 mark (3 marks for each). 15 practical exercises in coneyanceing carrying a total of 45 mark (3 marks of each). The remaining 10 marks will be given in a Viva- voice.</p>

**1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)**

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
856	LLB - 401	Law Of Evidence	2014	<p>UNIT-I Introduction: - Central Conceptions in Law of Evidence:- Facts: section 3 definition: distinction- relevant facts/ facts in issue, evidence: oral and documentary, circumstantial evidence and direct evidence, presumption(section 4), proving not proving and disproving, witness, appreciation of evidence.</p> <p>UNIT-II Facts: relevancy:-The doctrine of res gestate (section 6,7,8,10), the problems of relevancy of "otherwise" irrelevant facts(section 11), facts concerning bodies and mental state (section 14,15) Admission and Confessions: - General principles concerning admission (section 17,23), difference between "admission" and "confession", the problems of non admissibility of confessions caused by any inducement threat or promise(section), inadmissibility of confession made before a officer(section 25), admissibility of custodial confessions(section 26), admissibility of "information" received from accused person in custody; with special reference to the problem of discovers based on "joint statement"(section 27), confession by co-accused(section 30), the problems with the judicial action based on a "retracted confession".</p> <p>UNIT-III Dying Declarations: - The justification for relevance on dying deceleration (section 32), the judicial standards for appreciation of evidentiary value of dying declarations. Relevance of judgments: - Admissibility of judgments in civil and criminal matters (section 43), "fraud" and "collusion"(section 44). Expert Testimony: - Who is an expert? Types of expert evidence, opinion on relationship especially proof of marriage (section 50), the problem of judicial defense to expert testimony.</p> <p>UNIT- IV Oral Documentary Evidence:-General principles concerning oral evidence(section 59-60), general principles concerning documentary evidence(section 67-90), general principles regarding exclusion of oral by documentary evidence, special problems: re- hearing evidence, issue estoppel, tenancy estoppeal(section 116). Witness Examination and Cross Examinations:- Competency to testify(section 118),state</p>

**1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)**

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
857	LLB - 402	Media And Law	2014	<p>UNIT-I</p> <ol style="list-style-type: none"> <li>1. Ownership patterns – press – private – public</li> <li>2. Ownership patterns – films Private</li> <li>3. Ownership patterns – radio &amp; Television, Public</li> <li>4. Differences between visual and non – visual Media – Impact on peoples minds</li> </ol> <p>UNIT-II</p> <p>Press – Freedom, of speech and Expression – Article 19 (1) (a)</p> <ol style="list-style-type: none"> <li>1. Includes Freedom of the Press</li> <li>2. Laws of defamation, obscenity, blasphemy and sedition</li> <li>3. The relating to employees wages and service conditions</li> <li>4. Price and pages schedule Regulation</li> <li>5. Newsprint control order</li> <li>6. Advertisement – is it included within freedom of speech and expression?</li> <li>7. Press and the monopolies and Restrictive trade practices Act.</li> </ol> <p>UNIT-III</p> <p>Films – for Included in freedom in of speech and expressions?</p> <ol style="list-style-type: none"> <li>1. Censorship of films - constitutionality</li> <li>2. The Abbas case</li> <li>3. Differences between films and press – why pre – censorship valid for films but not for the press</li> <li>4. Censorship under the cinematograph Act</li> </ol> <p>UNIT-IV</p> <p>Radio and television – Government monopoly</p> <ol style="list-style-type: none"> <li>1. Why Government department?</li> <li>2. Should there be an autonomous corporation?</li> <li>3. Effect of television of people</li> <li>4. Report of the chandda committee</li> <li>5. Government policy</li> </ol>
858	LLB - 403	Law of Taxation (Income Tax, Wealth Tax, Central Sales Tax & MP Commercial Tax)	2014	<p>UNIT-I Fundamental principles relating to tax government financial policy, tax structure and their role in the natural economy. Concept of tax, Nature and characteristics of taxes, Distinction between, Tax and fee, Tax and cess, Direct and indirect taxes. UNIT-II Clubbing of income, UNIT-III</p> <p>Heads of income, Salaries, Income from house property, Capital from business of profession, Capital gains, Rate of Income Tax, Power and functions, Offences and penal sections, Settlement of grievances, Authorities, powers and functions</p> <p>UNIT-IV</p> <p>Central Sales Tax Act, 1956</p> <p>Sale of purchase of goods, Meaning of sale, Sale in the course of export of import, Charge of tax, Exemption and rebate, Sales tax authorities, Offences and penalties, Constitutional perspectives, Constitutional perspectives</p> <p>UNIT-V</p> <p>Manglore Electric Supply Co. Ltd. Commr of I.T. (1978) 113 ITR 635 (SC).</p>



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
859	LLB - 404	Constitutional Law - II	2014	<p>UNIT-I Administration of Union Territories, The Panchayat : and Munic Lities, The schedule and tribal areas</p> <p>UNIT-II Distribution of legislative power, Administrative relations, Disputes relating to water, trade, commerce and intercourse within territory of India</p> <p>UNIT-III Financial provisions: Property, , rights, liabilities obligation and suit Public service commissions, service under the Union and the States</p> <p>UNIT-IV Tribunals, elections, special provisions, relating to certain , official language</p> <p>UNIT-V Emergency provisions : Proclamation of emergency, effect of emergency, financial emergency, <del>Amendment in the Constitutions</del></p>
860	LLB - 405	Public International Law	2014	<p>UNIT-I Source of International Law,</p> <p>UNIT-II Relationship of International Law and Municipal Laws, Subject of International Law</p> <p>UNIT-III States, recognition, States, Succession,</p> <p>UNIT-IV Responsibilities of state CBBT, Nationality, , Asylum, extradition, treaties</p> <p>UNIT-V International organizations – U.N.O., including in its organs and International criminal court, Settlement of Disnutes. <del>International terrorism</del></p>
861	LLB - 406	Clinical – II (Professional Ethics, Bar Bench Relation & Accountability for Lawyers)	2014	<p>UNIT-I Admission, Enrolment &amp; rights of advocate Importance of Legal Profession, Rights of Advocates, State Bar Councils - Establishment and organization, Powers and Functions, Bar Council of India – Organization, Powers and Functions</p> <p>UNIT-II EthiCs of Legal Profession Duty to all clients</p> <p>UNIT-III Punishment for professional or other misconduct Professional or other misconduct – meaning and scope, The body or authority empowered to punish for professional or other misconduct, State Bar Council and its disciplinary committee, Bar Council of India and its disciplinary committee, Complaint against advocates and procedure to be followed by the disciplinary committee, Remedies against the order of punishment</p> <p>UNIT-IV Bench Bar Relation Role of Judge on maintaining rule of Law, Mutual respect, Maintenance of orderly society, Invaluable aid of advocates to judges, Privilege of advocates, Duty to avoid interruption of council, misconduct of lawyers and insulting language</p> <p>UNIT-V Contempt of court – its meaning and nature, Contempt by judges, magistrates or other persons acting judicially,</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
862	LLB - 501	Intellectual Property	2014	<p>UNIT-I copyright, trademarks, patents and designs , Introduction to the leading international concerning intellectual property rights : Universal Copyright, Convention, the Paris Convention Trips, the World Intellectual Property Rights Organization (WIPO) and the UNESCO</p> <p>UNIT-II Selected aspects of the Law of copyright in India Meaning of copyright , Copyright in literacy, dramatic and musical works, Copyright in sound records and cinematograph films, Ownership of copyright, Copyright authorities, Remedies,</p> <p>UNIT-III Intellectual Property in Trademarks The rationale of protection of trademarks as (a) an aspect of commercial and (b) of consumer rights, Registration of trademark-authorities under the trademark Act, Remedies</p> <p>UNIT-IV The Law of Intellectual Property : Patents Concepts of patents, Historical view of the patents law in India, Procedure for filling patent co-operation treaty, Rights and obligations of a patentee, Defenses in suit of infringement, Injunctions and related remedies</p> <p>UNIT-V Geographical indication Act, New plant vulture and breeds Act</p>
863	LLB - 502	Environmental Law	2014	<p>UNIT-I Concept of Environment and Pollution (Water, Air and Noise Pollution), Meaning and standards, Culprits and victims, Offences and penalties</p> <p>UNIT-II International Historical Perspective U.N. deceleration on right to development</p> <p>UNIT-III Constitutional Provisions related to Environment Constitution making – development and property oriented approach, Directive principles, (Status, role and interrelationship with fundamental rights and fundamental duties), Fundamental Duty, Judicial approach, Fundamental Rights (Rights to clean and healthy environment, Environment Vs. Development), Enforcing agencies and remedies (Courts, Tribunal, Constitutional, Statutory and judicial remedies)</p> <p>UNIT-IV Protection agencies: power and functions, Protection: means and sanctions, Emerging protection through delegated legislation, Hazardous waste, Bio-medical waste, Judiciary: complex problems in administration of environment justice</p> <p>UNIT-V Greenery conservation laws, Forest conservation, Conservation agencies, Prior approval and non-forest purpose, Denudation of forest: Judicial approach, Wild life, Sanctuaries and national parks, State monopoly in the sale of wild life and wild life article, Offences against wild life.</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
864	LLB - 503	Company Law	2014	<p>UNIT-I Theories of corporate personality,</p> <p>UNIT-II Forms of corporate and non-corporate organization , state corporations Government companies, small scale, co-operative, corporate and joint sectors</p> <p>UNIT-III Law relating to companies – Public and Private – Companies Act 1956 Promoters, Need of company for development, formation of a company registration and incorporation, Memorandum of association –various clauses-alteration therein-doctrine of ultra virus, Articles of association – binding force – alteration – its relation with memorandum of association – doctrine of constructive notice and indoor management – exceptions, Prospectus-issue-liability for misstatements in lieu of prospectus, Position, Shares – general principles of allotment, statutory restrictions transfer of shares – relationship between transferor and transferee, Shareholder – who can be ? and who cannot be shareholder –modes of becoming shareholder-calls on shares – forfeiture and surrender of shares – lien on shares, Share capital – kinds – alteration and reduction of share capital – further issue of capital – conversion of loan and debentures into capital – duties of courts to protect the interest of creditors and share holders</p> <p>UNIT-IV Directors – position –appointment – qualification – vacation of office – removal – resignation – powers and duties of directors – meeting, registers, loans – remuneration of directors , Meetings – kins procedure – voting, Dividends payment -- charges and mortgages – investments, Debentures – meaning – fixed and floating charges – kinds of debentures share holder and debenture holder remedies for debenture holders, protection of minority rights, Protection of oppression and mismanagement – who can apply ? Powers of the company, court and of the central Government, Investigations – powers, Private companies – nature and advantages – government companies – holding and subsidiary companies, Winding up – types – by court – reason – ground – who can apply – procedure – powers of liquidator – powers of court – consequences of winding up order voluntary winding up order voluntary winding up</p>
865	LLB - 504	Labour Laws - I	2014	<p>UNIT-I Labour policy in India, Industrial revolution in India, labour problems, Growth of labour legislation in India</p> <p>UNIT-II Industrial dispute Act 1947, Notice of change, Reference of certain industrial dispute to grievance settlements authorities, board, courts, tribunals, Power procedure &amp; duties of authorities, Strike, lock out, lay, Retrenchment, Penalties</p> <p>UNIT-III Trade Union Act 1926, Registration of trade union, Rights &amp; liabilities of registered trade union, Regulation, Penalties &amp; procedure</p> <p>UNIT-IV Minimum wages Act 1948, Introduction &amp; definition, Minimum wages; Authorities under the Act, Fixation of hours of work &amp; wages, Claims &amp; their determination, Cognizance of offence</p> <p>UNIT-V Factories Act 1948, registration &amp; licensing, health, Safety, Annual leave with wages. Penalties &amp; provisions</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
866	LLB - 505	Arbitration and Conciliation law of India (Clinical Course)	2014	<p>UNIT-I International arbitration, Ad hoc arbitration, , Statutory arbitration, Forms of arbitration agreement, Mandatory contents of arbitration agreement, Validity of the agreement.</p> <p>UNIT-II Domestic Arbitration Essential, kinds, who can enter into arbitration agreement, validity, interim measures by court</p> <p>UNIT-III Arbitrational Tribunal Appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge</p> <p>UNIT-IV Award Rule of guidance, form and content, , grounds of setting aside an award, can misconduct be a ground, incapacity of a party, invalidity of arbitration agreement, want of proper notice and hearing, contravention of composition and procedure, breach of confidentiality, impartiality of the arbitrator, Bar of limitation, resjudicata, consent of parties, enforcement</p> <p>UNIT-V Conciliation appointment, statements to conciliator, interaction between conciliator and parties, communication, duty of the parties to cooperate, <del>arbitration by parties, confidentiality, respect to judicial proceedings, costs</del></p>
867	LLB - 506	Legal Language and Legal Writing	2014	<p>Characteristics of Legal Language, UNIT-II Phonetics Theory and Practice UNIT-III Legal Terminology Terns used in civil law and criminal law, Latin word and expressions – law register, General Juristic Writings in English</p> <p>UNIT-IV Fundamental Principles of legal Writing Concision – Brief writing and drafting of law reports, Writing of case comments, Essay writing on topics of legal interest UNIT-V Proficiency in Regional Language Necessarily the proficiency in the language will contribute in a substantial measure to a successful practice in law. Phrases translation . Writing reacting and comments on important Legal issues published in Newspaper in Hindi and English. Adding to vocabulary in Hindi and English, Learning local terms used in the courts, local Districts and expressions for various documents and their standard nomenclature.</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
868	LLB- 601	Labour Laws - II	2014	<p>UNIT-I Mines Act 1952, Aims, Object, definition, Inspectors &amp; certifying surgeons, provisions as to health &amp; safety, Hours &amp; limitation of employment, Leave with wages.</p> <p>UNIT-II Bonded Labour System (Abolition) Act 1976, Aims, object, operation, definition of Act, Abolition of bonded labour system, Vigilance committee, Offences &amp; procedure for trial.</p> <p>UNIT-III Equal remuneration Act 1976, Introduction, definition, Act to leave overriding effect,</p> <p>UNIT-IV Child Labour (Prohibition &amp; Regulation Act 1986), Definition, object, of act, Prohibition of employment of children in certain occupation &amp; process, Penalties, procedure, , power, rules,</p> <p>UNIT-V E.S.I. Act 1948, Definition, Object, Scope of Act, medical benefit leave, Finance &amp; Audit, Adjudication of disputes, clause, Penalties</p>
869	LLB- 602	Insurance Law	2014	<p>UNIT-I Introduction Concept of Insurance and law of contract and law of torts future of insurance in globalizes economy, Insurance Regulatory Authority – role and functions</p> <p>UNIT-II General Principles of Law of Insurance Contract of Insurance-classification of contract of insurance, nature of various insurance contracts parties thereto, non disclosure, misrepresentation in insurance contracts, Insurable interest, The risk, The policy, classification of policies – its form and contents, its commencement, duration, cancellation, alteration, rectification, renewal, assignment, construction, Conditions of the policy, Alteration of the risk, Assignment of the subject matter</p> <p>UNIT-III Insurance The policy and formation of a life insurance contract, Circumstances affecting the risk, Amounts recoverable under life policy, Persons entitled to payment, Settlement of claim and payment of money.</p> <p>UNIT-IV Marine Insurance Nature &amp; scope, Classification of marine policies, The marine Insurance Act 1963, Insurable interest, insurable value, Marine insurance policy – conditions, express – warranties, constructions of terms of policy, Voyage – deviation, salvage, general average, particular charges, Measures of indemnity, total valuation, liability to third parties</p> <p>UNIT-V Social Insurance in India Important elements in social insurance, its need, , Workmen"s compensation – scope, risk covered, industrial accidents occupational diseases, cash benefits, incapacity,</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
870	LLB- 603	Banking Law	2014	<p>UNIT-I Introduction Evolution of Banking institution in India banking definition, banking company in India, banking legislation in India-common law and statutory, Commercial banks: function, Essential functions, Agency services, System of banking : Unit banking, branch banking, group banking and chain banking</p> <p>UNIT-II Bank and Customers Customer : meaning, Legal character of banker – customer relationship, Special types of customers : Lunatics, minors, agents, administrators and executors, partnership firms and companies, Cheque – Duties and liabilities of banks payment of cheques by bank liabilities of the banker in case of dishonor- protection of paying banker-forged cheques – alteration of cheque – collection of cheques and drafts-protection of collecting banker.</p> <p>UNIT-III Bill of exchange, promissory note – Hindi types of Hindi, notary public noting protest acceptance for honour payment for honour, Holder and holder in due course-distinction between a holder and holder in due course essential features of negotiable instrument – different types of bill and note reasonable, acceptance and negotiations, types of endorsement – restrictive endorsement – endorsement excluding personal liability – partial endorsement – (once a bearer in tangent always a bearer instrument), Dishonor of negotiable instrument</p> <p>UNIT-IV Control Banking Theory and RBI Characteristics and function of central banks, Objectives and organizational structure, Functions, Regulations of the monetary system, Monopoly of note issue, Credit control, penalties, default and recovery</p> <p>UNIT-V Merchant Banking Merchant banking in India, SEBI (Merchant Bankers) Regulations, 1992, Recovery of Debts Due to Bank</p>
871	LLB- 604	Criminology, Penology and Forensic Science	2014	<p>UNIT-I Crime and criminals, while collar crimes, offences against person and property – legal and social aspects; Punishment theories, institutional &amp; non – institutional treatment of offenders; criminology causation.</p> <p>UNIT-II correctional institutions of juvenile and adults special facilities and amenities for mates; special correctional institutional methods of correction; latest development.</p> <p>UNIT-III Crime prevention and recidivism; prisons, probation and parole, police organization, case diary; arrest and seizure.</p> <p>UNIT-IV scene of crime and preservation, collection, packing and transportation of various types of physical evidence; impressions finger prints, food and footwear prints, types prints, trak marks, call patterns;</p> <p>UNIT-V Questioned documents; and examination of forged documents, charged documents, attestation in documents, characteristics seal and examination of handwritten typed printed &amp; indented materials; DNA profiling and forensic aspect.</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
872	LLB- 605	Interpretation of Statutes	2014	<p>UNIT-I Interpretation of Statutes Meaning of the term „statues“, Purpose of interpretation of statues</p> <p>UNIT-II Aids to Interpretation Internal aids – Titles, Preamble, Heading and marginal notes, Sections and sub-sections, Punctuation marks, Illustrative, exceptions, provisos and saving clauses, Schedules, Non-obstinate clause. External aids – Travaux Preparatoires, Statues in pari material, Contemporanea Exposito, inquiry commission reports and Law commission reports</p> <p>UNIT-III Rules of Statutory Interpretation Primary rules, Literal rule, Golden rule, Mishief rule (rule in the Heydon“s case)</p> <p>UNIT-IV  Restrictive and beneficial construction, Taxing statues, Penal statues, Welfare legislation</p> <p>UNIT-V Principal of Constitutional Interpretation Harmonious constructions, Doctrine of pith and substance, Colourable legislation, Ancillary powers, Residuary power, <del>Doctrine of emergency</del></p>
873	LLB- 606	Moot Court (Clinical Course)	2014	<p>In this paper the marks shall be divided in following parts</p> <ol style="list-style-type: none"> <li>1. Participation in Moot Court (30 Marks) – every student may be required to do at least 3 moot courts with 10 marks for each. The moot court work will be on assigned problem and it will be evaluated for 5 marks for written submissions &amp; 5 for oral advocacy.</li> <li>2. Observance of Trial – (one civil &amp; one criminal case) Students may be required to attend two trials in the course.</li> <li>3. Advocate chamber</li> <li>4. Dairy prepration – 20 marks (one civil &amp; one criminal case)</li> <li>5. Viva – 10 marks – the viva voce examination on all the above 3 aspects will be conducted</li> </ol> <p>This practical should be conducted in the Department of Law of concern University. Viva – Voce examination of this paper will be conducted by a panel of two examiners out of which one external examiner shall be appointed by the examination committee of the University and internal examiner will be head of the Department of Law of the University</p>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
874	LLM - 101	Research Methods and Legal Writing	2018	<p>Introduction of Legal Research</p> <ul style="list-style-type: none"> <li>a. Socio-legal Research in India</li> <li>b. Research Method vis-a-vis Research Methodology</li> <li>d. Kind of Legal Research- Doctrinal and Non-doctrinal legal research; Inter/multidisciplinary, etc.</li> <li>e. Arm chair research vis-a-vis empirical research</li> </ul> <p>Research Design and Techniques</p> <ul style="list-style-type: none"> <li>a. Primary and secondary source</li> <li>b. Workable Hypothesis-formulation and evaluation</li> <li>c. Major steps in research design</li> <li>d. Sampling</li> <li>e. Survey and Case Study method</li> </ul> <p>Research Tools and Data Processing</p> <ul style="list-style-type: none"> <li>a. Observation</li> <li>b. Interview and schedule</li> <li>c. Questionnaire</li> <li>d. Socio-metrics and jurimetrics</li> <li>e. Data processing (deductions and Inductions) analysis and interpretation of data</li> </ul> <p>Legal Writing</p> <ul style="list-style-type: none"> <li>a. Essentials of good legal writing</li> <li>b. Structured Legal Writing ; Organization of Legal Material</li> <li>c. Report/article writing in legal research</li> <li>d. Use of definitions, maxims, concepts, principles, doctrines in legal research</li> <li>e. Modern- Technology- Computer, Internet, etc.</li> <li>f. Citation, Reference and Footnoting methodology</li> <li>g. Book review and case comments</li> </ul>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
875	LLM - 102	Indian Constitutional Law: the New Challenges	2018	<p>1- Federalism</p> <p>a- Creation of new states</p> <p>b- Allocation and share of resources – distribution of grants in aid</p> <p>c- The interstate disputes on resources</p> <p>d- Rehabilitation of internally displaced persons</p> <p>e- Centres responsibility and internal disturbance within states</p> <p>f- Directions of the centre to the state under article 356 and 365</p> <p>g- Federal comity : Relationship of trust and faith between centre and state</p> <p>h- Special status of certain states</p> <p>i- Tribal Areas, Scheduled Areas</p> <p>2- Right of equality : Privatization and its impact on affirmative action</p> <p>4- Empowerment of women</p> <p>5- Freedom press and challenges of new scientific development</p> <p>a. Freedom of speech and</p> <p>b. Right to strike hartal and bandh</p> <p>6- Emerging regime of new rights &amp; remedies</p> <p>a. Reading directive principle and fundamental duties into fundamental rights</p> <p>b. Compensation jurisprudence</p> <p>c. Right of education</p> <p>d. Commercialization of education and its impact</p> <p>7- Right of minorities to establish and administer education institutions and state control.8- Secularism and religious fanaticism</p> <p>9- Separation of power stresses and strain</p> <p>a. Judicial activism and judicial restraint</p> <p>b. PIL implementation</p> <p>c. Judicial independence ‘</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
876	LLM - 103	Law and Justice in a Globalizing World	2018	<p>1- Law and social change a- Law as an instrument of social change</p> <p>2- Religion and the law- Religion as a divisive factor b- Secularism as a solution to the problem c- Reform of the law on secular lines: problems d- Freedom of religion and non-discrimination on the basis of religion e- Religious minorities and the law</p> <p>3- Language and the law a- Language as a devise factor formation of linguistic states b- Constitutional guarantees to linguistics minorities c- Language policy and the constitution : Official language : multi language system d- Non -discrimination on the ground language</p> <p>4- Community and the law a- Caste as a divisive factor b- Non -discrimination on the ground of caste c- Protective discrimination : should castes, tribes and backward classes d- Reservation : statutory commission, statutory provisions</p> <p>5- Regionalism and the law a- Right of movement, residence and business, impermissibility of state or regional barriers d- Equality in matters of employment the slogan "Sons of the Soil" and its practices e- Admission to educational institutions : preferences to residents of a state</p> <p>6- Women and the law a- Crimes against women b- Gender injustices and its various forms c- Women's commission d- Empowerment of women : constitutional and other legal provisions</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
877	LLC 104	WHITE COLLAR CRIMES	2018	<p>1. Conceptual Perspective of White Collar Crimes</p> <ul style="list-style-type: none"> <li>· Concept and Types of White Collar Crimes</li> <li>· Indian Approaches to Socio-economics Offences</li> </ul> <p>· Growth of White Collar Crimes</p> <ul style="list-style-type: none"> <li>· Need for Specific Measures</li> <li>· Unethical practices of the Indian Bar</li> <li>· Unprofessional and Unethical Journalism</li> <li>· Medical Malpractice</li> <li>· Organizational or Corporate Crime</li> <li>· Law Commission recommendations</li> <li>· White Paper on white collar crime</li> <li>· Vigilance Commission</li> </ul> <p>2. Professional Deviance</p> <ul style="list-style-type: none"> <li>· Unethical practices of the Indian Bar</li> <li>· Unprofessional and Unethical Journalism</li> <li>· Medical Malpractice</li> <li>· Organizational or Corporate Crime</li> </ul> <p>3. White Collar Crime and Response of Indian Legal Order</p> <ul style="list-style-type: none"> <li>· Law Commission recommendations</li> <li>· White Paper on white collar crime</li> <li>· Vigilance Commission</li> <li>· Public Account Committee</li> <li>· Ombudsman Lokpal Bill</li> </ul> <p>4. Corruption in Politics and Government Some Major Scandals:</p> <ul style="list-style-type: none"> <li>· Bofors Scandal</li> <li>· Stock Market Manipulation Scam 1999-2001</li> <li>· 2G Spectrum Allocation Scandal</li> </ul>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
878	LLC 105	PENOLOGY: TREATMENT OF OFFENDERS	2018	<ul style="list-style-type: none"> <li>· Definition of penology</li> <li>2- Theories of punishment               <ul style="list-style-type: none"> <li>· Retribution</li> <li>· Utilitarian prevention deterrence</li> <li>· Behaviour prevention rehabilitation</li> <li>· Classical Hindu and Islamic approaches of punishment</li> </ul> </li> <li>3- The problematic of capital punishment               <ul style="list-style-type: none"> <li>· Constitutionality of capital punishment</li> <li>· Judicial attitudes towards capital in India – an impact through the state law and case law</li> </ul> </li> <li>4- Approaches to sentencing               <ul style="list-style-type: none"> <li>· Alternatives to imprisonment</li> <li>· Probation</li> <li>· Corrective labour</li> <li>· Fines</li> <li>· Collective fines</li> <li>· Reparation by the offender/by the court</li> </ul> </li> <li>5- Sentencing               <ul style="list-style-type: none"> <li>· Principal types of sentences in the penal code and special laws</li> <li>· Sentencing in white collar crime</li> <li>· Pre-sentence hearing</li> <li>· Sentencing for habitual offender</li> <li>· Summary punishment</li> <li>· Plea-bargaining</li> </ul> </li> <li>6- Imprisonment               <ul style="list-style-type: none"> <li>· The state of India"s Jails today</li> <li>· The disciplinary regime of Indian prisons</li> <li>· Classification of prisoners</li> <li>· Right of prisoner and duties of custodial staff</li> </ul> </li> </ul>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
879	LLC 201	Juvenile Delinquency	2018	<ul style="list-style-type: none"> <li>· The overall situation of children / young persons Indian, also with reference to crime statistics (of crimes by and against children)</li> <li>2. Determining factors of juvenile delinquency               <ul style="list-style-type: none"> <li>· Differential association</li> <li>· Anomie</li> <li>· Economic pressure</li> <li>· Peer group influence</li> <li>· Gang sub-culture</li> <li>· Class differentials</li> </ul> </li> <li>3. Legislative approaches               <ul style="list-style-type: none"> <li>· Legislative approaches during the late colonial era</li> <li>· Children"s act</li> <li>· Legislative position in various states</li> <li>· The juvenile justices act</li> <li>· Constitutional aspects</li> </ul> </li> <li>· Procession safeguards for juveniles</li> <li>· Powers given to government</li> <li>· Community participation as envisaged under the act</li> <li>4. Indian context of juvenile delinquency               <ul style="list-style-type: none"> <li>· Neglected -below poverty line, physically and mentally disabled, orphans,</li> <li>· Destitute, vagrants</li> <li>· Labourers In organized industries like zari, carpet, bidi, glass · In unorganised sector like domestic servant, shops &amp; establishment, rig pickers family trade</li> <li>· Delinquent – number, sex ratio, ratio to adult crime, types of offences committed, recidivism, rate of increase background</li> <li>· Drugs addicts</li> </ul> </li> </ul>

**1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)**

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
880	LLC 202	Collective Violence and Criminal Justice System	2018	<p>Legal order as a coercive normative order</p> <ul style="list-style-type: none"> <li>· Force monopoly of modern law</li> <li>· “Constitutional” and “Criminal” speech: speech as incitement to violence</li> <li>· “Collective political violence” and legal order</li> <li>· Nation of legal and extra-legal „repression</li> </ul> <p>2. Approach to violence in India</p> <ul style="list-style-type: none"> <li>· Religiously sanctioned structural violence : Caste and gender based</li> <li>· Discourse on political violence and terrorism during colonial struggle</li> <li>· Attitude towards legal order as possessed of legitimate monopoly over violence during the colonial period</li> </ul> <p>3. Agrarian violence and repression</p> <ul style="list-style-type: none"> <li>· Colonial legal order as a causative factor of collective political (agrarian) violence</li> <li>· The telangana struggle and the legal order</li> </ul> <p>4. Violence against the scheduled castes –</p> <ul style="list-style-type: none"> <li>· Notion of atrocities</li> <li>· Uses of criminal law to combat atrocities</li> <li>· Violence against women</li> </ul> <p>5. Communal violence</p> <ul style="list-style-type: none"> <li>· Incidence and coursed of “Communal” violence</li> <li>· Findings of various commissions of enquiry</li> <li>· The role of police and para-military systems in relation to, communal violence</li> <li>· Operation of criminal justice system and in relation communal violence</li> </ul>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
881	LLC 203	Privileged Class Deviance	2018	<ul style="list-style-type: none"> <li>· Conceptions of while-collar crimes</li> <li>· Indian approaches to socio-economic offences</li> <li>· Notions of privileged class deviances as providing a wider categorization of understanding Indian development</li> <li>· Typical forms of such deviance</li> <li>· Official deviances (deviance by legislators. Judges, bureaucrats)</li> <li>· Professional deviance: journalists, teachers, doctors, lawyers. engineers.</li> <li>· Architects and publishers</li> <li>· Trade union deviance (including teachers, law yers/urban property owners)</li> <li>· Landlord deviances (class/caste based deviance)</li> <li>· Police deviances</li> <li>· Deviance on electoral process (rigging, booth capturing, impersonation, corrupt practices)</li> <li>· Gender- based aggression by socially, economically and politically powerful</li> </ul> <p>Note: Depending on specialist interest by the teacher and the taught any three areas of deviance of privileged class may be explored. What follows is only illustrative of one model of doing the course.</p> <p>2. Official Deviance</p> <ul style="list-style-type: none"> <li>· Conception of official deviance-permissible limit of discretionary powers</li> <li>· The Chagia Commission Report on LIC Mundra Affair</li> <li>· The Das Commission Report on Pratap Singh Kairon</li> <li>· The Grover Commission Report on Dev Raj Urs</li> <li>· The Maruti Commission Reprot</li> <li>· The Ibakkar- Natarajan Commission Report on Fairfax</li> </ul> <p>3. Police Deviance</p> <ul style="list-style-type: none"> <li>· Structures of legal restraint on police power in India</li> <li>· Unconstitutionality of “third-degree” methods and use of fatal by police “Encounter” Killings</li> <li>· Police atrocities</li> <li>· The plea of superior orders</li> </ul>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
882	LLC 204	Drug Addiction, Criminal Justice & Human Rights	2018	<ul style="list-style-type: none"> <li>· Drug, Narcotics" "psychotropic substances"</li> <li>· "Dependence", "addiction"</li> <li>· "Crimes without victims"</li> <li>· "Trafficking" in "drugs"</li> <li>· "Primary drug abuse"</li> </ul> <p>How Does One Study the Incidence of Drug Addiction and Abuse?</p> <ul style="list-style-type: none"> <li>· Self-reporting</li> <li>· Victim-studies</li> </ul> <p>Anagraphic and Social Characteristics of Drug Users</p> <ul style="list-style-type: none"> <li>· Gender</li> <li>· Age</li> <li>· Religiousness</li> <li>· Single individuals/cobabitation</li> <li>· Socio-economic level of family</li> <li>· Residence patterns (urban/rural/urban)</li> <li>· Educational levels</li> <li>· Occupation</li> <li>· Age at first use</li> <li>· Type of drug use</li> <li>· Reasons given as cause of first use</li> <li>· Method of intake</li> <li>· Pattern of the use</li> <li>· Average quantity and cost</li> <li>· Consequences on addict"s health (physical/psychic)</li> </ul> <p>The International Legal Regime</p> <ul style="list-style-type: none"> <li>· Analysis of the background, text and operation of the single convention on</li> <li>· Narcotic drugs, 1061, 1972</li> </ul>
883	LLH 104	CONCEPTS AND DEVELOPMENT OF HUMAN RIGHTS	2018	<p>3. Human Rights: Policies and society</p> <ul style="list-style-type: none"> <li>i. Colonization imperialism and human rights</li> <li>ii. Power, practices, accountability and transparency</li> <li>iii. Liberalization, privatization and globalization</li> <li>iv. Human duties: responsibilities and obligations</li> </ul> <p>4. Human rights and judicial process</p> <ul style="list-style-type: none"> <li>i. Judicial activism</li> </ul> <p>5. Human rights protection Agencies</p>
884	LLH 105	HUMAN RIGHTS AND INTERNATIONAL ORDER	2018	<p>1. Development of the concept of Human rights Under International Law</p> <ul style="list-style-type: none"> <li>i. Role of international organization and Human rights</li> <li>ii. Universal Declaration of Human rights (1948)</li> <li>iii. Covenant on Political and Civil Rights (1966)</li> <li>v. Covenant on Economics social and cultural Rights (1966)</li> <li>vi.</li> <li>ii. European commission on Human Rights/ Court of Human Rights</li> <li>iii. American convention on Human Rights</li> <li>iv. African convention on Human Rights</li> <li>v. Other regional conventions.</li> </ul> <p>3. Protection agencies and mechanisms</p> <ul style="list-style-type: none"> <li>x. National and state Human Rights Commissions</li> <li>4. International enforcement of Human Rights</li> </ul>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
885	LLH 201	Protection & Enforcement of HR in India	2018	i. Constitutional philosophy- preamble ii. Fundamental Rights iii. Directive principles of State policy iv. Fundamentals Duties 2. Judicial Activism and Development of Human Rights Jurisprudence 3. Enforcement of Human Rights i. Formal enforcement mechanisms ii. Role of supreme court iii. Role of High court iv. Statutory Tribunals v. Special Courts 4. Role of India in implementing International Norms and Standards
886	LLH 202	HR of Disadvantaged groups: problems & issues in the protection & enforcement	2018	1. Emerging human rights jurisprudence and the role of judiciary 3. Rights of women 4. Rights of child 5. Rights of prisoners 6. Rights of dalits 7. The tribal and other indigenous people 8. The mentally ill 9. The stateless persons 10. The unorganized labour 11. Aids victims 12. Rights of minorities Enforcement of Human Rights Protection laws of the disadvantaged groups: problems and issues Future perspectives on human rights of the disadvantaged

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
887	LLH 203	International Humanitarian law & Refugee law	2018	1. Humanization of Warfare 2. Control of weapons I. Conventional II. Chemical III. Biological IV. Nuclear 3. Humanitarian law : implementation I. red cross : role II. national legislation 4. The concept of refugees I. Definition of refugees and displaced persons : their problems II. The UN Relief and Rehabilitation Administration and other International Refugees Organization : international protection III. Protection under national laws 5. Strategies to combat refugee problems 6. Meaning of "Security of State" 7. Meaning of "Public Order" 8. Suspension of Article 19 rights of declaration of emergency 9. President"s Right to suspend right to move any court 10. Article 21 special importance its non-suspend ability 11. Suspend ability- 44th amendment 12. Access to court and Emergency 13. Article 359: ups and downs of judicial review 14. Constitution 44th Amendment Act, 1978 15. Constitution 59th Amendment Act, 198 16. Martial Law 17. Presidential Constitution

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
888	LLH 204	Science Technology & human Rights	2018	<p>2. Implication of Development of Science and Technology on Human Rights</p> <p>2.1 Right to environment in the development of science and technology</p> <p>2.2 Right to development in the advancement of science and technology</p> <p>2.3 Right to human health and impact of development in medical sciences</p> <p>3. Medicine and the Law</p> <p>3.1 Organ transplantation</p> <p>3.2 Experimentation on human beings</p> <p>3.3 Euthanasia (mercy killing)</p> <p>3.4 Gene therapy</p> <p>4. Issue of Human Rights Ethics in Scientific and Technological Development</p> <p>4.1 Sex determination test</p> <p>4.2 Induced abortion</p> <p>4.3 Reproductive technology</p> <p>4.4 Cloning</p> <p>4.5 Invitro fertilization</p> <p>4.6 Artificial insemination</p> <p>4.7 Surrogate motherhood</p> <p>5. Development in information Technology and Human Rights</p> <p>5.1 Censorship of films - constitutionality</p> <p>5.2 The A</p> <p>i. Why Government department?ii. Should there be an autonomous corporation?</p> <p>iii. Effect of television on people</p> <p>iv. Report of the chandda committee</p> <p>v. Government policy</p> <p>vi. Commercial advertisement</p> <p>vii. Internal security of serials etc</p> <p>viii. Judicial Review of Doordarshan decisions: freedom to telecast</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
889	LBC 104	Principles of Corporate Law	2018	<ul style="list-style-type: none"> <li>ii. Essential ingredients in establishment of Corporation</li> <li>2. Shares and share capital                             <ul style="list-style-type: none"> <li>i. Concept of shares, share capital</li> <li>ii. Kinds of shares</li> <li>iii. Debentures,</li> <li>iv. Issue , Allotment , transfer and forfeiture of shares</li> </ul> </li> <li>3. Legal Aspects governing corporate management                             <ul style="list-style-type: none"> <li>i. Meetings, Majority Rule and minority protection</li> <li>ii. Role of central government, Company Registrar, Company Law Board/ Tribunal,</li> </ul> </li> <li>4. Amalgamation, Reconstruction, Mergers, take-over of Companies                             <ul style="list-style-type: none"> <li>i. Statutory provisions</li> <li>ii. Powers of court/ tribunal</li> <li>iv. Reconstruction/ amalgamation by sale of shares/sale of undertakings</li> <li>v. Procedures of Winding up a Company</li> </ul> </li> <li>5. Corporate Governance                             <ul style="list-style-type: none"> <li>i. Legal framework</li> <li>ii. Impact of globalization</li> </ul> </li> <li>6. Corporate Social Responsibility                             <ul style="list-style-type: none"> <li>i. Dimensions of CSR</li> <li>ii. Legislations and CSR</li> </ul> </li> </ul>
890	LBC 105	Corporate Crimes and Social Responsibility	2018	<ul style="list-style-type: none"> <li>Ø Corporate Crimes</li> <li>Ø Cyber Crimes</li> <li>Ø Corporate Social Responsibility: Theories and Justification</li> <li>Ø CSR and Multinational Corporations</li> <li>Ø Regulation of Multinational Corporations in India</li> </ul>
891	LBC 201	International Trade Law	2018	<ul style="list-style-type: none"> <li>Ø Introduction to ITL</li> <li>Ø FDI and Technology Transfer</li> <li>Ø International Commercial Arbitration</li> <li>Ø Competition Law</li> <li>Ø WTO</li> <li>Ø E-commerce</li> </ul>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
892	LBC 202	Banking and Insurance Law	2018	<p>Unit-I</p> <ol style="list-style-type: none"> <li>1. Bank nationalization and social control over banking</li> <li>2. Recovery of debt by banks</li> <li>5. Banker and Customer- Relationship between Banker and Customer,</li> <li>6. Termination of Banker and Customer Relationship</li> </ol> <p>Unit-II</p> <ol style="list-style-type: none"> <li>1. Special Features of Relationship between Banker and Customer- Banker's</li> <li>2. Obligations, Banker's right, Obligation and right of customers to his banker,</li> <li>3. Negotiable Instruments- Definition</li> <li>4. Essential Features of Negotiable Instruments</li> <li>5. Promissory Note, Bill of exchange and Cheque</li> <li>6. Dishonor of Cheques: statutory provisions with cases</li> </ol> <p>Unit-III</p> <ol style="list-style-type: none"> <li>1. Principles of Insurance</li> <li>2. Types of Contract of Insurance</li> <li>3. The Risk - commencement, attachment, assignment</li> </ol> <p>Unit-IV</p> <ol style="list-style-type: none"> <li>1. Insurance against 3rd party (relevant provisions from Motor Vehicle Act 1988)</li> <li>2. Liability Insurance</li> <li>3. Consumer protection for Banking and Insurance services</li> <li>4. Insurance Regulatory and Development Authority Act, 2000:- Establishment,</li> <li>5. Composition, Duties, Powers and Functions</li> </ol>
893	LBC 203	Law relating to Contract	2018	<ol style="list-style-type: none"> <li>1. General Principles of Contract</li> <li>2. Standard Form of Contract:</li> <li>3. E-contract</li> <li>4. Government Contract</li> <li>5. Specific Contract: Bailment, Agency etc.</li> <li>6. International Commercial Contract</li> </ol>
894	LBC 204	Companies Act	2018	<p>General Principles of Company Law</p> <ul style="list-style-type: none"> <li>Ø Basic Concepts</li> <li>Ø Incorporation: Advantages and Disadvantages</li> <li>Ø Memorandum of Association</li> <li>Ø Doctrine of Indoor Management</li> <li>Ø Doctrine of Ultra-vires: Erosion, Evasion and Effects</li> <li>Ø Prospectus</li> <li>Company Management and Administration</li> <li>Ø Director</li> <li>Ø Company Meetings</li> <li>Ø Inspection and Investigation</li> <li>Ø Prevention of Oppression and Mismanagement</li> <li>Ø Winding Up</li> <li>Ø Corporate Governance under SEBI Regulations</li> </ul>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
895	LLA 104	Evolution And Concept of ADR	2018	<p>UNIT – I: Introduction to ADR-I</p> <p>a. Disputes – meaning and Kinds of Disputes</p> <p>b. Dispute Resolution in adversary system, Justiciable court structure and jurisdiction</p> <p>c. ADR- Meaning and philosophy, Need for ADR</p> <p>d. Overview of ADR processes</p> <p>UNIT – II: Indian Perspective of ADR</p> <p>a. Types of ADR in India</p> <p>b. Current Trends</p> <p>c. Acceptability</p> <p>UNIT –III: Dispute Resolution at grass root level</p> <p>a) Lok Adalats,</p> <p>b) Nyaya Panchayath,</p> <p>c) Legal Aid,</p> <p>d) Preventive and Strategic legal aid.</p> <p>UNIT – IV: ADR Application</p> <p>a. Commercial and Financial Disputes</p> <p>b. Real estate and Land Disputes</p> <p>c. Consumer Disputes</p> <p>d. Accident Claims</p> <p>e. Matrimonial Disputes</p>
896	LLA 105	Law of Arbitration	2018	<p>UNIT – I</p> <p>b. Need of Arbitration in International and Indian Law</p> <p>UNIT –II: Law of Arbitration in India-I</p> <p>a. Arbitration Agreement</p> <p>b. Appointment of Arbitrator</p> <p>c. Conduct of Arbitration Proceedings</p> <p>a. Power of Courts to interfere in Arbitration Proceedings</p> <p>d. Place of Arbitration</p> <p>e. Law applicable to the Arbitration</p> <p>UNIT – III: Law of Arbitration in India-II</p> <p>a. Interim Measures</p> <p>b. Jurisdictional Issues</p> <p>c. Arbitral Award</p> <p>d. Setting Aside the Arbitral Award</p> <p>e. Enforcement of Arbitral Award</p> <p>f. Online Dispute Resolution</p> <p>UNIT – IV: International Dispute Resolution</p> <p>a. Foreign Award</p> <p>b. New York Convention</p> <p>c. Geneva Convention</p> <p>d. Enforcement of Foreign Award, Public Order</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
897	LLA 201	International Commercial Arbitration	2018	<p>UNIT-I:</p> <ul style="list-style-type: none"> <li>a. Emergence of International Commercial Arbitration</li> <li>b. Dispute Resolution in International Trade</li> <li>d. International Arbitration Institutions</li> <li>e. A comparison between institutional versus ad-hoc rules of arbitration</li> </ul> <p>UNIT-II: Applicability of Laws</p> <ul style="list-style-type: none"> <li>a. Types of laws applicable in international commercial arbitration</li> <li>b. Governing law of arbitration, Law applicable to the substantive and procedural issues</li> <li>c. Enforcing the choice of law clause</li> <li>d. Party Autonomy:</li> <li>e. Conflict Rules</li> </ul> <p>UNIT-III: Regulating International Commercial Arbitration</p> <ul style="list-style-type: none"> <li>a. An introduction to UNCITRAL Model law on International Commercial Arbitration</li> <li>b. Judicial intervention to Arbitration</li> <li>c. Reference to arbitration</li> <li>d. Interim Measures</li> <li>e. General policy for enforcement, review and refusal of foreign award in India.</li> </ul> <p>UNIT-IV: Recognition or enforcement of foreign arbitral awards</p> <ul style="list-style-type: none"> <li>a. Foreign Award- meaning</li> <li>b. Reciprocity and Commercial Reservation</li> <li>c. Indian law- Scope and Applicability</li> </ul>
898	LLA 202	Mediation Conciliation & Negotiation	2018	<p>UNIT – I: Mediation-I</p> <ul style="list-style-type: none"> <li>a. Mediation: importance of Mediation</li> <li>b. Adjudication vs Mediation</li> <li>c. Techniques of Mediation</li> </ul> <p>Obligations of Mediation</p> <p>UNIT – II: Mediation II</p> <ul style="list-style-type: none"> <li>a. Supreme Court"s Module on Mediation</li> <li>b. Civil and Commercial Mediation</li> <li>c. Family Mediation</li> <li>d. Victim-offender Mediation</li> </ul> <p>UNIT – III: Conciliation and Negotiation</p> <ul style="list-style-type: none"> <li>b. Law Relating to Conciliation</li> <li>a. Techniques and approach to Negotiation</li> </ul> <p>UNIT – IV: International Practices</p> <ul style="list-style-type: none"> <li>a. Comparative study of Mediation</li> <li>b. Comparative Study of Conciliation</li> <li>c. Negotiation for International Relations and Disputes</li> </ul>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
899	LCL 104	Fundamental Rights, Fundamental Duties And Directive Principles Of State Policy	2018	<p>1. Enforcement of Fundamental Rights</p> <p>I. Definition of 'State' - Rights against state</p> <p>II. Rights against non-state actors</p> <p>III. Is there need to enlarge the definition of State?</p> <p>3. Fundamental Rights: Limitations, Suspend ability and Amenability</p> <p>4. Remedies against Violation/Threat of Violation of Fundamental Rights - Effects of Indemnity Granted under Article 34</p> <p>5. Significance and Importance of Fundamental Duties</p> <p>6. Significance of Directive Principles of State Policy and their Unenforceability</p> <p>7. Emerging Regime of New Rights and Remedies under the Garb of Fundamental Rights</p> <p>8. Use of DPSP and International Instruments in Interpreting FRs.</p> <p>9. Constitutional Torts</p> <p>10. FRs and Judicial Review</p> <p>I. Reasonableness Test and Strict Scrutiny Test</p> <p>II. Rights Test and Essence of Rights Test</p>
900	LCL 105	MASS MEDIA LAW	2018	<p>1. Mass Media</p> <p>i. Ownership patterns - press - private public</p> <p>ii. Ownership patterns- films private</p> <p>iii. Ownership patterns - radio &amp; television, Public</p> <p>2. Press freedom, of speech and Expression- Article 19 (1) (a)</p> <p>i. Includes freedom of the press</p> <p>ii. Laws of defamation, obscenity, blasphemy and sedition</p> <p>iii. The relating to employees" wages and services conditions</p> <p>iv. Price and pages schedule Regulation</p> <p>v. Newsprint control order</p> <p>vi. Advertisement- is it included within freedom of speech and expression?</p> <p>vii. Press and the monopolies and Restrictive trade practices Act.</p> <p>viii. Press and the monopolies and Restrictive trade practices Act.</p> <p>3. Films- for included in freedom in of speech and expressions?</p> <p>Role of Indian in Implementing International Norms and standards</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
901	LCL 201	Judicial Review	2018	<ol style="list-style-type: none"> <li>1. The Concept of Judicial Review – Origin and Its Democratic Legitimacy</li> <li>2. Judicial Review of Legislation</li> <li>3. Judicial Review of Administrative Actions               <ol style="list-style-type: none"> <li>I. Ground</li> <li>II. Scope – Permissibility of Merits Review</li> </ol> </li> <li>4. Limits on Judicial Review               <ol style="list-style-type: none"> <li>I. Doctrine of Political Questions</li> <li>II. Judicially Manageable Standards</li> <li>III. Policy Matters</li> </ol> </li> <li>5. Constitutional Framework for Judicial Review of Administrative Actions in India               <ol style="list-style-type: none"> <li>I. Power and Jurisdiction of the Supreme Court</li> <li>II. Power and Jurisdiction of High Courts</li> <li>III. Subordinate Courts and Judicial Review of Administrative Actions – Is there a need to invoke Article 32 (3)</li> </ol> </li> <li>6. Writs               <ol style="list-style-type: none"> <li>I. Mandamus</li> <li>II. Certiorari</li> <li>III. Quo warranto</li> <li>IV. Prohibition</li> <li>V. Habeas Corpus</li> </ol> </li> <li>7. Judicial Activism as an Extension of Power of Judicial Review</li> <li>8. Evaluation of Judicial Review</li> </ol>
902	LCL 202	General Principles of Administrative Law	2018	<ol style="list-style-type: none"> <li>1. Administrative Law</li> <li>2. Basic Constitutional Principles: Indian Perspectives               <ol style="list-style-type: none"> <li>i. Rule of Law</li> <li>ii. Separation of Powers</li> <li>iii. Natural Justice</li> </ol> </li> <li>3. Classification of Administrative Functions</li> <li>4. Administrative Discretion and Rules of Fairness</li> <li>5. Transparency and Accountability               <ol style="list-style-type: none"> <li>i. Lokpal and Lokayukt</li> <li>ii. Right to Information</li> <li>iii. Vigilance Commission</li> <li>iv. Comptroller and Auditor - General of India</li> <li>v. Commissions of Inquiry</li> </ol> </li> <li>6. Delegated Legislation               <ol style="list-style-type: none"> <li>i. Importance, Need and Constitutionality of Delegated Legislation</li> <li>ii. Conditional Legislation</li> </ol> </li> <li>7. Controls on Delegated Legislation               <ol style="list-style-type: none"> <li>i. Parliamentary Control</li> <li>ii. Procedural Control</li> <li>iii. Judicial Control</li> <li>8. Administrative Tribunals</li> </ol> </li> </ol>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
903	LCL 203	National Security, Public Order and Rule of Law	2018	<p>1. National Security, Public Order and Rule of Law</p> <p>2. Subjective satisfaction or objective assessment?</p> <p>2. Preventive Detention and Indian Constitution</p> <p>1. Article 22 of the constitution</p> <p>2. Preventive detention and safeguards</p> <p>3. Declaration of emergencies</p> <p>4. 1975 emergency</p> <p>3. Exceptional legislation</p> <p>1. COFEPOSA and other legislation to curb economic offenders</p> <p>2. TADA "the draconian law" comments on NHRC</p> <p>3. Special courts and tribunal</p> <p>4. Due process and special legislation</p> <p>4. Civil Liberties and Emergency</p> <p>1. Article 19</p> <p>2. meaning of "Security of State"</p> <p>3. meaning of "public order"</p> <p>4. suspension of Article 19, rights on declaration of emergency</p> <p>5. president's right to suspend right to move any court</p> <p>6. article 21, special importance- its non suspend ability</p> <p>7. suspend ability - 44th amendment</p> <p>5. Access to court and emergency</p> <p>1. Article 359 : ups and downs of judicial review</p> <p>2. constitution 44th amendment Act 1978</p> <p>3. constitution 59th Amendment Act 1988</p> <p>6. Martial Law</p> <p>1. provisions in English Law</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
904	LCL 204	Human Rights	2018	<p>1. Panoramic view of Human Right</p> <p>1. Human Rights in Non-Western Thought</p> <p>2. Awareness of Human Rights during the nationalist movement</p> <p>3. Universal Declaration of Human Rights Constituent Assembly and part III drafting process</p> <p>4. Subsequent developments in International Law and the position in India (e.g.) convention of social discrimination, torture, gender discrimination, environment and the two human rights covenants</p> <p>2. Fundamentals Rights Jurisprudence as Incorporating Directive Principles</p> <p>1. The dichotomy of fundamental rights (F.R.) and directives principles (D.P.)</p> <p>2. The interaction between F.R. and D.P.</p> <p>3. Resultant expansion of basic needs oriented human rights in India</p> <p>3. Right not be subject to Torture, in Human or Cruel Treatment</p> <p>1. Conceptions of torture, third degree methods</p> <p>2. "Justification" for it</p> <p>3. Outlawry of torture at international and constitutional law level</p> <p>4. Incidence of torture in india</p> <p>5. Judicial attitudes</p> <p>6. Law Reform- proposed and pending</p> <p>4. Minority Rights</p> <p>1. Conception of minorities</p> <p>2. Scope of protection</p> <p>3. The position of minority "Women" and their basic rights</p> <p>4. Communal Riots as involving violation of Rights</p> <p>5. Rights to Development of Individual and Nations</p> <p>1. The UN declaration on right to development 1987</p> <p>2. The need for constitutional and legal changes in India from Human Rights standpoint</p> <p>6. People;s Participation in Protection and Promotion of Human Rights</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
905	LLE 104	ENVIRONMENT AND DEVELOPMENT: LAW AND POLICY	2018	<ul style="list-style-type: none"> <li>ii. Natural and biological sciences: perspectives</li> <li>iii. Modern concepts: Conflicting dimension</li> <li>2. Development               <ul style="list-style-type: none"> <li>i. Theories of development</li> <li>ii. Right to development</li> <li>iii. Sustainable development - national and international perspectives</li> <li>iv. Developing economics</li> </ul> </li> <li>3. Policy and Law               <ul style="list-style-type: none"> <li>i. Role of government</li> <li>ii. Five-Year Plans</li> <li>iv. Forest Policy</li> <li>vi. Conservation strategy</li> <li>vii. Water policy</li> </ul> </li> <li>4. Population, environment and Development               <ul style="list-style-type: none"> <li>i. Population and sustainable development</li> </ul> </li> <li>5. Constitutional Perspectives               <ul style="list-style-type: none"> <li>i. Fundamental rights</li> <li>ii. Right of environment</li> <li>iii. Enforcement of the right</li> <li>iv. Directive principles and fundamental duties</li> <li>v. Legislative power</li> <li>vi. Environment: Emerging concepts and challenges</li> <li>vii. Polluter pay principle absolute liability of hazardous industry</li> <li>viii. Precautionary principle</li> <li>ix. Public trust doctrine</li> </ul> </li> </ul>
906	LLE 105	RESOURCE MANAGEMENT AND THE LAW	2018	<ul style="list-style-type: none"> <li>1. Water               <ul style="list-style-type: none"> <li>i. Salinity</li> <li>ii. Bund and spillways</li> <li>iii. Aquaculture and Fishing: Regulation</li> <li>iv. Irrigation</li> <li>v. Ground water management</li> <li>vi. Interstate water management and disputes</li> </ul> </li> <li>2. Land               <ul style="list-style-type: none"> <li>i. Controls on land development</li> <li>ii. Eco-friendly land planning: conservation, utilization and conservation</li> <li>iii. Mining and quarrying</li> </ul> </li> <li>3. Concepts of Common Property and State Property               <ul style="list-style-type: none"> <li>i. Forest</li> <li>ii. Wildlife</li> <li>iii. Common facilities and the right to use: roads, pathways, parks, lakes, rivers</li> <li>iv. Natural heritages-Tribal habitat</li> <li>v. Historical monuments</li> <li>vi. Wet lands: wise use concept</li> </ul> </li> <li>4. Energy               <ul style="list-style-type: none"> <li>i. Sources</li> <li>ii. Energy related environment problems: tapping transmission and utilization, indiscriminate use</li> <li>iii. Utilization of conventional energy: hydro-electric, thermal and nuclear</li> <li>iv. Non-conventional energy: Solar, wind, tidal and biogas</li> </ul> </li> </ul>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
907	LLE 201	Prevention & Control of Pollution	2018	<ol style="list-style-type: none"> <li>1. Pollution               <ol style="list-style-type: none"> <li>2. Pollution of water                   <ol style="list-style-type: none"> <li>i. Ground water pollution</li> <li>iii. Sources</li> <li>iv. Critique of existing</li> <li>v. Machinery</li> <li>vi. Powers</li> <li>vii. Function</li> <li>viii. Offences and penalties</li> </ol> </li> <li>3. Pollution of Air                   <ol style="list-style-type: none"> <li>i. Pollutants and effects</li> <li>ii. Modalities of control</li> <li>iii. Conflicts of jurisdiction of different control</li> <li>iv. Agencies</li> <li>v. Critique of the existing legal framework</li> </ol> </li> <li>4. Noise pollution                   <ol style="list-style-type: none"> <li>i. Sources and effects</li> <li>ii. Different legal controls</li> <li>iii. Ned for specific law</li> </ol> </li> <li>5. Disposal of Waste                   <ol style="list-style-type: none"> <li>i. Kinds of wastes</li> <li>ii. Disposal agencies: local bodies and other agencies</li> <li>iii. Disposal and recycling of wastes</li> </ol> </li> <li>6. Sanctions against pollution                   <ol style="list-style-type: none"> <li>i. Efficacy of criminal and civil sanctions</li> <li>ii. Corporate liability, civil and criminal</li> <li>iv. Civil liability, compensatory and penal</li> </ol> </li> </ol> </li> </ol>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
908	LLE 202	Environment & International Legal order	2018	<p>1. International concern for Environment Protection</p> <ol style="list-style-type: none"> <li>1. World environment movement</li> <li>2. Natural and cultural heritage</li> <li>3. Role of international and regional organizations</li> </ol> <p>2. International Obligation towards Sustainable Development</p> <ol style="list-style-type: none"> <li>1. International financing policy</li> <li>2. World environment fund</li> <li>3. Global environmental Facility (GEF)</li> <li>4. International co-operation</li> <li>5. Poverty alleviation</li> </ol> <p>3. Marine Environment</p> <ol style="list-style-type: none"> <li>1. Marine resources: conservation and exploitation</li> <li>2. Scientific research and exploration</li> <li>3. Pollution from ships</li> <li>4. Dumping of oil and other wastes into the sea</li> <li>4. Trans-boundary Pollution Hazards</li> </ol> <ol style="list-style-type: none"> <li>1. Oil pollution</li> <li>2. Nuclear fallouts and accidents</li> <li>3. Acid rain</li> <li>4. Chemical pollution</li> <li>5. Green house effect</li> <li>6. Depletion of ozone layer</li> <li>7. Space pollution</li> </ol> <p>5. Control of Multinational Corporations and Containment of environmental Hazards</p> <ol style="list-style-type: none"> <li>1. Problems of liability and control mechanisms</li> <li>2. Disasters management at international level</li> <li>3. Monopoly of biotechnology by MNCs</li> </ol>
909	LLE 203	Biological Diversity & Legal Order	2018	<p>Bio-diversity</p> <ol style="list-style-type: none"> <li>4. Significance of wild life</li> <li>5. Medicinal plants</li> <li>6. Plant and microorganism</li> </ol> <p>Bio-diversity and Legal Regulation</p> <ol style="list-style-type: none"> <li>1. Utilization of flora and fauna for bio-medical purposes</li> <li>2. Experimentation on animals: Legal and ethical issues</li> <li>3. Genetic mutation of seeds and microorganisms</li> <li>4. Genetic engineering</li> <li>5. Legal mechanisms of control</li> <li>6. Recognition of regional and local agencies</li> </ol> <p>Development projects and destruction of bio- diversity , sustainable development</p> <p>Problem in Legal Regulation of Medicinal Plants</p> <ol style="list-style-type: none"> <li>1. Cosmetic plants</li> <li>2. Animal products</li> <li>3. Utilization of flora and fauna for bio medicinal purpose by multi -national corporation :</li> </ol> <p>problems of control</p> <ol style="list-style-type: none"> <li>4. Regulation of trade in wildlife products</li> </ol> <p>Legal framework for development and protection of sanctuaries</p> <ol style="list-style-type: none"> <li>1. parks zoos biosphere resources</li> <li>2. Protection of genetic resources for agricultur</li> </ol>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
910	LLE 204	Environmental Legislation	2018	<p>1. General laws on environmental concern</p> <p>i. Code of Criminal Procedure : public Nuisance</p> <p>ii. Provisions in the Indian Penal Code</p> <p>iii. Local Bodies law : an overview</p> <p>2. Enrolment (Protection) Act , 1996</p> <p>i. Necessary and proper clause , concentration of power on the control government</p> <p>ii. Delegated legislation: power to make rules , regulations and to issue directions</p> <p>iii. Delegations of powers</p> <p>3. Coastal zone management</p> <p>i. sea erosion</p> <p>ii. SRZ notification</p> <p>iii. prohibitions and exemptions</p> <p>iv. permissible activities</p> <p>v. classifications of zones</p> <p>vi. regulations of sea resorts</p> <p>vii. eco tourism</p> <p>viii. coastal zone management</p> <p>ix. aquacultures</p> <p>4. Laws on hazardous substance</p> <p>5. Preparedness of environmental disasters</p> <p>6. Emerging legal controls</p> <p>i. eco mark</p> <p>ii. Environmental impact assessment</p> <p>iii. Public participation in environmental decision making</p> <p>iv. Environmental information</p>
911	LLF 104	Uniform Civil Code	2018	<p>Unit 1</p> <p>1. Uniform civil code - feasibility, impediments to the formulation of uniform civil code and role of state, comparative analysis with U.S.A, connotations of directive principles u/a -44 of constitution of India with special reference to personal law and role of judiciary.</p> <p>2. Religious pluralism and its implications in the matters of marriage, divorce and maintenance – concept of marriage and theories of divorce with special reference to Hindu law, Muslim law, Parsi law, Christian law, Special marriages law, Foreign marriages law and Indian divorces law. Kinds of maintenance and right to get maintenance under personal and Uniform law.</p> <p>Unit 11</p> <p>1. Optional uniform civil code – meaning, need and scope of optional uniform civil code specifically in the law on succession and inheritance applicable to Hindu, Muslim, Christian and Parsi, and its comparative analysis with uniform law.</p> <p>2. Secular laws and its implications in the matters of adoption including inter country adoptions and guardianship – concept, nature and relevance of adoption and guardianship with special reference to Hindu law, Muslim law, Parsi law, Christian law and Uniform law.</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
912	LLF 105	Law Relating To Marriage And Separation	2018	<p>Hindu Law Hindu marriage: kinds, conditions and solemnization, Matrimonial remedies: nullity of marriage, restitution of conjugal rights, judicial separation, Difference between judicial separation and divorce and theories of divorce.</p> <p>Muslim Law Muslim marriage: concept, evolution, nature, essentials and option of puberty (Khyar-ul-bulug), iddat, Legal effect of a valid marriage, Muta or temporary Marriage, Mahr, Dissolution of marriage (Talaq), Legal effects of change of religion.</p> <p>Laws Relating to Christian and Parsi and Jews Concept of parsi and jews marriage: nature, kinds, essentials, Nullity of marriage, Judicial separation, Concept of divorce.</p> <p>Contemporary Issues Uniform Civil Code, Legitimacy of live-in relationships, Marriages under Special Marriages Act, 1954, NRI Marriages, Concept of same gender marriage and its legality, Family Courts: <del>Constitution, power and functions, Administration of gender justice</del></p>
913	LLF 201	Inheritance & Succession	2018	<p>Introduction Inheritance in Hindu, Muslim and other religion: object, scope and nature of inheritance in Hindus, Muslims, and other Religious communities such as Parsis and Christians.</p> <p>Inheritance under Hindu law Succession under Mitakshara and Dayabhaga, Joint family property, Coparcenary Property, Order of inheritance of male and female, Classes of heirs and rules of exclusion.</p> <p>Inheritance under Muslim Law Pre Islamic customs and Islamic reforms, Sunni law of inheritance, Shia law of inheritance, Doctrine of increase and return under Sunni and Shia law and Rules of exclusion, Testamentary succession.</p> <p>Recent development and contemporary issues <del>The Constitution of India, Judicial Trends and the Family Courts Act, 1994</del></p>
914	LLF 202	Women's Rights And Their Protection	2018	<p>1. Introduction</p> <p>1. Rights and Protection of Women: International Perspective Relevant provisions of: i. Universal Declaration on Human Rights (UDHR), ii. Convention on Elimination of Discrimination Against Women (CEDAW), iii. Convention Political Rights of Women, iv. Convention on Nationality of Married Women, v. Convention on Elimination of Violence Against Women.</p> <p>3. Rights and protection of women: National scenario Position under general laws: i. Constitution of India, ii. Criminal laws, iii. Personal laws, iv. Property laws, v. Industrial and Labour laws.</p> <p>Position under special laws: i. Dowry prohibition act, ii. Domestic violence act, iii. Pre-conception and prenatal diagnostic techniques (prohibition of sex selection) act, iv. National Women Commission.</p> <p>4. Contemporary issues and Special initiatives for women i. Law against Sexual harassment at workplace, ii. National policies for girl child, iii. National policies for the empowerment of women, iv. Participation of women in politics,</p>

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915	LLF 203	Child Rights And Protection	2018	Legislative approach Place of child in Indian Constitution with special reference to Article 15(3), Article 24, Article 39 (e) and (f), Article 45, Protection of child through different legislations, National Commission for Protection of Child Rights: mandate, constitution and powers. International Regime ILO Convention on Child Labour 1999, United Nation Conventions on the Right of Child 1989, UN Convention on Child Prostitution and Child Pornography 2000, Role of UNICEF for the protection of child rights. Judicial Contribution and Preventive Strategies Juvenile in conflict with law, Social Action Litigation concerning Juvenile Justice, Sexual Exploitation of Children, Role of NGOs protecting child rights, trafficking in children. Educational Rights Article 21-A of Indian Constitution, Right of children to free and compulsory education,
916	LLF 204	Religion And Family Law	2018	Introduction Religion and multiculturalism, Freedom of propagation of religion, Critical evaluation of fatwa and khap, Uniform Civil Code. Marriage Marriage: personal laws and under Special Marriage Act, 1954, conditions for valid marriage, consequences and effects. Divorce Divorce: concept, origin, status of children, Rights and obligations after divorce under personal laws and Code of Criminal Procedure, 1973. Adoption and Maintenance Adoption by Hindus and by other faith: statutory provisions, scope, effect and consequences, Maintenance under Cr. P.C. and in different personal laws
917	LIP 104	Introduction to Intellectual Property Rights	2018	Pre- TRIPs and post TRIPs 2. Justification and Rationale 3. Balancing Rights of the IPR Holder and the Society 4. Enforcement of IPRs 5. Exhaustion of IPRs 6. IPR and Human Rights 7. Interface between IPR and Competition Law
918	LIP105	Law of Copyright	2018	Copyright 1. Meaning, Nature, Justification, Registration 2. History and International Treaties 3. Idea/expression Dichotomy; Copyright in Concept Notes 4. Moral Rights 5. Rights of Performers, Rights of Broadcasting Organizations etc., 6. Modes of Transfer 7. Infringement: Civil and Criminal Remedies 8. Border Protection Measures 9. Fair Dealing 10. Copyright in Database, Software and Digital Works 11. Folklore and Cultural Expressions

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
919	LIP 201	Laws of Patent & Undisclosed Information	2018	<p>Patent</p> <ol style="list-style-type: none"> <li>1. International Treaties</li> <li>2. Patentability Criteria</li> <li>3. Patentable and Non- patentable inventions</li> <li>4. Registration, Ownership, Rights of Patentee, Transfer of technology</li> <li>5. Working of Patents and Compulsory licensing</li> <li>6. Infringement</li> <li>7. Impact of TRIPs and TRIPs Flexibilities</li> <li>8. Pharma patents vis a vis Public Health Issues</li> <li>9. Patent vis-à-vis Copyright: Software and Computer Programmes</li> <li>10. Utility Patent</li> </ol> <p>Undisclosed Information</p> <ol style="list-style-type: none"> <li>1. Rationale and Subject matter of Confidential Information</li> <li>2. TRIPS Regime</li> <li>3. Trade Secrets v. other forms of protection</li> </ol>
920	LIP 202	Law of Trademark	2018	<p>Trademark</p> <ol style="list-style-type: none"> <li>1. Justification, History, and International Treaties</li> <li>2. Registration (India and International level) and Scope of Protection</li> <li>3. Kinds : Conventional and Non-conventional</li> <li>4. Licensing and Assignments</li> <li>5. Passing off, Infringement and Remedies</li> <li>6. Character Merchandising</li> <li>7. Comparative Advertisement and Disparagement</li> <li>8. Interplay of Unfair Competition and Trademark Law</li> </ol>
921	LIP 203	Protection of Plant Varieties & Traditional Knowledge	2018	<ol style="list-style-type: none"> <li>1) Variety of plants: <ul style="list-style-type: none"> <li>· Kinds of plants.</li> <li>· Relation with Intellectual Property.</li> </ul> </li> <li>2) Breeder and its Rights: <ul style="list-style-type: none"> <li>· Who is the breeder?</li> <li>· Licensing.</li> <li>· Rights of breeder.</li> <li>· Remedies in case of infringement.</li> <li>· Authorities involved.</li> </ul> </li> <li>3) Protection of plants: <ul style="list-style-type: none"> <li>· Need of protection.</li> <li>· Protection of breeder of the variety under Indian Constitution.</li> <li>· Role of DPSP regarding the protection of new varieties of plants.</li> </ul> </li> <li>4) The Protection of Plant Varieties and Farmers' Rights Act, 2001: <ul style="list-style-type: none"> <li>· Introduction and Authorities.</li> <li>· Plant Varieties and Essentially Derived Variety-Application for Registration (Chapter III).</li> <li>· Duration and Effect of Registration</li> <li>· Benefit Sharing and Duration of Registration.</li> <li>· Compulsory License</li> <li>· Appellate Tribunal</li> </ul> </li> <li>5) Farmers Rights, Revocation and Penalties: <ul style="list-style-type: none"> <li>· Surrender and revocation of certificate.</li> <li>· Rights of farmers and of communities.</li> <li>· Protection from infringement.</li> <li>· Authorization of plant variety.</li> <li>· Governmental schemes.</li> </ul> </li> </ol>

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922	LIP 204	Laws of Layout Design & Geographical Indication	2018	Industrial Design and Layout Designs of Integrated Circuit 1. Meaning, Scope and Registration 2. History, International Developments 3. Designs v/s Copyright and Trademark 4. Infringement and Remedies Geographical Indication 1. National and International Perspective 2. Meaning, Nature and Justification 3. Geographical Indication v. other forms of IPRs 4. Registration, Infringement and remedies 5. TRIPS and Concerns for developing countries
923	LLL 104	Law Relating To Industrial Relations	2018	1. Trade Union Act, 1926 - Recognition of Trade Union -Affiliation of Unions to political parties - Multi-unionism - Policies towards workers, participation in management - role of State - Workers participation in Management - Liberalization and Industrial relation in India. 2. Collective bargaining - Process of Collective bargaining - Perquisites for collective bargaining - strikes/lockouts [pen-down, tool down, go slow, work to rule, stay in, sit in, picketing] - Gherao - Law relating to collective bargaining. 3. Freedom of Association - Constitutional and legal aspects 4. Industrial Disputes Act - Layoff - retrenchment - compulsory retirement - Voluntary retirement - superannuation 5. Industrial Dispute Resolutions - Methods - Conciliation Officer - Board of Conciliation -Legal status of Conciliation settlements - Voluntary Arbitration - Arbitration under the Industrial Disputes Act - Compulsory Adjudication - Power of reference - Reference by Government -
924	LLL 105	Law Relating To Labour Welfare	2018	1. Constitution and Labour Welfare —Right to work- Bonded Labour child labour —special provision for women and children- Law relating to protection of Women in work place International conventions. 2. Minimum Wage- Types and kinds of wage determination theories of wage , Payment of Wages —Bonus Dearness allowance —basic wage Other wage [HRA, CCA, MA, LTC, Leave encashment, Overtime allowances, cash incentives, conveyance allowance] National Wage Policy Payment of Wages Act Denial of minimum wage as Forced Labour 3. ILO standard for labour International Convention for Labour Welfare UDHR —ICCPR. 4. Labour and Human Rights Equality of Opportunity in employment Equal Pay for Equal Work Equal Remuneration Act Maternity Benefit Shops and Establishment 5. Unorganised sector and labour laws and Agriculture labourer (concept, exploitation, tribal labour in forest settlement, plantation labour Act, political movement, agrarian reforms) migrants , sale promotion, small scale industries, beedi and cigar, construction labour, ship
925	LLL 201	Law Relating To Industrial Injuries And Social Security	2018	1. Workmen's Compensation From Compensation to Insurance Judicial Interpretation of the express 'arising out of and in the course of employment' Employee State Insurance Act 1948 2. Fatal Accidents Act, 1857 Motor Vehicle Compensation Law Employer Liability Act 1935 3. Industrial safety Factories Act Environmental destruction Bhopal —Shriram gas leak 4. Occupational Health and Industrial Injuries Old age, sickness and disablement -Hazardous employment- Employers Liability - Medical Insurance - Public Liability Insurance Act 1991 5. Social Security Five year plan National Commission on Labour PF, Pension and Gratuity Mining worker Social Security for Unorganized Labour —Employee stock option —workers cooperatives

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926	LLL 202	Law Relating To Service Regulation	2018	<ol style="list-style-type: none"> <li>1. Service Law- Recruitment Procedure- Rules Agencies —Employment Exchange</li> <li>2. Conditions of Service terms Central Civil Service Rules State Civil Service Rules Pay Commission Fixation of pay and other allowances- Law Relating to Civil Servants/Rules 'Doctrine of pleasure'</li> <li>3. Contractual Employment concept Security of tenure —Employment Act { UK }</li> <li>4. Misconduct and discipline of the employees major and minor misconduct File noting Confidentiality of Adverse remarks Internal appeal mechanism Inquiry procedure punishment Managerial prerogative transfer, long leave —Standing order</li> <li>5. Judicial Review Central Administrative Tribunal State Administrative tribunal- Powers and Functions: Appeal Provision —Write</li> </ol>
927	LLL 203	Wages	2018	<ol style="list-style-type: none"> <li>1. Constitutional Perspectives on Wages               <ol style="list-style-type: none"> <li>1.1 The constitutional ideals: Right to work; Right to living wage; Right to equal pay for equal work</li> <li>1.2 History of Wage legislation in India: Findings of Royal Commission on Wages 1931</li> <li>1.3 Wage Concept of Minimum Wage, Living Wage, Fair Wage. Principles governing fixation of these Wages.</li> <li>1.4 Committee on Fair Wages 1949 (Recommendations)</li> </ol> </li> <li>2. Theories and Facets of Wages               <ol style="list-style-type: none"> <li>2.1 Theories of wages: Wage differentials</li> <li>2.2 Regulations of Payment of Wages: Safeguards against unlawful deductions and delay in payment of wages - Payment of Wages Act, 1936. Jurisdictions, Powers of Presiding Officer, Wages Authority .</li> </ol> </li> <li>3. Facets of Wages               <ol style="list-style-type: none"> <li>3.1 Methods for wage fixation - The Minimum Wages Act, 1923, Wage Fixation through Adjudication – Principles evolved by Judiciary; Wage Fixation by Wage Boards – Principals &amp; Practices – Functionary &amp; Wage Boards Critical Appraisal                   <ol style="list-style-type: none"> <li>3.1.1 Dearness Allowance – Concept, meaning, Evolution; D.A. &amp; Consumer Price Index – Controversies involved. Imposition of ceiling limit on the Extent of neutralization.</li> <li>3.1.2 Bonus concept - as "deferred wage", "Profit sharing" Facets Attendance bonus, incentive bonus, Incentive Bonus, etc. Critical Study of Payment of Bonus Act, 1965</li> <li>3.1.3 Other Allowances and concessions :House rent allowance, City compensatory allowance, Educational allowance, Conveyance allowance, Cash incentives: percentage on turn-over, Medical allowance, Leave travel concessions, Free and subsidized food and products, Leave encashment, Overtime allowances, Low wages and high perks as a camouflaging stratagem of defeating ceiling on wages.</li> </ol> </li> </ol> </li> <li>4. Wages, Price and Tax – Correlations               <ol style="list-style-type: none"> <li>4.1 Increase of wages - impact on price</li> <li>4.2 Increase of price - impact on wages</li> <li>4.3 Tax - impact on price and wages                   <ol style="list-style-type: none"> <li>4.3.1 Taxation on goods and increase of prices</li> <li>4.3.2 Taxation on wage income - a cut on real wages</li> </ol> </li> </ol> </li> </ol>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
928	LLL 204	Agricultural Labour	2018	<p>1. Agricultural Labour Relations</p> <p>1.1 Agricultural labourer - the concept</p> <p>1.2.1 Non-exploitative fair relation: the feudal hegemony, share in products as wages, wages in kind, benefits in addition to wages, participation in festive occasion, grievance redressal at landlord's residence</p> <p>1.3 Exploitation of labour by the landlord</p> <p>1.3.1 Longer hours of work and lower wages: statutory regulation</p> <p>1.3.2 Bonded labour</p> <p>1.3.3 Indebtedness</p> <p>1.4 Tribal labour in forest settlements</p> <p>1.5 Migrant agricultural labour</p> <p>2. Trade Unionism and Collective Bargaining among Agricultural Labour</p> <p>2.1 Unorganized nature</p> <p>2.2 Seasonal character</p> <p>2.3 Political movements</p> <p>2.4 State, regional and macro-regional disparities in collective bargaining, organization and remuneration</p> <p>3. Industrial Labour Norms in the Agricultural Labour Area</p> <p>3.1 Problem: multi employer - employment situation</p> <p>3.2 Workmen's compensation</p> <p>3.3 Minimum wages</p> <p>4. Labour Welfare</p> <p>4.1 Need for state initiative and support</p> <p>4.2 Assessment of existing measures: statutory and non-statutory</p> <p>4.3 Agrarian reform as agricultural labour protection measure: land to the tiller doctrine</p> <p>4.4 Environmental impact of distribution of forest land among agricultural labourers</p> <p>4.5 Futuristic perspectives</p> <p>5. Dispute Settlement Mechanism</p> <p>5.1 Practices: settlements</p> <p>5.2 Statutory measures: conciliation, adjudication</p>
929	MTDC-102	Micro Controller System Design	2013	<p>UNIT-I: Review of 8-Bit and 16-bit microprocessor, support chips and interfacing techniques, single chip microcomputers, architecture, program and data memory. UNIT-II : Single chip micro controllers- INTEL 8051/ 8751, MOTOROLA 68HC0/68HC11 architecture, instruction set and programming, Memory mapping, addressing modes, Registers, expanded modes. Interrupt handling, Timing and serial I / O. UNIT-III: Software development Modular approach, integrated software development environment, Object oriented interfacing and programming, Recursion and debugging. UNIT-IV:ATMEL 89C51 / 52 and PIC micro-Controllers. UNIT-V:DSP Processor architecture and sample design using TI – DSP.</p>
930	MTDC-103	DSP Application	2013	<p>UNIT-I:Review of Discrete time signals: sequences, representation. Discrete time systems: linear, time invariant, LTI systems, properties, and constant coefficients difference equations. UNIT-II: Realization of discrete time system, Discrete Cosine Transform, Relationship between DFT and DCT. Computation of DFT: FFT/Decimation in Time and Decimation in Frequency. UNIT-III: Application of MATLAB for Design of Digital filter. Effect of Finite register length in filter Design, Design of FIR filters by windowing – Rectangular, Bartlett, Hann, Hamming, Kaiser, Window filter, Design method relationship of Kaiser to other window. UNIT-IV:Basic principals of spectrum estimation, estimate of auto covariance, power spectrum, cross covariance and cross spectrum. UNIT-V:Advance signal processing technique and transforms: multi rate signal processing- down sampling/up, sampling, introduction to discrete Hilberts Transform, Wavelet Transform, Haar Transform.</p>
931	MTDC-104	VLSI Design	2013	<p>UNIT-I: Introduction: Basic concept of integrated circuits and manufacturing, Design fundamental for digital CMOS circuits, Design Abstraction and circuit Validation. UNIT-II:CMOS Logic gate design, Basic Physical design, CMOS Logic structure, I/O Structure, Power and Delay consideration. UNIT-III: System Design: CMOS Chip Design, standard cells, Programmable gate array, Design Capture, Simulation and Verification. UNIT-IV:Subsystem Design: Data Operation, CMOS Sub System Design, Memory and Control Strategies, PLA and ROM Implementation. UNIT-V: CAD system and Algorithms: CAD systems, Layout Analysis, Placement and Routing Algorithms, Timing Analysis, Optimization, Logic Synthesis and Simulation, Testability Issues.</p>

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932	MTDC-105	Data Communication And Computer Network	2013	UNIT-I: Review of synchronous and asynchronous transmission, circuit switching, message switching, packet switching and their comparison.RS-232 C and X.21 standards, modern operation, null model.UNIT-II: Data link control, point-to-point and multi-point links, flow control, sliding window protocol, various ARQ technique for error control and their comparison and performance analysis, HDLC as a bit oriented link control protocol.UNIT-III: Communication Network:- Virtual circuit and datagram, routing algorithm, dijkstera and Bellman ford least cost, algorithm, various routing protocol, congestion control technique, deadlock and its avoidance. UNIT-IV: Local Area network:- Various topologies and medium access control schemes such as contention, polling, token parsing and performance analysis, various IEEE standards for LAN, UBS LANs, FDDI.UNIT-V: Introduction to WAN packet switching technologies such as ATM and Frame relay. Introduction to TCP / IP protocols.
933	MTDC-201	System Programming	2013	UNIT-I: Fundamental of programming, steps in problem solving with digital computer algorithm, flow chart and textual representation, primitive actions, control construct like conditional, iteration, conditional repetition, recursion, programming with Pascal of C.UNIT-II:Data & Data types, data representation, data structure array-various operations with array, concept of pointers and pointers manipulations, pointers for data structures and functions, static and dynamic allocations, implementations with arrays and pointers.UNIT-III: applications of stacks, queues & various operations on queues, tree, binary and K-ary trees, tree traversal, insertion and deletion in tree, B-tree and AVL tree, operations on those tree applications.UNIT-IV: Searching and sorting, linear, binary and Hash search, minimum and maximum selection, divide and conquer,sorting, insertion sort, bubble sort, quick sort & heap sort, matrix operations, dynamic programming.UNIT-V:Overview of system programs, Assembler, interpreter, compiler, Editor and operating system.
934	MTDC-202	Modelling and Simulation of Computer	2013	and type of models, Various steps in simulation, General concept in discrete event simulation. UNIT-II: Practical models in simulation: review of terminology and concepts, useful statistical models, discrete distributions, continuous distributions, Poisson process and empirical distribution.Queueing model: Characteristics of queueing system transient and steady state behavior of queue, measures of performance using queueing systems property. UNIT-III: Direct transformation for normal distribution, Acceptance and rejection technique. UNIT-IV: Modeling: Data Collection, identifying the distribution with data, parameter variation, goodness of fit tests,selection of input model without data, multivariate and input models. UNIT-V: types of simulation with respect to output analysis, types of performance and their estimation, output analysis for terminating simulations, analysis for terminating simulation.
935	MTDC-203	Network Design Technology	2013	UNIT-I: Review of concepts of Layering and Layered models- OSI & TCP/IP LAN Technology, transmission Medium, Topology, Medium Access Control (MAC) Techniques including MAC & LLC sub layers. UNIT-II: LAN system, Ethernet system, Fast Ethernet& Gigabit Ethernet, Token Ring, FDDI Internet working withTCP/IP, Internet Protocol (IP) Suite including IP V4, IP V6 Transport Protocols, TCP and UDP.UNIT-III: Introduction to IP routing, various interior gateways protocols like RIP, OSPF and exterior gateway protocols like BGP .UNIT-IV: Overview, ISDN, interface and functions, layers and ISDN services-ISDN standards and services High Speed network frame relay, frame relay protocols, services and congestion control. UNIT-V: ATM: ATM adaptation layer (AAL), ATM traffic and congestion control ATM LAN, ATM LAN emulation and multi protocols over ATM (MPOA) .
936	MTDC-204	Optical Network	2013	UNIT-I: Telecommunication, first generation optical network, multiplexing technique, second generation optical network,virtual circuit services and data gram, transparencies of regenerator .UNIT-II: First generation of optical network: SONET, SDH, goals of SONET design , Multiplexing in SONET,elements of SONET/SDH infrastructure, SONET physical layer,comuter interconnections,ESCON,fiber channel, FDDI,ATM,IP layered architecture , physical layer, data link layer, network layer, transport layer.UNIT-III: Topologies for broadcast networks, bus topology, star topology, media accesscontrol(MAC) protocols, throughput calculation, synchronization, aloha and slotted ALOHA, test beds,LAMBDANET.UNIT-IV: Wavelength routing network: optical layer, wavelength cross connect, wavelength reuse reliability, virtualtopology and circuit switching and node design, degree of wavelength conversion, network design.UNIT-V: Photonic packet switching ,optical time domain multiplexing(OTDM),Method of multiplexing anddemultiplexing, Broadcast ,OTDM network ,bit interleaving and packet interleaving, optical and gates non linear optical loop mirror.
937	MTDC-205	Mobile & Satellite Communication	2013	UNIT-I:The cellular concept, system design fundamentals, frequency reuse, reused distance, cluster size, channel assignment strategies, handoff strategies, co-channel interference and system capacity, trunking and grade of service. UNIT-II: Speech coding for wireless system applications and broadcast systems, coding techniques for audio and voice and popular speech codes.UNIT-III: Modulation techniques for mobile and satellite communication, their generation and detection, performance of spectral and power efficiency. Physical layer technique, diversity, spread, spectrum, frequency hopping, direct sequence, adaptive equalization, Orthogonal Frequency Division Multiplexing (OFDM).UNIT-IV: MAC Protocols; 802.11 and its variants, ETSI-HILARAN type 1 MAC protocol, multiple access with collision avoidance.UNIT-V: Introduction to GEO, MEO and LEO satellite systems, Antena positioning in GEO and Link calculations, wideband CDMA concepts principles.

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938	MTDC-301 (A)	Information Theory & Coding	2013	UNIT-I: Introduction to uncertainty, information, entropy and its properties, entropy of binary memory less source and its extension to discrete memory less source.UNIT-II: Binary symmetric channel, mutual information & its properties, channel capacity, channel coding theorem, and its application to BSC, Shannon's theorem on channel capacity, capacity of channel of infinite bandwidth, Bandwidth signal to noise Trade off, Practical communication system in light of shannon's theorem, Fading Channel.UNIT-III: Group and field of Binary system Galois field and its construction in GF (2) and its basic properties, vector spaces and matrices in GF(2), Linear Block Codes, Systematic codes, and its encoding circuits, syndrome and error detection ,minimum distance, error detecting and correcting capabilities of block code. UNIT-IV: Cyclic codes and its basic properties, Generator & parity check matrix of cyclic codes, encoding & decoding circuits, syndrome computation & error detection, cyclic Hamming codes. UNIT-V: Introduction to BCH codes, its encoding & decoding, error location & correction.
939	MTDC-302 (A)	Advanced Digital Communication	2013	UNIT-I:Introduction to digital modulation technique and their spectral characteristics, optimum receivers for signals corrupted by AWGN and their performance for memory less channel.UNIT-II:Signal design band limited channels and their characterization, probability of error in detection PAM with zero ISI, modulation codes for spectrum spacing. UNIT-III: Optimum receivers for channels with ISI and AWGN, linear equalization and decision feed back equalization.UNIT-IV: Multi channel and multi carrier systems, spread spectrum signals for digital communication, direct sequence spread spectrum signals and frequency hopped spread spectrum signals and their performances, OFDM. UNIT-V: Characterization of fading multi path channels, frequency non-selective slowly padding channels, diversity techniques for padding multi path channels, coded waveform for padding channels and their application.
940	MTDC-302 (B)	Optical Instrumentation & Measurement	2013	UNIT-I: Optical Spectrum Analyzer Optical power and energy meter, Monochrometer, CCD, Ellipsometer, transducer, Lock in Amplifier, Box car Average.UNIT-II: Fiber optic sensors: Pressure, temperature, strain, Magnetic & Electric field sensors based on characteristics like intensity, phase, polarization, frequency and wavelength of light wave .UNIT-III: Fiber optic Measurement: Introduction to measurement techniques Multimode Fiber: Refractive Index Profile.UNIT-IV: Non destructive loss Measurement (OTDR), Transmission Bandwidth and dispersion, Bandwidth of Jointed fiber, Differential Mode Delay (DMD).UNIT-V: Single Mode Fiber: Attenuation, Refractive Index Profile (RIP), Mode Field Diameter, Equivalent step Index (EXI) Profile, Mode Cut off Wave length and the Single Mode operating regime
941	MTVD-101	Solid State Device Modeling And Simulation	2013	UNIT-I: Quantum Mechanical Concepts, Carrier Concentration, Transport Equation. UNIT-II: Injection and Transport Model, Continuity Equation, Diode Small Signal and Large Signal (Change Control Model), Transistor Models. UNIT-III:Models for Enhancement, Depletion Type MOSFET, CMOS Models in SPICE.UNIT-IV: MOSFET: Long and Short Channel Parameters, Statistical Modeling of Biopolar and MOS Transistors. UNIT-V: Static and Dynamic Models, Rate Equations, Numerical Technique, Equivalent Circuits. Modeling of LEDs, Laser Diode and Photo-detectors.
942	MTVD-102	CMOS Analog Circuit Design	2013	UNIT-I:Basic MOS fabrication processes, PN junction, MOS transistor, passive components, lateral and substrate BJT and latchup.UNIT-II: Large-signal and small-signal model for the MOS transistor, computer simulation models, simulation of MOS circuits using SPICE. UNIT-III: MOS switch, MOS diode/ active resistor, current sinks and sources, current mirrors, current and voltage references, bandgap reference, simulation of CMOS sub circuits using SPICE. UNIT-IV: Common-Source stage (with resistive load, diode connected load, current-source load, triode load, source degeneration), source follower, common-gate stage, cascode stage, folded cascode stage, simulation of CMOS amplifiers using SPICE.UNIT-V: 741 op-amp circuit, dc & small-signal analysis of 741 op-amp, simulation of 741 op-amp using SPICE, macro models for op-amps. Frequency response of CS stage.
943	MTVD-103	Digital Signal Processing Structures For VLSI	2013	UNIT-I:Linear System Theory- Convolution- Correlation - DFT- FFT- Basic concepts in FIR Filters and IIR Filters.UNIT-II: Pipelining of FIR Digital Filters- Parallel Processing- Pipelining and Parallel Processing for Low Power. Retiming: DefinitionsProperties and problems- Solving Systems of Inequalities. UNIT-III: Fast Convolution: Cook-Toom Algorithm- Modified Cook-Toom Algorithm.Design of Fast Convolution Algorithm by Inspection. Parallel FIR filters-Fast FIR algorithms.UNIT-IV: Pipelined and Parallel Recursive Filters : Pipeline Interleaving in Digital Filters- Pipelining in 1st Order IIR Digital Filters- Pipelining in Higher- Order IIR Filters.UNIT-V:Scaling and Roundoff Noise : Scaling and Roundoff Noise- State Variable Description of Digital Filters
944	MTVD-104	Low Power VLSI Design	2013	UNIT-I:Introduction to low power VLSI design-Need for low power-CMOS leakage current-static current-Basic Principles of low power design.UNIT-II: Circuit - transistor and gate sizing - pin ordering - network restructuring and reorganization - adjustable threshold voltages - logic-signal gating - logic encoding. Pre-computation logic.UNIT-III: Power reduction in clock networks - CMOS floating node - low power bus - delay balancing - SRAM. UNIT-IV: Switching activity reduction - parallel voltage reduction - operator reduction -Adiabatic computation - pass transistor logic.UNIT-V: Software design and power estimation Low power circuit design style - Software power estimation - co-design

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945	MTVD-105	Graph Theory And Optimization Techniques	2013	UNIT-I: Networks and the maximum flow – Minimum cut theorem – Trees – Spanning trees – Rooted trees .UNIT-II: Planar graphs – Euler’s formula – Five colour theorem – Coloring of graphs – Chromatic number (vertex and edge) properties .UNIT-III: Computer Representation of graphs – Basic graph algorithms – Minimal spanning tree algorithm – Kruskal and Prim’s algorithm – Shortest path algorithms – Dijkstra’s algorithm – DFS and BFS algorithms.UNIT-IV: Single variable and multivariable optimization – Lagrangian method – Kuhn-Tucker conditions – Random pattern and Random search methods.UNIT-V: Classification – Techniques of unconstrained minimization – Scaling of Design variables – Direct search methods – Random jumping method
946	MTVD-201	Testing Of VLSI Circuits	2013	UNIT-I: VLSI Testing Process And Test Equipment - Types of testing - ATE –ADVANTEST model T6682.UNIT-II: Faults in Digital circuits-failures and faults. Modeling of faults. Temporary faults. Test generation for combinational logic circuits-combinational ATPG-Boolean Difference Method-D-Algorithm-PODEM-FAN Algorithm.UNIT-III: DSP based testing - Static ADC & DAC testing methods- Testable memory design –Reduced Functional Faults-MARCH and MAT+ algorithm. Analog and Mixed signal tests.UNIT-IV: Delay test - Path delay test and fault models - Transition faults - delay test methodologies - practical consideration - IDDQ testing - Testing methods - Limitations of IDDQ testing - DFT IDDQ.UNIT-V: DFT - Scan Design - Partial scan design - BIST- TPG for BIST - output response analysis, BIST Architectures- Random Logic BIST
947	MTVD-202	Digital VLSI Design	2013	UNIT-I: MOS structure capacitanceDesign logic gates using NMOS and PMOS and CMOS devices-Stick Diagram. UNIT-II: Modeling of MOS Transistor using modeling technique-various model CMOS Inverter. Performance of propagation delay sizing inverter consumption-static consumption .UNIT-III: Basic Concepts-LEVEL1-LEVEL2-LEVEL3 comparison. Static CMOS inverterEvaluating the Robustness of CMOS inverter.UNIT-IV: Design techniques to reduce switching activity - Radioed logic-DC VSL - pass transistor logic - Differential pass transistor logic - Sizing of level restorer-Sizing in pass transistor-Dynamic CMOS design-Basic principles.UNIT-V: Data Path Operations: Addition/Subtraction - Comparators- Zero/One Detectors- Binary Counters- ALUsMultiplication- Shifters- Memory elements- control: Finite-State Machines
948	MTVD-203	DSP Architectures And Applications	2013	UNIT-I: Common features of DSP processors, numeric representations in DSP processor, data path of a DSP processor, memory structures in DSP processors, VLIW architecture, special addressing modes in DSP processors.UNIT-II: Architecture of TMS320C5X Processors- Assembly Instructions- Addressing Modes- Pipelining and Peripherals.UNIT-III: Architecture of TMS320C3X- Instruction Set- Addressing Modes- Data Formats- Floating Point OperationPipelining and Peripherals.UNIT-IV:Introduction to Black fin processor- Architecture overview-processor core-addressing modes-instruction setsTargeted applications.UNIT-V:VLIW Architecture- SHARC- SIMD- MIMD Architectures- Application: Adaptive filters-DSP based biometry receiver
949	MTVD-204	System On Chip Design	2013	UNIT-I: Essential issues of SoC design – A SoC for Digital still camera – multimedia IP development : Image and video codecs.UNIT-II:SoC embedded software – energy management techniques for SoC design. UNIT-III:Design methodology for NOC based systems – Mapping concurrent application onto architectural platforms. UNIT-IV: Packet switched network for on-chip communication – energy reliability tradeoff for NoC’s – clocking strategies.UNIT-V: MP-SoC from software to hardware – NoC APIs – multilevel software validation for NoC – Software for network on chip
950	MTVD-205	Fundamentals And Application Of Mems	2013	UNIT-I: Microsystems and miniaturization, Working principle of micro system – Micro sensors, Micro actuators, MEMS with Micro actuators.UNIT-II: Substrate and wafer, silicon as a substrate material, silicon compound, silicon Piezo- resistors, Gallium Arsenide, quartz, Piezoelectric crystals, polymers and packaging Materials. UNIT-III: Fabrication Process – Photolithography, Ion implantation, Oxidation, Chemical vapor deposition (CVD), Physical vapor deposition, Deposition by Epitaxy, Etching.UNIT-IV:Micro system Design – Design consideration, process design, Mechanical design, Mechanical design using MEMS. UNIT-V: RF MEMS Switch, phase shifter, and smart sensors. Case study of MEMS pressure sensor Packaging
951	MTVD-301 (A)	ASIC Design	2013	UNIT-I: Combinational Logic Cell –Sequential logic cell – Data path logic cell – Transistors as Resistors – Transistor Parasitic Capacitance –Logical effort – Library cell design – Library architecture. UNIT-II:Altera Max DC & AC inputs and outputs – Clock & Power inputs – Xilinx I/O blocks. UNIT-III:Actel ACT –Xilinx LCA – Xilinx EPLD – Altera MAX 5000 and 7000 – Altera MAX 9000 – Altera FLEX – Design systems – Logic Synthesis – Half gate ASIC –Schematic entry – Low level design language – PLA tools – EDIF-CFI design representation. UNIT-IV: FPGA Partitioning- Partitioning Methods. Floorplanning and Placement: Floorplanning- Placement- Physical Design Flow.UNIT-V: -Programmable logic arraysTransistor chaining-Weinberger Arrays-Gate Matrix Layout-ID Compaction-2D compaction

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952	MTVD-302 (A)	Programming In HDL	2013	UNIT-I: System tasks and compiler directives, Modules and ports, Gate-level Modeling, Dataflow Modeling, Behavioral Modeling. UNIT-II: Tasks and Functions-example-useful modeling techniques-Timing and delays-Switch level modeling-user defined primitives. UNIT-III: Basic Concepts: Data Objects, Data Types, Operators, Concurrent and Sequential Assignment Statements, Different Styles of Modeling. UNIT-IV: Procedure and functions - examples-packages - Generic constants and statements - examples. Component and configuration . UNIT-V: Verilog synthesis-modeling tips for Verilog logic synthesis-combinational and sequential logic synthesis using VHDL-VHDL modeling restrictions.
953	MTVD-302 (B)	Embedded Wireless Sensor Networks	2013	UNIT-I: Embedded network systems – representation of signals – signal propagation – sensor principles. UNIT-II: Source detection and identification – digital communications – multiple source estimation and multiple access communications. UNIT-III: Networking – network position and synchronization services. UNIT-IV: Energy management – data management – articulation mobility and infrastructure. UNIT-V: Node architecture – network data integrity – experimental system design.
954	MTCS-102	Pattern Recognition	2013	UNIT I Pattern recognition overview: Pattern recognition, Classification and Description—Patterns and feature Extraction with Examples—Training and Learning in PR systems—Pattern recognition Approaches—Other Approaches to PR. UNIT II Statistical pattern recognition: Introduction to statistical Pattern Recognition—supervised Learning using Parametric and Non Parametric Approaches. UNIT III Linear discriminant functions and unsupervised learning and clustering: Introduction—Discrete and binary Classification problems—Techniques to directly Obtain linear Classifiers -- Formulation of Unsupervised Learning Problems—Clustering for unsupervised learning and classification. UNIT IV Neural pattern recognition : Introduction to Neural networks—Feedforward Networks and training by Back Propagation—Content Addressable Memory Approaches and Unsupervised Learning in Neural PR. UNIT V Syntactic pattern recognition: Overview of Syntactic Pattern Recognition—Syntactic recognition via parsing and other grammars—Graphical Approaches to syntactic pattern recognition—Learning via grammatical inference. 1. Robert Schalkoff, "pattern Recognition: statistical , structural and neural approaches, John wiley & sons , Inc,1992. 2. Earl Gose, Richard johnsonbaugh, Steve Jost, Pattern Recognition and Image Analysis, Prentice Hall of India, Pvt Ltd, new Delhi. 3. R.O.Duda, P.E.Hart & D.G Stork, Pattern Classification 2nd Edition, J.Wiley Inc 2001.
955	MTCS-103	High Performance Computer Architecture	2013	UNIT I Introduction: review of basic computer architecture, quantitative techniques in computer design, measuring and reporting performance. UNIT II CISC and RISC processors. Pipelining: Basic concepts, instruction and arithmetic pipeline, data hazards, control hazards, and structural hazards, techniques for handling hazards. Exception handling. UNIT III Pipeline optimization techniques. Compiler techniques for improving performance. Hierarchical memory technology: Inclusion, Coherence and locality properties; Cache memory organizations, Techniques for reducing cache misses; Virtual memory organization, mapping and management techniques, memory replacement policies. UNIT IV Instruction-level parallelism: basic concepts, techniques for increasing ILP, superscalar, super-pipelined and VLIW processor architectures. Array and vector processors. Multiprocessor architecture: taxonomy of parallel architectures. UNIT V Centralized shared-memory architecture: synchronization, memory consistency, interconnection networks. Distributed shared-memory architecture. Cluster computers. Non von Neumann architectures: data flow computers, reduction computer architectures, systolic architectures. 1. John L. Hennessy and David A. Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann. 2. John Paul Shen and Mikko H. Lipasti, Modern Processor Design: Fundamentals of Superscalar Processors, Tata McGraw-Hill 3. M. J. Flynn, Computer Architecture: Pipelined and Parallel Processor Design, Narosa Publishing House 4. Kai Hwang, Advanced Computer Architecture: Parallelism, Scalability, Programmability, cGraw HILL

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956	MTCS-104	Advance Algorithm Design & Analysis	2013	<p>UNIT I Introduction and basic concepts complexity measures, worst and average case complexity functions, problem complexity. Algorithm design principles : divide and conquer and recursive algorithms, greedy problem complexity. UNIT II Sorting And Selection Problems : -Finding maximum, minimum and minimum K largest elements in order and sorting by selection, lower bounds. UNIT III Searching and set manipulation – Path lengths in binary trees, optimality of binary search in worst-case and average-case. UNIT IV Union-Find Problems – Tree representation of set weighted union and path compression – analysis and application. UNIT V Algebraic Problems – Winograd’s and Strassen’s matrix multiplication algorithms and applications to related problems. 1. Horowitz, Sahni, Rajasekaran, “Computer Algorithms”, Galgotia, 2. Aho, Hopcroft, Ullman, “Data Structures and Algorithms”, Pearson Education P 3. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson P 4. Gilberg, Data structures Using C++, Cengage 5. Tanenbaum A.S., Langram Y, Augestien M.J., “Data Structures using C &amp; C++”, Prentice Hall of India, 2002</p>
957	MTCS-105	Distributed Systems	2013	<p>UNIT I Overview of distributed file system: Introduction to distributed file system-Design issues of DFS-Trends in distributed file system-Peer to Peer networks-characteristics of peer to peer networks. UNIT II Designing file system in distributed networks: Designing Distributed file system(DFS)-DFS Scenarios Features of DFS-Feature requirement of DF UNIT III Concepts related to file sharing in manet :Issues in sharing files in MANET-Data replication-Issues in data replication-Pessimistic replication-primary copy tokens ,voting-Optimistic replication- replica state ,version ,time stamping—advantages of optimistic replication-Replication models-Master slave model ,Client server model ,peer to peer model. UNIT IV Performance issues of file sharing in manet: System model-mobility patterns- assumptions-File accessing-file replica management-replica replacement policies-Maintaining replacement consistency Performance issues-performance metrics-Factors affecting performance. UNIT V Related work: A special purpose peer to peer file sharing system for MANET-A distributed service discovery model for MANET-Peer to Peer file sharing over MANET-,Efficient peer to peer information sharing over mobile ad hoc networks-Cluster based replication for large scale MANET-Trusted application centric ad hoc networks. 1. Andrew S Tanenbaum, "Distributed Operating Systems", Pearson Education India, 2001 2. Mukesh Singhal, Niranjn G Shivratri, "Advanced Concepts in Operating Systems", McGraw Hill International, 1994. 3. Pradeep K Sinha, "Distributed Operating Systems Concepts and Design ", PHI, 2002 4. A Distributed File System for Mobile Ad-hoc Networks Joˆao Pedro Faria Mendon,ca Barreto (Licenciado) funded by Microsoft research 5. Hassan Artail1, Member, IEEE, Khaleel Mershad, and Hicham Hamze, "DSDM: A Distributed Service Discovery Model for MANETS",IEEE Transactions on Parallel and Distributed Systems,March 2008.</p>

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958	MTCS-201	Advanced Computer Networking	2013	<p>UNIT I Introduction to computer networks; telephone networks, networking principles; multiple access, multiplexing FDM, TDM, SM; local area networks Ethernet, token ring, FDDI. UNIT II Switching circuit switching, packet switching, multicasting; scheduling performance bounds, best effort disciplines, naming and addressing, protocol stack, SONET/SDH; ATM networks AAL, virtual circuits, SSCOP UNIT III Internet addressing, routing, end point control; Internet protocols IP, TCP, UDP, ICMP, HTTP; traffic management models, classes, scheduling. UNIT IV Control of networks QoS, static and dynamic routing, Markov chains, queuing models, Bellman Ford and Dijkstra's algorithms, window and rate congestion control, large deviations of a queue and network, open and closed loop flow control, control of ATM networks. Mobile IP, Voice over IP (VoIP), VPNs, Network Security. UNIT V Congestion Control: Control vs. Avoidance, Overview of Algorithms, Congestion in the Internet. Management: Quality of Service (QoS), network vs. distributed systems management, Protocols, web based management. Special topics in design of computer networks. ext Books and References:</p> <ol style="list-style-type: none"> <li>1. J. Walrand and P. Varaya, High Performance Communication Networks, Harcourt Asia (Morgan Kaufmann), 2000.</li> <li>2. S. Keshav, An Engineering Approach to Computer Networking, Pearson Education, 2004 L. Garcia and I. Widjaja, Communication Networks: Fundamental Concepts and Key Architectures, Tata McGraw Hill, 2000.</li> <li>3. J. F. Kurose and K. W. Ross, Computer Networking:A Top Down Approach Featuring the Internet, Pearson Education, 2001</li> </ol>
959	MTCS-202	Real Time Systems	2013	<p>UNIT I Introduction, Modeling Timing constraints, Scheduling Real-Time Tasks: Types of Schedulers. UNIT II Table-driven, Cyclic, EDF, RMA, Handling Resource sharing among real-time tasks, Scheduling Real Time Tasks in Multiprocessor and D UNIT III Commercial Real-time operating systems: General concepts, Unix and Windows as RTOS, Real-time middleware UNIT IV Survey of commercial RTOS, Real-Time Communication , Real-time channel, Packet scheduling, Real Time MAC pr UNIT V Real-Time Databases, Architecture and software engineering issues, Case studie 1. Rajib Mall, "Real-Time Systems: Theory and Practice," Pearson, 2008.</p> <ol style="list-style-type: none"> <li>2. Jane W. Liu, "Real-Time Systems" Pearson Education, 2001.</li> <li>3. Krishna and Shin, "Real-Time Systems," Tata McGraw Hill. 1999.</li> </ol>
960	MTCS-203	Advance Soft Computing	2013	<p>UNIT I Fundamental Concepts: - Introduction to Artificial Neural Networks (ANN). Learning Process: - error-correction learning, Hebbian learning, competitive learning, Boltzmann learning, the credit-assignment problem, supervised learning, and other learning techniques. UNIT II Single neuron/ Perceptron networks: - training methodology, typical application to linearly separable problems. Multilayer Perceptron: - Back propagation algorithm, virtues and limitation of BP algorithm, modifications to back-propagation. UNIT III Radial-basis function Networks – interpolation problem, Covers theorem, regularization networks, applications. Recurrent Networks. UNIT IV Introduction to Fuzzy systems, Membership function, Fuzzy relational operation, fuzzy IF THEN rules, Sugeno and Mamdani type systems, Adaptive Neuro-Fuzzy sytems, training methods. UNIT V Application of ANN and Fuzzy systems to non-stationary time series prediction; pattern classification; control; communication engineering; system identification and pattern classification.</p> <ol style="list-style-type: none"> <li>1. S. Haykin, Neural Networks, A Comprehensive Foundation; Pearson Education, India (The book is also published by Prentice Hall of India), 2008 (ISBN- 81-203-2373-4).</li> <li>2. M. T. Hagan, Howard B. Demuth, Mark H. Beale, Neural Network Design; (ISBN: 0-9717321-0 8); Thomson 2002</li> <li>3. Jang, Sun and Mizutani, Neuro-Fuzzy and Soft-Computing – A computational approach to</li> </ol>



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
961	MTCS-204	Distributed And Parallel Databases	2013	<p>UNIT I Introduction: Parallel database system, Distributed database system, Architectures for Parallel Databases, Parallel Query Evaluation, Data Partitioning, UNIT II Parallelizing Sequential Operator Evaluation Code, Parallelizing Individual Operations, Bulk Loading and Scanning, Sorting, Joins. UNIT III Distributed Databases, Introduction to DBMS, Architecture of DDBs, Storing data in DDBs, Fragmentation, Replication, Distributed catalog management, Distributed query processing, UNIT IV Distributed concurrency control and recovery: Concurrency Control and Recovery in Distributed Databases, Lock management can be distributed across sites in many ways. UNIT V Distributed Deadlock, Distributed Recovery</p> <ol style="list-style-type: none"> <li>1. Raghu Ramakrishnan, Johannes Gerhke, "Database Management Systems" McGraw Hill.</li> <li>2. Decision support &amp; database system –Efreem G. Mallach.</li> <li>3. Datawarehousing fundamental – Paulraj Ponniah Wiley.</li> <li>4. Introduction to data mining with case studies – G.K. Gupta.</li> <li>5. Elmasri and Navathe, "Fundamentals of Database Systems", Person Education.</li> <li>6. Korth, Silberchatz, Sudarshan, "Database System Concepts" Mc Graw Hill.</li> <li>7. Peter Rob and Coronel, "Database Systems, Design, Implementation and Management", Thomson Learning.</li> <li>8. Data Warehousing (OLAP) S. Nagabhushana New Age.</li> </ol>
962	MTCS-205	Advance Network Security	2013	<p>UNIT I Introduction to cryptography: Attacks, Services, and Mechanisms, Security Attacks, Security Services, A Model for Internet work Security. UNIT II Conventional Encryption: Classical and Modern Techniques, Conventional Encryption: Algorithms Triple DES, International Data Encryption Algorithm, Blowfish, RC5, CAST, RC2, Characteristics of Advanced Symmetric Block Ciphers. UNIT III Confidentiality Using Conventional Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.; Public-Key Cryptography Principles of Public-Key Cryptosystems, The RSA Algorithm, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography. UNIT IV Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs. UNIT V Hash and Mac Algorithms ( MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA-1), RIPEMD, HMAC), Digital Signatures and Authentication Protocols and Web Security. 1. W. Stalling, Cryptography and Network Security: Principles and Practices, 4th Ed, 2005</p> <ol style="list-style-type: none"> <li>2. B. A. Forouzan, Cryptography and Network Security, McGraw Hill, 2nd Ed, 2004.</li> <li>3. J. Hershey, Cryptography Demystified, McGraw Hill, 2003</li> <li>4. R E Smith, Internet Cryptography, Addison Wesley</li> <li>5. J. Knudsen, Java Cryptography, O'Reilly, 1998.</li> </ol>
963	MTCS-301	Fault Tolerant Computing Systems	2013	<p>UNIT I Introduction: Computer and Computation Distribution, System models and Fault models. Test generation for combinational circuits, sequential circuits and Fault simulation. UNIT II Fault Tolerance Concepts- Recovery in time, Fault detection techniques, Modeling Faulttolerant systems - Rollback modular redundancy and Exception Handling. UNIT III Fault Tolerant in Real time Systems - Architecture of Fault - tolerant computers generalpurpose commercial systems - High availability systems - Critical computations UNIT IV Fault Tolerant multiprocessor - Communication Architectures, Shared memorY UNIT V Interconnections, loop architectures, Tree Networks, Graph Network and in Binary cube interconnection. Fault Tolerant Software - Design of fault Tolerant software - Reliability Models, Construction of acceptance tests, validation of Fault tolerant software. 1. Israel &amp; Krishnan, "Fault Tolerant Systems" Elsevier Publications, 2007.</p> <ol style="list-style-type: none"> <li>2. D. K. Pradhan, "Fault Tolerant computing - Theory and Techniques "Prentice Hall.Inc.1986.</li> <li>3. Levi &amp; Agrawala, "Fault Tolerant Systems Design, McGraw hill, 1994.</li> <li>4. MA. Breuer and A.D.Friedman, "Diagnosis and Reliable design of Digital Systems", Computer Sci. Press, 1976.</li> </ol>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
964	MTCS-302	Statistical Data Mining	2013	<p>UNIT I Introduction to Data mining: Motivation for Data Mining, its importance, Role Data in Data Mining, Data Mining functionalities, patterns in data mining UNIT II Type of patterns, Classification of Data Mining Systems, Major issues in Data Mining; Data Warehousing and OLTP technology for Data Mining, Data Mining Languages, and System Architectures UNIT III Concept Description: Characterization and Comparison, Mining Association Rules in Large Databases, Classification and Prediction, Cluster Analysis, Mining Complex Data. UNIT IV Applications and Trends in Data Mining Characteristics of data warehouse, Data Mart, Online Analytical Processing, OLAP tools, Data warehouse Architecture, Organizational Issuer. UNIT V Tools for Data warehousing, Performance consideration, case studies. Special topics in data mining and data ware housing. 1. J. Han &amp; M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Ed,2006.</p> <p>2. M. J. A. Berry and G. Linoff, Mastering Data Mining: The Art and Science of Customer Relationship Management, Wiley Computer Publishing, 2000.</p> <p>3. P. Adriaans &amp; D. Zantinge, Data Mining, Addison Wesley, 1996.</p> <p>4. R. Mattison, Data Warehousing: Strategies, Tools and Techniques, Mc Graw Hill, 1996.</p> <p>5. P. Ponniah, Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals,Wiley, 2001.</p>
965	MBT- 511	CELL BIOLOGY	2012	<p>Unit 1 : Cell: Molecular, structural/functional organization. The central dogma: Law of DNA-, chromosome-and gene constancy.Evidence that DNA is the genetic material Structure of DNA, RNA and polypeptide. Unit 2 : Chemical bonds Building blocks of macromolecules: amino acids, purine and pyrimidine bases, fatty acids and sugars, and small molecules of biological importance: vitamins and minerals, proteins, carbohydrates and lipids. Biochemical structures: proteins, nucleic acids, and lipids. Secondary structure, tertiary structure. Ramachandran plot, structure- function correlations, anatomy of biological macromolecules. Unit 3 : DNA damage, repair and recombination. DNA modification enzymes-methylation, demethylases, DNases, gyrases, topoisomerase, restriction endonucleases. RNA transcription-phage, E.coli and eukaryotes . Unit 4 Structure and organization of genome: structure of globin, insulin, IgG and r DNA genes,structure and function of chromatin, DNA replication. Sequencing: nucleic acids and proteins. Transcription. Unit 5: Cell dynamics, cytoskeleton and cell surface. Extracellular matrix</p>
966	MBT- 512	BIOMOLECULES AND METABOLISM	2012	<p>UNIT I : Chemical foundations of Biology -pH, pK, acids, bases, buffers, weak bonds, covalent bonds. Principles of thermodynamics. UNIT II : Amino acids and peptides-classification, chemical reactions and physical Properties.Sugars - classification and reactions. Heterocyclic compounds-and secondary metabolites in living systems . UNIT III: Physical techniques in proteins, nucleic acids and polysaccharides structure analysis (UV, IR, MMR, LASER, MASS, Fluorescence spectroscopy, Differential calorimetry, X - ray Crystallography, Ultra Centrifugation, Electron cryomicrography, Scanning Tunneling microscopy . UNIT IV: Lipids,Polysaccharides, Protein folding.UNIT V: Water and its properties, enzymes coenzymes, metabolism of carbohydrate, amino acids and lipids, in born errors of metabolism. Bio-energetics and oxidative phosphorylation. Blood clotting .</p>
967	MBT- 513	MICROBIAL PHYSIOLOGY AND GENETICS	2012	<p>UNIT I : History and Scope of Microbiology, Major characteristics used in microbial taxonomy . UNIT II : Nutritional requirements of micro-organisms, mode of nutrition, phototrophy, mixotrophy, saparophytic, symbiotic and parasitic organisms, microbial growth and population kinetics, methodology for measuring growth and growth regulation . UNIT III: Glycolytic pathways, tricarboxylic acid cycle, energy production, oxidative phosphorylation, energetics of chemolithotrops and autotrophs and transport . UNIT IV: Gene transfer mechanism in microbe's transformation, transduction, conjugation, and Recombination.UNIT V: Basic concepts, action of pathogens, human pathogenic viruses and bacteria, Gram-positive and Gram- negative Bacilli of medical importance. Miscellaneous bacterial agents of disease; DNA and RNA viruses and their diseases, Fungal diseases. Life cycle of some important pathogens like- Malaria, hepatitis, filaria, Kalazar and AIDS .</p>
968	MBT- 514	IMMUNOLOGY	2012	<p>UNIT I : Introduction Phylogeny of Immune System. UNIT II : Antibody structure and function Antigen - antibody interactions Major histocompatibility complex BCR &amp; TCR, generation of diversity. Complement system Cells of the Immune system: Hematopoiesis and differentiation. UNIT III : Lymphocyte trafficking, B-lymphocytes, T-lymphocytes, Macrophages, Dendritic cells, Natural killer and Lymphokine . UNIT IV : Cytokines and their role in immune regulation:T-cell regulation, HHC restriction Immunological tolerance Cell - mediated cytotoxicity; Mechanism of T cell and NK cell mediated lysis, antibody dependent cell mediated cytotoxicity, macrophage mediated cytotoxicity Hypersensitivity. UNIT V : Autoimmunity Transplantation Immunity to infectious agents</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
969	MBT- 521	BIOINFORMATICS	2012	UNIT I : An overview of computers, microcomputers, VDUs and printer, programming, Algorithms. Languages and packages: Introduction to MS Office, MS Access, Front Page and introduction to C, Java and SQL. UNIT II : Introduction to PERL: Scalar variables, strings and numbers, Assignment statements, Arrays, Hashes, Operators, Input from file, Standard Input, Conditional and logical operators, loops, I/O, Input from file named in command line, Regular expression, Pattern matching, Meta symbols, Pattern modifiers, Subroutines. UNIT III : Biological Sequence Databases UNIT IV : Sequence Comparison Methods. UNIT V: Database Search Algorithms
970	MBT- 522	TOOLS AND TECHNIQUES IN BIOTECHNOLOGY	2012	UNIT I : Principles and applications, simple, compound, phase-contrast and fluorescent microscopes. Electron microscopy. UNIT II: Electromagnetic spectrum, Beer Lambert's Law. Photometry, UV/VIS Spectrophotometry, Infrared spectroscopy, Atomic absorption spectroscopy, ESR and NMR spectroscopy. Mass spectroscopy Electromagnetic spectrum, Beer Lambert's Law. Photometry, UV/VIS Spectrophotometry, Infrared spectroscopy, Atomic absorption spectroscopy, ESR and NMR spectroscopy. Mass spectroscopy . UNIT III : Introduction and types of chromatography, paper, thin layer, gas, Gel permeation, ion-exchange, HPLC, FPLC and affinity chromatography and instrumental details of each. UNIT IV: Paper and gel electrophoresis, Polyacrylamide gel electrophoresis (native and SDS), Agarose gel electrophoresis, Blotting.UNIT V : Nature and types of radiations, preparation of labelled biological samples. Detection and measurement of radioactivity, GM counter, Scintillation counter, Autoradiography.
971	MBT- 523	GENETIC ENGINEERING	2012	UNIT : I The recombinant DNA Technology . UNIT II : Design and characteristics of expression vectors for cloning in prokaryotes and factors that affect expression.Cloning in Yeast. UNIT III : Methods for Constructing rDNA and cloning: Inserts; vector insert ligation; infection,transferring and cloning.Methods for screening and selection of recombinant clones. UNIT IV : Fine anatomy of DNA segment- General principle of chemical and enzymatic methods of nucleotide sequence analysis and advantages of automatic gene sequencers . UNIT V : Principles and applications of Blotting techniques- Southern, Northern, Western and Eastern blotting; Polymerase Chain reaction and types
972	MBT- 524	BIOPROCESS ENGINEERING AND TECHNOLOGY	2012	UNIT I :Introduction to bioprocess engineering, bioreactors, isolation, preservation and maintenance of industrial microorganisms, kinetics of microbial growth and death, media formulation for industrial fermentation, Air and media sterilization. Designing of a fermenter/Bioreactor. UNIT II: Types of fermentation process, analysis of batch fed batch and continuous bioreactions, biotransformation, stability of microbial reactors, analysis of mixed microbial populations, specialized bioreactors . UNIT III:Downstream processing . UNIT IV : Industrial production of chemicals. UNIT V: Food Biotechnology.
973	MBT- 531	ANIMAL BIOTECHNOLOGY	2012	UNIT I : Laboratory requirements for animal cell culture: Sterile handling area. Sterilization of different materials used in animal cell culture, Aseptic concepts. UNIT II: Media and reagents. UNIT III: Different types of cell cultures, Trypsinization, Cell separation, Continuous cell lines, Suspension culture, Organ culture.Development of cell lines, Characterization and maintenance of cell lines, stem cells, Cryopreservation, Common cell culture contaminants. UNIT IV: Stem cell research. UNIT V: Gene transfer technology in animals.
974	MBT- 532	PLANT BIOTECHNOLOGY	2012	UNIT 1 :Introduction to the techniques of plant tissue culture. Concept of cellular totipotency, Nutritional requirements, single cell culture, micro-propagation, somaclonal variation, somatic embryogenesis and production of embryoids. UNIT 2 :Haploid and double haploid production, Protoplast isolation and culture. Somatic hybridization and cybrid production and their applications in crop improvement. UNIT 3: Basis of tumor formation, hairy roots, features of Ti and Ri plasmids, mechanisms of DNA transfer, role of virulence genes, use of Ti and Ri as vectors, binary vectors, use of 35S and other promoters, genetic markers, use of reporter genes, methods of nuclear transfer, particle bombardment, electroporation, microinjection, transformation of monocots. UNIT 4 :Photoregulation and phytochrome regulation of nuclear and chloroplast genes expression, Molecular biology of light and dark reactions of photosynthesis, Genetics of nif genes, Molecular mechanism of nitrogen fixation. UNIT 5: Plant secondary metabolites.
975	MBT- 533	HUMAN GENETICS AND HUMAN GENOME	2012	UNIT I : History and development of human genetics. UNIT II :Somatic cell genetics ,Tissue culture techniques. UNIT III : Human genome mapping – genetic mapping, physical mapping-restriction fragment length polymorphism, pulse field gel electrophoresis, yeast artificial chromosomes,bacterial artificial chromosomes, P1 derived artificial chromosomes, expressed sequence tags, sequence-tagged sites, microsatellites and single nucleotide polymorphisms. UNIT IV : Inherited human diseases-single gene diseases, complex traits. Identification and isolation of disease genes. UNIT V : Yeast two-hybrid system. Statistical methods for genetic analysis of complex traits. Cancer genetics. Immunogenetics; pre-natal diagnosis-chorionic villus sampling, amniocentesis Pre-implantation diagnosis
976	MBT- 534	SOCIAL, ETHICAL, LEGAL AND MANAGEMENT ISSUES	2012	UNIT I : IPR . UNIT II: Social- genetic discrimination: insurance and employment, human cloning, foeticide, sex determination. Religious consideration in stem cell therapy. UNIT III : Ethical: somatic and germ line gene therapy, clinical trials, the right to information, ethics committee function. UNIT IV : Biosafety. UNIT V: Management-Planning, Organizing, Leading & Controlling; Concepts and characteristics of information; Importance of MIS; Communication - type, channels & barriers; Financial management, planning and control.

  
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977	MBT- 541	ENZYME AND ENZYME TECHNOLOGY	2012	UNIT : I Enzyme classification & nomenclature of enzymes (IUB); extraction, isolation and purification of enzyme by various methods. UNIT II : Mechanism of enzyme action - concept of active site and energetic of enzyme substrate complex formation - specificity of enzyme action; kinetics of single substrate reactions -turnover number -estimation of Michaelis - Menten's parameters; multi-substrate reactions - mechanisms & kinetics; allosteric regulation of enzymes . UNIT III: Enzyme inhibitions - kinetics of competitive, non-competitive & uncompetitive inhibitions; nucleophilic & electrophilic attack; role of metal ions in enzyme catalysis. UNIT IV : Immobilized enzymes. UNIT V : Structure and function of coenzyme.
978	MBT- 542	STEM CELL BIOLOGY & SOMATIC AND GERM CELL ENGINEERING	2012	UNIT I :Introduction to stem cells - Embryonic Stem Cells, Adult stem cells, Molecular basis Pluripotency and its application, Stem cell niches, Stem cell renewal, Cell cycles regulators in stem cells. UNIT II: Epigenetic mechanism of cellular memory, Germ line Stem Cells, Stem Cells and Cloning, Nuclear cloning and Epigenetic reprogramming. UNIT III: Tissue and organ development . UNIT IV : Applications- Neurons Stem Cells and Potential Therapies, Spinal cord injury, Strategies Using Cell Therapy to Induce Cardiomyocyte Regeneration in Adults with Heart Disease, Stem cell therapy: Current State and Future Perspectives, Embryo culture, transplantation and teratogenesis. UNIT V: Teratomas.Organ culture. Artificial blood.Amniocentesis-karyology and biochemical diagnostics-genetic counselling.Mammalian embryo fusion-allopheny. Transgenesisgene transfers, knock-outs. Somatic cell fusion and somatic cell genetics
979	MSB- 511	BACTERIOLOGY, VIROLOGY & GENERAL MICROBIOLOGY	2012	Unit 1 : Bacterial taxonomy; Identification of bacteria, General characters of Rickettsia and Chlamydia, Diseases, Mode of nutrition in bacteria. Unit 2 : General account of sterilization culture media, pure culture techniques; A general idea about bacterial toxins and enzymes; Bacteriophage; Bacterial diseases. Unit 3 : General properties and evolution of viruses; Cultivation of virus and viral assay; Transmission of plant viruses and control measures, Oncogenic viruses and tumorigenesis; Viral diseases. Unit 4 Biological nitrogen fixation, Fermentation technology, Mycoplasma. Unit 5: Microbial conversion of waste product with particular reference to alcohol and biogas, General account of Immunity, properties of antigens and antibodies, Allergy and types of allergies, Mycotoxins and their harmful effects
980	MSB- 512	BIOLOGY AND DIVERSITY OF FUNGI AND PLANT PATHOLOGY	2012	UNIT I : Recent trends on the classification of fungi with reference to morphological and paramorphological criteria. UNIT II: Comparative study of following sub-division; Zygomycotina: Mucor, Rhizopus, Syncephalastrum, Ascomycotina: Tapharina, Emericella, Penicillium, Chaetomium, Morchella. UNIT III :Comparative study of following sub-division; Basidiomycotina: Puccinia, Melampsora, Ustilago, Polyporus, Cyathus, Deuteromycotina: Fusarium, Cercospora, Colletotrichum. Mushroom cultivation: Mycorrhizal application in agriculture and forestry; Fungal cytology and genetics: Heterothallism, heterokaryosis, parasexual cycle, mutation. UNIT IV Symptomatology in fungal, bacterial and viral infection of plants, Etiology and control of the following crop diseases. UNIT V Role of enzyme and toxins in pathogenesis; Disease control by physical, chemical and biological methods, resistant varieties; Crop rotation, plant quarantines, seed certification
981	MSB- 513	BIOLOGY AND DIVERSITY OF ALGAE, BRYOPHYTES AND LICHENS)	2012	UNIT I : Comparative survey of important systems of classification of algae; Criteria for algal classification and modern trends; Diagnostic features of algal phyla, range of thallus and reproductive diversity. UNIT II : Comparative account of algal pigments ; light microscopic structure, ultra structure and function of Cell wall, flagella, chloroplast, pyrenoids and eyespots and their importance in taxonomy. Study of Cyanophyta, Chlorophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta up to the ordinal level with reference to the following genera: Anabaena, Gonium, Chlorella Enteromorpha, Bulbochaete, Closterium, Acetabularia, Nitella, Botrydium, Navicula, Cyclotella, Batrachospermum and Gracillaria . UNIT III:General characteristics of the division: Diophyta, Chrysophyta and Cryptophyta. Distribution of algae in soil, fresh water and marine environment, role of algae in soil fertility, productivity in fresh water and marine environment algae role in fisheries, algae in symbiotic association, algae in polluted habitats . UNIT IV: Origin of Bryophytes: Primitive vs. advanced characters, derived features: evolutionary lines, Classification. Comparative morphological, anatomical and cytological studies of gametophyte and sporophyte of Calobryales
982	MSB- 514	BIOLOGY AND DIVERSITY OF PTERIDOPHYTES AND GYMNOSPERMS	2012	UNIT I : Evolution of Pteridophytes; Soral and stelar evolution ; Classification of Pteridophytes. UNIT II : Comparative organography, systematics; reproduction and phylogeny of the following: Psilophytales, Rhyniales, Zosterophyllophytales; Psilotales; Lycopdiales, Lepidodendrales Sphenophyllales Ophioglossales, Osmundales, Filicales, Marsiliales, Salviniiales. UNIT III : Speciation and evolutionary trends in ferns; Cytology; Polyploidy and hybridization; Pteridophytic life - cycle, apospory, vegetative apomixes. UNIT IV : SMorphology and anatomy of vegetative and reproductive organs, fossil representatives and interrelationship of Cycadales, Ginkgoales, Coniferales, Taxales, Ephedrales, Welwitschiales and Gnetales. UNIT V : Structure and evolution of archegonium in Bryophytes, Pteridophytes and Gymnosperms Distribution of living and fossil Gymnosperm in India.

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983	MSB- 521	ANGIOSPERM ANATOMY, EMBRYOLOGY AND PALYNOLOGY	2012	UNIT I : Origin, growth, differentiation and ultra structure of cell and tissue, fine structure of plasmodesmata, microtubules, microfibrils and secondary structure; Apical, lateral and intercalary meristems- their ultra structure and histochemistry, organogenesis. UNIT II : Nodal anatomy-nodal types and evolutionary consideration, Vascular cambium vs. cork cambium factors controlling their activity, periderm, lenticles, abscission, wound healing; Anatomy of monocotyledons and dicotyledonous seed and fruits, seed appendages, their anatomy structure and function. UNIT III : Microsporangium UNIT IV : Embryology and taxonomy. UNIT V : Development and evolution of pollen types; stereo and ultrastructure of exine, apertures, furrow. Palynology and taxonomy; Aerobiology and its application. Aeropalynology
984	MSB- 522	ANGIOSPERM MORPHOLOGY AND TAXONOMY)	2012	UNIT I : General concept of morphology, origin and evolution of flower. Co-evolution of flower, vis a vis pollinators; Origin and evolution of polypetaly, sympetaly, apetaly; monocy, diocy. Monocot flower. UNIT II: Stamens: origin and evolution from foliar to reduced condition, extension of connective beyond anthers; mono di and polyadephy; nectaries and nectar; Carpels. UNIT III : Role of floral anatomy in interpreting the origin and evolution of a flower and floral parts. Floral anatomy and taxonomy; Experimental study on flower. UNIT IV: Botanical exploration.UNIT V : Botanical nomenclature. ICBN, principles, articles, recommendation and amendments of code.
985	MSB- 523	WATER RELATIONS, GROWTH AND DEVELOPMENT	2012	UNIT : I Water relations of plants, Nernst equation and Donnan's potential. Role of ATPase as a carrier, co-transport (symport ) and counter transport (antiport). Ion channels, role of calmodulin. UNIT II : Photosynthesis. UNIT III : CAM pathway, Photorespiration. UNIT IV : Enzymes, Enzyme regulation . UNIT V : Chemical control of growth and morphogenesis, Bioassay of plant growth regulators and mode of action with reference to auxins; Gibberellins, cytokinins, abscisic acid and ethylene; Phytochrome.
986	MSB- 524	CYTOLOGY AND MOLECULAR BIOLOGY OF PLANTS)	2012	UNIT I :The plant cell, cytokinesis, Nucleus. UNIT II: Chromosome, Eukaryotic genome . organization, prokaryotic genome organization, variation in Chromosome and its significance . UNIT III:DNA: packaging of DNA, nucleosome, nuclear membranes, C-value paradox, cot curves, chemical structure. genetic code; DNA replication in prokaryotes and eukaryotes; Transcription, RNA splicing; Translation: Prokaryotic and eukaryotic gene regulation (Operon concept) . UNIT IV : Meiosis, Mitosis Chromosomal aberrations: Heteroploidy. UNIT V: Transposable elements and its molecular basis; Membrane structure and function, ATPase sites
987	MSB- 531	BIOCHEMISTRY AND METABOLISM IN PLANTS	2012	UNIT I : Lipid, Synthesis of carbohydrates from fatty acids; Protein: Amino acid structure and Biosynthesis; protein conformation, protein synthesis. UNIT II: TSecondary plant products, Shikimic acid pathway and phenolic compound synthesis. UNIT III: Cell wall components, Cellulose, Cyanogenesis. UNIT IV: DNA and RNA-DNA replication; Transcription in prokaryotes and eukaryotes, transcript modification; Regulation of translation . UNIT V: Nitrate metabolism in plants; Nitrogen fixation, Nitrogenase system; Ammonium assimilation, GS-GOGAT system.
988	MSB- 532	PLANT BREEDING	2012	UNIT 1 :Introduction: Objectives of plant breeding, important achievements and future prospects. Genetic variability and its role in plant breeding. UNIT 2 :Systems of reproduction in plants. UNIT 3: Hybridization. UNIT 4 :Breeding for resistance. UNIT 5: Mutation breeding, Role of mutations in Plant Breeding.
989	MSB- 533	PLANT BIOTECHNOLOGY: IN VITRO CULTURE, GENETIC ENGINEERING AND IPR ISSUE	2012	UNIT I : Concept and scope of Biotechnology; Techniques of tissue culture, cell culture and organ culture; Sterilization, culture media. UNIT II :Micropropagation, IPR. UNIT III : Biotransformation, Strategies of microbial strain improvement; The recombinant DNA concept and principle of cloning; Isolation and purification of DNA. UNIT IV : Restriction endonuclease, Blotting southern, northern and western; Selection and screening of recombinant clone; Cloning vehicles salient features: plasmid , cosmid & Ti plasmid. UNIT V : Single stranded DNA viruses CaMV Lambda phage vectors M13 vectors; Expression vectors; Cloning construction of genomic and DNA libraries.
990	MSB- 534	HERBAL TECHNOLOGY, INDUSTRIAL MICROBIOLOGY	2012	UNIT I : History of Medicinal plants. Traditional Medicinal systems: Ayurvedha, Siddha, Unani and Naturopathy. Definition of Drug . UNIT II: Pharmacognosy, Drug adulteration, Drug evaluation, Chemical evaluation, Physical evaluation and Biological evaluation. Phytochemical investigations. UNIT III : Cultivation, collection and preparation of natural drugs. UNIT IV : Industrial Microbiology- Industrial product of vinegar & citric acid. Industrial product of antibiotics; penicillin and streptomycin Microbes as a source of Single Cell protein (SCP). Mushrooms Dairy product from microorganisms; butter, yogurt and cheese. Biopesticides, Biofertilizer, Biopolymers, Bioremediation. UNIT V: Ethnobotany, Ethno Medicines, Ethnobotanical field methods.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
991	MSB- 541	CROP PATHOLOGY	2012	UNIT : I Introduction to crop pathology. UNIT II : Process of infection and pathogenesis . UNIT III: Defense mechanism in plants. UNIT IV : Transmission of plant disease,Plant disease management. UNIT V : Major diseases in plants (a) Cereals: Rice - blast disease, bacterial blight; Wheat - black rust disease. (b) Vegetables: Chilly - leaf spot; Ladies finger - vein clearing disease. (c) Fruits: Banana - bacterial leaf blight, leaf spot; Mango - Anthracnose; Citrus - bacterial canker; Papaya – mosaic. (d) Spices: Ginger - rhizome rot; Pepper - quick wilt; Cardamom - marble mosaic disease. (e) Oil seeds: Coconut - grey leaf spot, bud rot disease. (f) Rubber yielding: Hevea braziliensis - abnormal leaf fall, powdery mildew. (g) Sugar yielding: Sugarcane - red rot; root knot nematode. (h) Cash crops: Arecanut - nut fall disease. (i) Beverages: Tea - blister blight; Coffee - rust
992	MSB- 542	ECOLOGY- CLIMATOLOGY, SOIL SCIENCE AND AUTECOLOGY	2012	UNIT I :Definition, scope and concept of plant ecology; History of ecology and relation of ecology with other disciplines. Principles of ecology. UNIT II: Light and temperature as ecological factors; Precipitation and Relative Humidity as ecological factors; Measurement and analysis of light, temperature, Precipitation and relation Humidity; Importance of water as an important factor on the life of plants. UNIT III: Origin, development and formation of soil. Soil profile; Classification of soil; Effects of soil environment of plants; Chief soil types of India . UNIT IV : Biotic components of an ecosystem; Interrelation of various organisms; Population ecology, Natality, Mortality, Age distribution; Concept of carrying capacity. UNIT V: Morphological, anatomical and physiological relation of plants with their environment; Plant indicators; Ecotypic and Ecadic differentiation; Physical and physiological dryness; <u>Geneecology</u> .
993	MCH- 511	INORGANIC CHEMISTRY	2012	Unit 1 : Metal-Ligand Equilibrium in Solution. Unit 2 : Reaction Mechanism of Transition Metal Complexes I. Unit 3 : Reaction Mechanism of Transition Metal Complexes II. Unit 4 Metal-Ligand bonding . Unit 5: HSBA Theory.
994	MCH- 512	ORGANIC CHEMISTRY-I	2012	UNIT I : Structure and reactivity.UNIT II: Chirality. UNIT III :Aromaticity. UNIT IV Aliphatic nucleophilic substitution. UNIT V Stereochemistry of elimination reactions.
995	MCH- 513	PHYSICAL CHEMISTRY-I	2012	UNIT I : Introduction to Exact Quantum Mechanical Results. UNIT II : Variational and perturbation methods. Applications of variation method and perturbation theory to the Helium atom. Molecular Orbital Theory. UNIT III: Chemical Thermodynamics. UNIT IV: Statistical Thermodynamics. UNIT V:Macromolecules.
996	MCH- 514	Group Theory & Vibrational Spectroscopy	2012	UNIT I : Symmetry and Group theory in Chemistry. UNIT II : Microwave Spectroscopy. UNIT III : Infrared-Spectroscopy. UNIT IV : Vibrational Spectroscopy Symmetry, shapes and molecular vibrations of AB <sub>2</sub> , AB <sub>3</sub> , AB <sub>4</sub> , AB <sub>5</sub> and AB <sub>6</sub> , Raman Spectroscopy. UNIT V : <u>Ultraviolet and Visible spectroscopy</u> .
997	MCH-515(A)	MATHEMATICS FOR CHEMISTS	2012	UNIT I : Vectors, dot, cross and triple products etc. gradient, divergence and curl, Vector Calculus, Matrix Algebra. UNIT II : Differential Calculus. UNIT III : Integral calculus UNIT IV : Elementary Differential equations. UNIT V: Permutations and <u>Combinations</u> .
998	MCH-515(B)	BIOLOGY FOR CHEMISTS (Note:-For students without Biology in B.Sc.)	2012	UNIT I : Cell structure and functions. UNIT II : Carbohydrates. UNIT III :Lipids UNIT IV : Amino acids, Proteins. UNIT V: Nucleic acid.
999	MCH- 521	INORGANIC CHEMISTRY -II	2012	UNIT I : Electronic Spectra and Magnetic Properties of Transition Metal Complexes . UNIT II : Metal $\pi$ -Complexes. UNIT III : Magnetic properties of transition metal complexes. UNIT IV : Boranes- Classification, preparation, reactivity, bonding and topology of Boranes, carboranes, metalboranes and metallocarbonaes. UNIT V: Optical rotation dispersion and circular dichroism.
1000	MCH- 522	ORGANIC CHEMISTRY -II	2012	UNIT I : Common organic reactions and their mechanisms base catalysed reactions, Stork Enamine reaction, acid catalysed reactions, reactions of carboxylic acids and their derivatives. UNIT II: Eletrophilic aromatic substitution. UNIT III : Pericyclic reactions:conservation of molecular orbital symmetry, electrocyclic reactions, cycloaddition, sigmatropic rearrangements, the ene reaction, Mobius – Huckel analysis . UNIT IV: Molecular orbital symmetry.UNIT V : FMO approach and perturbation of molecular (PMO) approach for the explanation of sigma tropic rearrgements under thermal and photochemical conditions. suprafacial and antarafacial shifts of H Sigmatropic shift involving carbon moieties, retention and inversion of configurations.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1001	MCH- 523	PHYSICAL CHEMISTRY -II	2012	UNIT : I Chemical kinetics: Empirical rate laws, Arrhenius equation, theories of reaction rates, determination of reaction mechanisms. Kinetics of inorganic mechanisms . UNIT II : Surface Chemistry and Catalysis. UNIT III : Complex Reactions: Opposing reactions, Complex reactions, Parallel reactions , kinetics of free radical polymerization Fast reactions: Experimental techniques for fast reactions viz., flow method, relaxation method, flash photolysis. UNIT IV : Electrochemistry: Nernst equation, electrode kinetics, electrical double layer, Debye-Hückel theory. Voltammetry, Current voltage relationship, characteristics of DME, half-wave potential. Amperometric titrations. Corrosion . UNIT V : Thermodynamics criteria for non-equilibrium states, entropy production and entropy flow, entropy balance equation for different , irreversible processes.
1002	MCH- 524	Magnetic Resonance and Mössbauer Spectroscopy	2012	UNIT I : Nuclear Magnetic Resonance Spectroscopy. UNIT II: Nuclear Quadrupole Resonance Spectroscopy . UNIT III: Electron Spin Resonance Spectroscopy . UNIT IV : Infrared Spectroscopy. UNIT V: Mössbauer Spectroscopy, Mass Spectrometry .
1003	MCH-525	Computational Methods in Chemistry	2012	UNIT I : Introduction to computers and Computing. UNIT II: Computer Programming in FORTRAN/C/BASIC. UNIT III: Programming in Chemistry . UNIT IV : Operation of PC. Data Processing. Running of standard Programs and Packages such as MS-WORD, MS EXCEL special emphasis on calculations and chart formations. X-Y plot. Use of Programs Chemcraft, Molden and PovRey. UNIT V: Application of internet for chemistry with search engines like google. Various types of files like PDF, JPG, RTF and hitmap.scanning. OMR. Web camera.
1004	MCH- 531	Photochemistry	2012	UNIT I : Photochemical Reactions. UNIT II: Determination of Reaction Mechanism. UNIT III: Intramolecular reactions of the olefinic bond-geometrical isomerism, cyclisation reactions, rearrangement of 1,4- and 1,5-dienes. Photochemistry of Aromatic Compounds Isomerisations, Additions and Substitutions. UNIT IV: Photochemistry of Carbonyl Compounds . UNIT V: Miscellaneous Photochemical Reactions.
1005	MCH- 532	Environmental Chemistry	2012	UNIT 1 : Environment Introduction. Composition of atmosphere, vertical temperature, temperature inversion, heat budget of the earth, atmospheric system, vertical stability atmosphere, Biochemical cycles of C,N, P, S and O. Biodistribution of elements. Hydrosphere- Chemical composition of water bodies-lakes, streams, rivers and wet lands etc. Hydrological cycle Aquatic pollution . UNIT 2 : Water quality standards. UNIT 3: Atmosphere. UNIT 4 :Cement, sugar, distillery, drug, paper and pulp, thermal power plants, nuclear power plants, metallurgy. Polymers, drugs etc. Environmental disasters – Cherbonyl, Three mile island, Seveso and minamata disasters, Japan tsunami. UNIT 5: Environmental Toxicology.
1006	MCH- 533	Bioinorganic Chemistry	2012	UNIT I : Electron Transfer in Biology. UNIT II : Metalloporphyrins. UNIT III : Metalloenzymes, Metal Ions in Biological Systems . UNIT IV : Enzymes: Introduction, Nomenclature and classification, concept and identification of active site by use of inhibitors, reversible & irreversible inhibition. Mechanism of Enzyme action: Transition state theory, Orientation and steric effect, acid-base catalysis, covalent catalysis. Co-Enzyme Chemistry: Cofactors as derived from vitamins, coenzymes, prosthetic groups, apoenzymes, Structure and biological functions of coenzyme A. Enzyme Models. UNIT V : Biotechnological Application of enzymes.
1007	MCH- 534	Basic Medicinal Chemistry	2012	UNIT I : Basic consideration of drugs . UNIT II: Drugs affecting the central nervous system. UNIT III : Anesthetics. UNIT IV : Cardiovascular Drugs. UNIT V: Local anti-infective drugs, Sulpha Drugs.
1008	MCH-535	Pharmaceutical Biotechnology	2012	UNIT I : Basic Immunology, innate-acquired immunity, antibody structure, immune response against bacterial, viral and parasitic infections, vaccines . UNIT II: DNA, RNA, Basic techniques in genetic engineering, Recombinant DNA methods, restriction enzymes, gene identification and isolation, cloning, screening expression of clone genes using plasmid and phage vector systems, use of recombinant DNA technology, Chemical synthesis of DNA, polymerase chain Reaction (PCR). UNIT III : Characteristic scale for quantum phenomena, nanoparticles, nano-clusters, nano-tubes, nanowires and nanodots. Electronic structure: quantum dots, quantum wires and quantum wells, confinement of electrons energy quantization Semiconductor nanocrystals, carbon nanotubes, Nanofluidics and surfaces: liquid structure near solid-liquid interfaces. UNIT IV : Genomics and Bioinformatics, Enzymes Technology. UNIT V: Fermentation Technology.
1009	MCH- 541	Analytical Chemistry	2012	UNIT : I Statistical tests and Error Analysis, Sampling and Sample Treatment. UNIT II : Spectrochemical. UNIT III: Electroanalytical Methods. UNIT IV : Chromatography Techniques . UNIT V : Principles of analytical separations, liquid-liquid extraction : Distribution coefficient, distribution ratio, solvent extraction of metals, analytical separations, multiple batch extractions, countercurrent distribution., multiple extractions. Thermal Methods : Thermal methods of analysis: Principles and instrumentation of TG and DTA. Complementary nature of TG and DTA. Differential scanning calorimeter (DSC). Applications of thermal methods in analytical chemistry



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1010	MCH- 542	Chemistry of Natural Products	2012	UNIT I : Terpenoids. UNIT II: Alkaloids. UNIT III: Steroids: Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry, Isolation, Structure determination and synthesis of: Cholesterol, Bile acids. Harmons: Androsterone, Testosterone, Ostrone, Progesterone, Aldosterone, Biosynthesis of Steroids. Prostaglandis-Occurrence, nomenclature, classification, biogenesis and physiological effects. Synthesis of PGE2 and PGF2a. UNIT IV : Plant Pigments-Occurrence, nomenclature and general methods of structure determination. Isolation and synthesis of Apigenin, Luteolin Quercetin, Myrcetin, Vitexin, Diadzein, Aureusin, Cyanidin, Hirsutidin, Biosynthesis of flavonoids: Acetate pathway and Shikimic acid pathway. Porphyrins: Structure and synthesis of Haemoglobin and Chlorophyll . UNIT V: Pyrethroids and Rotenones.
1011	MCS- 511	Object Oriented Programming using C++	2012	Unit 1 : An overview of object oriented programming, Drawbacks of procedural programming, Concepts of OOP: Class, Object, Data abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing. An overview of C++ programming: basic programming construction, program statements, cout & cin, preprocessor directives; Decision Making Statements . Unit 2 : Loops, Arrays; Structures; Function declaration and definition,, Calling the Function, comparison with library functions, passing arguments to functions: passing variables, passing by value, passing structure variables, Returning values from functions, returning structure variables, reference arguments. Unit 3 : Classes and objects, specifying the class, C++ object as data types, Constructors and destructors, objects as functions arguments, overloaded constructors, return objects from functions, objects and memory, static class data, array of objects. Friend Functions, Pointers. Unit 4 Operator overloading, Inheritance. Unit 5: File and Streams.
1012	MCS- 512	Advanced Operating Systems	2012	UNIT I : A brief description of its functional behavior & responsibilities as a resource manager and as an interface between hardware and user. Logical View and User View, Operating system need and services, Classification and Evolution and organization of OS, Hierarchical/Layered Organization of OS. Processor Management. UNIT II: Memory Management. UNIT III : Device Management and I/O Programming. UNIT IV Information Management & File System. UNIT V Distributed & Network Operating Systems: Introduction to distributed systems, special functions supported by corresponding OS. Network OS; Remote login; remote file transfer. Distributed OS; Transparent migration of process & data; remote procedure call, Detection and recovery from failures. Distributed file system; mutual exclusion/synchronization using centralized and distributed approaches; concurrency control, majority protocols and time stamping; deadlock detection/prevention. Case Studies: Single User System – MS-DOS, Multi User System – LIUNIX/ Solaris 2.0, Network OS-Novell Netware.
1013	MCS- 513	EMBEDDED SYSTEM	2012	UNIT I : Microcontrollers and Embedded Processors, overview of the 8051 family, Inside the 8051, Introduction to 8051 assembly programming, Assembling and running an 8051 program, the program counter and ROM space in the 8051, data types and directives, 8051 Flag bits and the PSW Register, 8051 Register Banks and stack. UNIT II : Loop and Jump instructions, call instructions, time delay generation and calculation, pin description of 8051, I/O programming, Bit Manipulation, Immediate and register addressing modes, accessing memory using various addressing modes, Unsigned Addition and SuCStraction, Unsigned Multiplication and division, signed number concepts and arithmetic operations. UNIT III: Logic and compare instructions, rotate and swap instructions BCD and ASCII application programs, single-Bit Instruction programming, Single bit operations with CY, reading input pins vs. Port Latch, programming 8051 Timers, counter programming, Basics of serial communication, 8051 connection to RS232, 8051 Serial Communication programming . UNIT IV: Difference between RISC and CISC Architectures PIC Controller (Study Example Microchip: PIC 16F877) (i) Memory organization ii) I/O ports (iii) Indirect Addressing, INDF and FSR Registers UNIT V: Introduction to ARM & Thumb Processor ARM Controller (Study Example AT91M42800A) (i) Architectural Overview. (ii) Memory Map. (iii) Peripherals. (iv) System Peripherals. v) User Peripherals. (vi) Operating Modes
1014	MCS- 514	ADVANCED DBMS	2012	UNIT I : Overview of Database Concepts; Relational model. UNIT II : Relational Database design, Query Processing. UNIT III : Transaction Processing & Concurrency Control; Crash Recovery. UNIT IV : Distributed Database, Client/Server database. UNIT V : Object Oriented Databases, Integrity, Security.

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1015	MCS- 521	Data Structures Algorithms & Analysis	2012	UNIT I : Data structures basics, Mathematical/algorithmic notations & functions, Complexity of algorithms, String processing: storing strings, Linear arrays and their representation in memory, traversing linear arrays. Inserting & deleting operations, Multidimensional arrays, Record structures and their memory representation. UNIT II :Queues. Representation of queue, Insert & delete operations on queue, Deques, Priority queues. UNIT III : Trees, Binary trees & and their representation in memory, Traversing binary trees. Traversal algorithms, Header nodes: threads. Binary search trees, searching, inserting and deleting in binary trees. Heap and heapsort. Path length & Huffman's' algorithm. General trees UNIT IV : Graph theory, sequential representation of graphs, Linked representation, operations & traversing the graphs. UNIT V: Sorting, Time and Space Complexity of sorting, Insertion Sort, Selection Sort. Merging & Merge- sort, Radix sort, Hashing. Divide and conquer, binary search with its variants, Quick sort, Linear search and Binary search algorithms
1016	MCS- 522	Software Engineering and Testing	2012	UNIT I : S/w Engineering Fundamentals, Project Management. UNIT II: Software Requirements and Analysis, System Design. UNIT III : Software Quality Assurance,Introduction to Software Testing. UNIT IV: Levels of Testing , Different types of Testing.UNIT V : Black Box & White Box Testing (Test Case Design Techniques), Object Oriented Testing, Computer Aided Software testing tools (CAST).
1017	MCS- 523	Advance Computer Networks	2012	UNIT : I Layered network architecture, review of ISO-OSI Model. Data communication techniques: Pulse Code Modulation, (PCM), Data modems, Multiplexing techniques-Frequency- Division, Time-Division Transmission Media – Wires, Cables, Radio, Links, Satellite Links, Fiber- Optic Links. Asynchronous Transfer Mode (ATM). UNIT II : Local Area Networks (LANs),Network Layer Protocols,Routing Algorithms. UNIT III : Data Link Protocols, Transport Layer Protocols,Session Layer Protocols. UNIT IV : Error Detection, Queuing Models . UNIT V : Presentation and Application Layer Protocols, Cryptography.
1018	MCS- 524	Numerical Methods & Discrete Mathematical Structures	2012	UNIT I :Transcendental and polynomial equations,System of linear algebraic equations. UNIT II: Numerical differentiation and integration,Numerical Solution of ordinary . UNIT III: Interpolation and approximation. UNIT IV : Desecrate structure,Boolean Algebra, Posets and lattices,Introduction to Combinatorices. UNIT V: Graph And Algorithms; FiniteState Machines and Languages.
1019	MCS- 531	PROGRAMMING IN JAVA	2012	UNIT I : History and features of Java, Difference between C, C++ & JAVA. JAVA and Internet, WWW, Web Browsers, java supports system, Java Environment. JDK, JVM, Byte code Java Programming Basics: Structure of Java program, JAVA tokens and Statements, Constants & Variables, Data types, Operators, Command line arguments. Java Statements & Arrays: if and switch statement. while, do-while and , for. Introduction to arrays, types of arrays, new operator, Strings. String class & its methods, Vectors. Classes & Objects. UNIT II: Inheritances: Specifying sub class, types of inheritance, visibility control: public, private, protected, package. super keyword, Overriding methods, Dynamic method dispatch, Abstract methods and classes, final methods & classes, Packages & Interfaces : Introduction to packages, naming conventions, package statement, creating packages, import statement, accessing package, use of CLASSPATH, adding class to package, hiding classes. Interface, implementing interfaces, multiple interfaces. Multithreading. UNIT III: Exception Handling: Managing exceptions, types of exceptions, handling exceptions. Multithreading. UNIT III: Exception Handling: Managing exceptions, types of exceptions, handling exceptions.
1020	MCS- 532	Object Oriented Analysis and Design using UML	2012	UNIT 1 :Two views of software Developments: SSAD and OOAD, Object – Orientation, Object and classes, Abstraction and encapsulation, Methods and Message, Interfaces , Inheritance and Polymorphism, Access Control, The Business case for OO Developments. Object Oriented Methodologies. UNIT 2 :Unified Approach,Object-Oriented Systems Development Process. UNIT 3: Behavioral Analysis, Domain Analysis or Business Object Analysis, Use-case Driven Object Oriented analysis . UNIT 4 :Design Phases. UNIT 5: Design Refinement,Persistent Object and Database Issues,Introduction to Testing Strategies, Impact of Object Orientation on Testing. Testing Business Process. Design Matrix. Discovering reusable pattern
1021	MCS- 533	COMPUTER GRAPHICS	2012	UNIT I : Introduction of computer Graphics and its applications, Overview of Graphics systems, Video display devices, Raster scan display, Raster scan systems, video controller, Raster scan display processor, Random scan display, random scan systems, color CRT monitor, Flat panel display, Interactive input devices. UNIT II : Line drawing algorithms, DDA, Bresenham's, Circle generating, Mid-point circle algorithm, Ellipse generating, Polynomials, Scan-line polygon fill, Boundary fill. UNIT III : Basic transformation's, Translation, Rotation, Scaling, Matrix representation's & homogeneous co- ordinates, Composite transformation's, Reflection, Two dimensional viewing, Two dimensional clipping, Line, Polygon, Curve, Text. 3D-transformation, Projection, Viewing, Clipping. UNIT IV : Spline representation, Cubic spline, Bezier curve, Bezier surfaces, Beta spline, B- spline surfaces, B-spline curve, Hidden surfaces, Hidden lines, Z-buffer. UNIT V : Fractal's geometry Fractal generation procedure, Classification of Fractal, Fractal dimension, Fractal construction methods. Color models, XYZ, RGB, YIQ, CMY & HSV, Shading algorithms, Shading model, Illumination model, Gouraud shading, Phong shading.

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1022	MCS- 534	ELECTIVE- I (DIGITAL IMAGE PROCESSING)	2012	UNIT I : Introduction to image processing, Two Dimensional Systems and Mathematical Preliminaries. UNIT II: Image Perception, Image Sampling and Quantization, Image Transforms, Image Representation by Stochastic Models. UNIT III : Image Enhancement, Image Filtering and Restoration. UNIT IV : Image Analysis and Computer Vision. UNIT V: Image Reconstruction from Projections, Image Data Compression.
1023	MCS- 541	Artificial Intelligence (A.I.)	2012	UNIT : I Games, theorem proving, natural language, processing, vision & speech processing, robotics, and expert systems AI, Techniques – search, knowledge, abstraction problems solving State Space Search, Control Strategies: Depth First Search, Breadth First Search, and Production Systems. Problem Characteristics: Decomposition, Ignorable, Recoverable, Predictable. UNIT II : Use of Heuristics: Hill climbing, Best First Search A* Algorithm : Admissibility, AND/OR Graph- AO* Constraint Satisfaction : Cryptarithmic, Waltz Line Labeling. Game Playing: Mimic Search, Alpha-Beta Pruning. Knowledge Representation. UNIT III: Rule Based Systems, Object Oriented Representations, LISP. UNIT IV : Handling Uncertainty, Concept of Learning, Learning Automation; The Genetic Algorithm, Learning by Induction, Neural Networks, Hopfield Networks, Perceptions-Learning Algorithm, Backpropagation Network, Backpropagation Machine, Recurrent Networks. Planning: Components of Planning System , Plan Generation Algorithms, Forward State Propagation, Backward State Propagation , Non-Linear Planning Using Constraint Posting . UNIT V : Expert Systems: Need & Justification for Expert Systems- Cognitive Problems, Expert System Architecture , Rule Based Systems, Non Production System, Knowledge
1024	MCS- 542	Internet Computing with ASP.NET	2012	UNIT I :HTML Basics. UNIT II: ASP.NET Controls. UNIT III: ADO.NET. UNIT IV : XML in .NET. UNIT V: Web Services.
1025	MMM- 511	ANALYSIS- I	2012	Unit 1 : Brief review of sets, relations and functions. Finite and infinite sets, countable and uncountable sets, Schröder-Bernstein theorem, Ordered fields, least upper bound property, the field of real numbers, Archimedean property, density of rational numbers, existence of nth root of positive real numbers, exponential and logarithm, the extended real number system, the complex field. Unit-2: Numerical sequences and their convergence, bounded sequences, Cauchy sequences, construction of real numbers using Cauchy sequences; series of complex numbers, convergence of series, series of nonnegative terms Unit-3: Euclidean spaces, metric spaces, open and closed sets, limit points, interior points, compact spaces; statements only of the following: nested interval theorem, Heine-Borel theorem, and Bolzano- Weierstrass' theorem. Unit-4 : Limits of functions, continuous functions, continuity and compactness, uniform continuity, connected sets, connected subsets of real numbers, continuity and connectedness, intermediate value theorem; discontinuities and their classifications, monotonic functions, infinite limits and limits at infinity. Unit-5: Differentiation of real valued functions of one real variable.
1026	MMM- 512	ORDINARY DIFFERENTIAL EQUATIONS	2012	UNIT I : Linear equations with constant coefficients; the second and higher order homogeneous equation; initial value problems for second order equations Unit-2: Linear equations with variable coefficients, initial value problems for the homogeneous equations; existence theorem; uniqueness theorem; solutions of homogeneous equations; the theorem on n linearly independent solutions; the Wronskian and linear independence Unit-3: Existence and uniqueness of solutions – introduction; equations with variable separated; exact equations, Lipschitz condition. Unit-4: Initial value problems for the homogeneous equations; solutions of homogeneous equations; Wronskian and linear independence; non-homogeneous equations; homogeneous equations with analytic coefficients; Legendre equation, justification of power series method; Legendre polynomials and Rodrigues' formulae. Unit-5: Linear equations with regular singular points – introduction; Euler equation; second order equations with regular singular points
1027	MMM- 513	CLASSICAL MECHANICS	2012	UNIT I : Generalized coordinates; holonomic & non-holonomic systems; D'Alembert's principle; Lagrange's equations; calculus of variations. UNIT II: Hamilton's principle, Lagrange's equations from Hamilton's principle, extension of Hamilton's principle to non-conservative and non-holonomic systems, conservation theorems and symmetry properties. UNIT III: Eulerian angles; Euler's theorem on the motion of a rigid body; infinitesimal rotations; rate of change of a vector; coriolis force; Euler's equations of motion; force free motion of a rigid body; heavy symmetrical top with one point fixed. UNIT IV: Hamilton's equations of motion, conservation theorems and physical significance of Hamiltonian, Hamilton's equations from variational principle, principle of least action. UNIT V: Equations of canonical transformation; integral invariants of Poincare'; Lagrange and Poisson brackets as canonical invariants, equations of motion in Poisson bracket notation; infinitesimal contact transformations; constants of motion and symmetry properties.

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1028	MMM- 514	ALGEBRA	2012	UNIT I : A brief review of groups, their elementary properties and examples, subgroups, cyclic groups, homomorphism of groups and Lagrange's theorem; permutation groups, permutations as products of cycles, even and odd permutations, normal subgroups, quotient groups; isomorphism theorems, correspondence theorem. UNIT II : Group action; Cayley's theorem, group of symmetries, dihedral groups and their elementary properties; orbit decomposition; counting formula; class equation, consequences for p-groups; Sylow's theorems . UNIT III : Applications of Sylow's theorems, conjugacy classes in $S_n$ and $A_n$ , simplicity of $A_n$ . Direct product; structure theorem for finite abelian groups; invariants of a finite abelian group . UNIT IV : Basic properties and examples of ring, domain, division ring and field; direct products of rings; characteristic of a domain; field of fractions of an integral domain; ring homomorphisms . UNIT V : A brief review of polynomial rings over a field; reducible and irreducible polynomials, Gauss' theorem for reducibility of $f(x) \in \mathbb{Z}[x]$ ; Eisenstein's criterion for irreducibility of $f(x) \in \mathbb{Z}[x]$ over $\mathbb{Q}$ .
1029	MMM- 521	LINEAR ALGEBRA	2012	UNIT I : Vector spaces, linear independence; linear transformations, matrix representation of a linear transformation; isomorphism between the algebra of linear transformations and that of matrices. UNIT II : Similarity of matrices and linear transformations; trace of matrices and linear transformations, characteristic roots and characteristic vectors, characteristic polynomials, relation between characteristic polynomial and minimal polynomial;. UNIT III : Projections and their relation with direct sum decomposition of vector spaces; invariant subspaces; primary decomposition theorem, cyclic subspaces; companion matrices; a proof of Cayley-Hamilton theorem . UNIT IV : Inner product spaces, properties of inner products and norms, Cauchy-Schwarz inequality; orthogonality and orthogonal complements, orthonormal basis, Gram-Schmidt process. UNIT V: Forms on inner product spaces and their matrix representations; bilinear forms; Hermitian forms; symmetric bilinear forms; orthogonal diagonalization of real quadratic forms.
1030	MMM- 522	ANALYSIS-II	2012	UNIT I : Sequences of functions, pointwise and uniform convergence; uniform convergence and continuity; uniform convergence and integration;. UNIT II: Directional derivatives; derivatives of functions of several variables and their interrelationship; chain rule; mean value theorem; higher order partial derivatives; equality of mixed partial derivatives, Schwarz lemma; Taylor's theorem.N. UNIT III : Injective mapping theorem, surjective mapping theorem, inverse function theorem and implicit function theorem of functions of two and three . UNIT IV: $\sigma$ rings of sets, additive, countably additive, regular set functions, outer measures on power set of reals, measurable spaces, Lebesgue measure, measurable functions and their properties.UNIT V : Lebesgue integral, Lebesgue integrable functions, properties of integrals, Lebesgue's monotone convergence theorem, Fatou's lemma, Lebesgue's dominated convergence theorem, integration of complex valued functions, functions of class $L^2$ , Fourier series, Riesz-Fischer theorem.
1031	MMM- 523	PARTIAL DIFFERENTIAL EQUATIONS	2012	UNIT : I Definition of PDE, origin of first-order PDE; determination of integral surfaces of linear first order partial differential equations passing through a given curve. UNIT II : Origin of second order PDE, linear second order PDE with constant coefficients, linear second order PDE with variable coefficients. UNIT III : Separation of variables in a PDE; Laplace's equation, elementary solutions of Laplace's equations; families of equipotential surfaces. UNIT IV: Wave equation, the occurrence of wave equations, elementary solutions of onedimensional wave equation; vibrating membranes, three dimensional problems. UNIT V: Diffusion equation, resolution of boundary value problems for diffusion equation, elementary solutions of diffusion equation, separation of variables.
1032	MMM- 524	PROGRAMMING IN C AND APPLICATIONS	2012	UNIT I : Character sets for C; constants and variables in C; arithmetic expressions in C; assignment and multiple assignments and mode of statements in C; built-in functions and libraries in C; input and output statements in C; comment statements; data types; TYPE declarations; statement labels; elementary programs in C. UNIT II: Logical IF statements in C; switch, break, continue GOTO statements in C; WHILE, FOR, DO WHILE loops in C. UNIT III: Subscripted variables and arrays in C; array variables, syntax rules, use of multiple subscripts in arrays, reading and writing multi-dimensional arrays, for loops, for arrays in C; format specifications in C. UNIT IV: Some algorithms and programs on theory of matrices and numbers like Sieve method for primality test, generation of twin primes, solution of congruence using complete residue system, addition, subtraction and multiplication of matrices. transpose, determinant . UNIT V: Function definition, function prototypes, arguments, call by value, call by reference, pointers, character arrays, automatic variables in C, external variables and names in C, scope, evaluation of C expressions with arithmetic and logical, file operations.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1033	MMM- 531	TOPOLOGY	2012	<p>UNIT I : Definition and examples of topological spaces; basis and sub basis; order relations, dictionary order, order topology; subspace topology; Kuratowski's closure axioms.</p> <p>UNIT II : Continuity and related concepts; product topology; quotient topology; a brief introduction to minimal uncountable well ordered set <math>\Omega</math>; countability axioms; Lindelof spaces and separable spaces.</p> <p>UNIT III: Connected spaces, generation of connected sets; component, path component; local connectedness, local path-connectedness.</p> <p>UNIT IV: Compact spaces; limit point compact and sequentially compact spaces; locally compact spaces; one point compactification; finite product of compact spaces, statement of Tychonoff's theorem.</p> <p>UNIT V: Separation axioms; Urysohn's lemma; Tietze's extension theorem; statement of Urysohn's metrization theorem.</p>
1034	MMM- 532	COMPLEX FUNCTION THEORY	2012	<p>UNIT 1 : Brief survey of formal power series, radius of convergence of power series, exponential, cosine and sine, logarithm functions introduced as power series, their elementary properties.</p> <p>Unit – 2: Integration of complex-valued functions and differential 1-forms along a piecewise differentiable path, primitive, local primitive and primitive along a path of a differential .</p> <p>Unit – 3: Cauchy's integral formula, Taylor's expansion of holomorphic functions, Cauchy's estimate; Liouville's theorem; fundamental theorem of algebra; zeros of an analytic function and related results; maximum modulus theorem; Schwarz' lemma.</p> <p>Unit – 4: Laurent's expansion of a holomorphic function in an annulus, singularities of a function, removable singularities, poles and essential singularities;</p> <p>Unit – 5: Complex form of equations of straight lines, half planes, circles, etc., analytic (holomorphic) function as mappings; conformal maps; Mobius transformation; cross ratio; symmetry and orientation principle; examples of images of regions under elementary analytic function.</p>
1035	MMM- 533	NUMERICAL ANALYSIS	2012	<p>UNIT I : A brief introduction to algebraic and transcendental equations and their roots; direct and iterative methods for determination of roots of these equations. UNIT II :A brief introduction to systems of linear algebraic equations and their solutions, eigenvalue problem and its solution; direct and iterative methods; forward and backward substitution method; Cramer's rule; Gauss elimination method;. UNIT III : Lagrange and Newton interpolation; Lagrange interpolating polynomial and Newton divided differences interpolating polynomial. UNIT IV : Differentiation and integration; numerical differentiation; methods based on linear and quadratic interpolation with error of approximation; methods based on finite differences. UNIT V : Ordinary differential equations and their numerical solutions; initial value problems; error estimates; Euler- Richardson method, Runge-Kutta methods and Predictor- Corrector method; error analysis and algorithm for each of these methods.</p>
1036	MMM- 534	APPLICATION OF MATHEMATICS IN ENVIRONMENTAL	2012	<p>UNIT I : Linear Equations, matrix form, row reduction; row rank and column rank, row equivalence, row reduced echelon matrices, various methods to find solutions of a system of linear equations, linear inequalities. UNIT II: Introduction to ecology and environment; linear programming problem –introduction, graphical solution method, some exceptional cases; general linear programming problem, duality, simplex method; problems related to ecology and environment. UNIT III : Integral equations of convolution type and their solutions by Laplace transform, Fredholm's theorems; integral equations with symmetric kernel. UNIT IV : Generalized functions; Minusinski's operational calculus of one variable . UNIT V: Eigenvalue problem; ordinary differential equations of the Sturm-Liouville type; eigenvalues and eigenfunctions; expansion theorem.</p>
1037	MMM- 541	MATHEMATICAL METHODS	2012	<p>UNIT : I Laplace transforms, properties of Laplace transform, inversion formula convolution, application to ordinary and partial differential equations; Fourier transform, properties of Fourier transform, inversion formula, convolution, Parseval's equality; Fourier transform of generalized functions, application of transforms to heat wave and Laplace equation. UNIT II : Formulation of integral equations, integral equations of Fredholm and Volterra type, solution by successive substitution and successive approximation; integral equations with degenerate kernels. UNIT III: Integral equations of convolution type and their solutions by Laplace transform, Fredholm's theorems; integral equations with symmetric kernel. UNIT IV : Generalized functions; Minusinski's operational calculus of one variable . UNIT V : Environmental Education</p>
1038	MMM- 542	ELEMENTARY NUMBER THEORY	2012	<p>UNIT I : Divisibility. UNIT II: Congruence modulo powers of prime; power residues; primitive roots and their existence; quadratic residues; Legendre symbol, Gauss' lemma about Legendre symbol; quadratic reciprocity law; proofs of various formulations; Jacobi symbol. UNIT III: Greatest integer function; arithmetic functions, multiplicative arithmetic functions . UNIT IV : Diophantine equations – solutions of <math>ax + by = c</math>, <math>x^2 + y^2 = z^2</math>, <math>x^4 + y^4 = z^2</math>; properties of Pythagorean triples; sums of two, four and five squares; assorted examples of diophantine equations. UNIT V: Simple continued fractions, finite and infinite continued fractions, uniqueness, representation of rational and irrational numbers as simple continued fractions, rational approximation to irrational numbers.</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1039	MMB- 511	GENERAL MICROBIOLOGY	2012	Unit 1 : Historical development of Microbiology – Spontaneous generation, germ theory of disease. General characteristics of different groups of microorganisms. Classification of bacteria . Unit-2: Microscopy Unit-3: Isolation of microorganisms – Serial dilution to extinction in liquid medium and streaking/spreading on solid medium,. Other methods for isolating bacteria and fungi from soil and water. Replica-plating techniques for isolation of mutants. Unit-4 :Microbial growth . Unit-5: Principles and methods of sterilization;.
1040	MMB- 512	MICROBIAL ECOLOGY	2012	UNIT I : Microbial Ecosystems Unit-2:Meaning of succession Diversity, stability and succession Unit-3: Ecology and Genetics, Genetic structure of population: Genotype frequency, allele frequencies. Unit-4: Interactions and Ecosystem Management, Microbial Interactions Unit-5: Concept of sustainable development
1041	MMB- 513	MICROBIAL GENETICS	2012	UNIT I : Concept of gene – Muton, recon and cistron. One gene-one enzyme, one gene-one polypeptide, one gene-one product hypotheses. Types of RNA and their functions. Outlines of RNA biosynthesis in prokaryotes. Genetic code. Structure of ribosomes and a brief account of protein synthesis. Operon concept. Regulation of gene expression in bacteria – lac operon. Basic principles of genetic engineering . UNIT II: Genetic recombination . UNIT III: Modes of gene transfer in bacteria: Transformation . UNIT IV: Recombination in bacteriophages. Genetics of yeast and Neurospora. Benzer’s studies on r-II locus of T4 bacteriophage to establish the units recon, muton and cistron. Mutagenesis . UNIT V: Mitochondrial and chloroplast genomes. Concept of gene structure – Classical geneticist view to modern concept. <i>Experimental evidence for colinearity of the gene and its product. Genetic material.</i>
1042	MMB- 514	ADVANCE TECHNIQUES IN MICROBIOLOGY	2012	UNIT I -Biophysical Techniques-I: Determination of size, shape and Molecular weight of Macromolecules:- by Viscosity, CD/ORD, Light scattering, diffusion sedimentation and Centrifugation techniques. UNIT-II: Biophysical Techniques-II: Electrophoresis: Agarose Gel, SDS-page, two-dimensional gel electrophoresis, capillary electrophoresis, immune-electrophoresis. UNIT-III: Microscopical Techniques: Electron Microscopy: SEM, TEM, Staining procedures and microscopy. Fluorescent Microscopy: Staining procedures and Microscopy, FISH. Laser scanning, confocal microscopy.Scanning tunneling and atomic force microscopy.Immunoelectron microscopy,cryolectron microscopy. UNIT-IV: Blotting techniques: Western,southern, northern, Radioimmunoassay. Unit-V: Other advance techniques: NMR and its biological importance. Site-directed mutagenesis, transcriptional start point mapping.
1043	MMB- 521	MOLECULAR BIOLOGY	2012	UNIT I : Nucleic acids as genetic information carriers: experimental evidence, DNA structure: historical aspects and current concepts, melting of DNA. UNIT II : Retroviruses and their unique mode of DNA synthesis. Relationship between replication and cell cycle. Inhibitors of DNA replication . UNIT III : Structural features of RNA (rRNA, tRNA and mRNA) and relation to function. Initiator and elongator class of tRNA, ribosome binding site on mRNA and corresponding site on rRNA, peptidyl transferase activity of 23S rRNA. Transcription UNIT IV : Regulation of gene expression: operon concept, catabolite repression, instability of bacterial RNA, positive and negative regulation, inducers and corepressors. Negative regulation – E. coli lac operon; positive regulation – E. coli ara operon; regulation by attenuation – his and trp operons; antitermination – N protein and nut sites in I. <i>Maturation and processing of RNA. UNIT V:Protein synthesis.</i>
1044	MMB- 522	MICROBIAL FERMENTATION TECHNOLOGY	2012	UNIT I : General Principles of Fermentation Bioreactors:Bioreactor types, immobilized bioreactors, types of fermentation. Fermentation kinetics and Monods Model. UNIT II: Growth kinetics and Monod’s Model. UNIT III : Downstream processes: types of processing units and systems, Storage and packaging methods. Scale up: scale down, criteria involved in scale up. Productivity, power requirements Basic control theory. UNIT IV: Industrial Fermentation Products. UNIT V : Food and Healthcare products,Aminoacids,Vitamins.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1045	MMB- 523	Laboratory control of antimicrobial therapy; various methods of drug susceptibility testing, antibiotic assay in body fluids. Brief account on available vaccines and schedules; passive prophylactic measures; Noscomical infection, common types of hospital infections and their diagnosis and control	2012	UNIT : I Early discovery of pathogenic microorganisms, development of bacteriology as scientific discipline; contributions made by eminent scientists. Classification of medically important microorganisms; Normal microbial flora of human body; role of resident flora; normal flora and the human host. UNIT II : Establishment, spreading, tissue damage and anti-phagocytic factors; mechanism of bacterial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenital tracts. UNIT III : Classification of pathogenic bacteria. Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Cornebacterium, Bacillus, Clostridium, Non sporing Anaerobes, Organisms belonging to Enterobacteriaceae, Vibrios, Non fermenting gram negative bacilli Yersinia; Haemophilus; Bordetella, Brucella, Mycobacteria, Spirochaetes, Actinomycetes, Rickettsiae, Chlamdiae. UNIT IV: General properties of Viruses. UNIT V: Laboratory control of antimicrobial therapy; various methods of drug susceptibility testing, antibiotic assay in body fluids. Brief account on available vaccines and schedules; passive prophylactic measures; Noscomical infection, common types of hospital infections and their diagnosis and control.
1046	MMB- 524	FOOD MICROBIOLOGY	2012	UNIT I : Food as substrate for microorganisms: Micro organisms important in food microbiology - Molds, Yeasts and Bacteria . UNIT II: Contamination and spoilage: Cereals, sugar products, vegetables, fruits, meat and meat products, Milk and Milk products – Fish and sea foods – poultry – spoilage of canned foods. Detection of spoilage and characterization. UNIT III: Food-borne infections and intoxications: Bacterial and nonbacterial – with examples of infective and toxic types - Clostridium, Escherichia, Salmonella, Shigella, Staphylococcus, Vibrio, Yersinia, Nematodes, protozoa, algae, fungi and viruses. UNIT IV: Food fermentations: bread, cheese, vinegar, fermented vegetables, fermented dairy products; Experimental and Industrial production methods. Spoilage and defects of fermented dairy products – oriental fermented foods, their quality standards and control. UNIT V: Food produced by Microbes.
1047	MMB- 531	INDUSTRIAL MICROBIOLOGY	2012	UNIT I : Biotechnological innovations in the chemical industry, biocatalyst in organic chemical synthesis, efficiency of growth and product formation, microbial growth kinetics, measurement of growth. UNIT II : Media formulation. Sterilization, kinetics of thermal death of microorganisms, batch and continuous sterilization. Shake flask, stirred tank airlift fermenter, fed batch continuous and immobilized cell reactor. UNIT III: Aeration and agitation, power requirement, oxygen transfer kinetics, concepts of Newtonian and Non-Newtonian fluids, plastic fluid apparent viscosity, foam and antifoam. Large scale production. UNIT IV: Metabolic pathways and metabolic control mechanism, industrial production of citric acid, enzymes, ethanol, acetic acid, production and diversification of antibodies. Biofertilizers, biopesticides, mushroom production, fermented food/beverages, Biopolymers UNIT V: Industrial strains. Strategies for selection, improvement & maintenance, large-scale production using recombinant microorganisms. Scale-up, instrumentation control, physical and chemical environment sensors, downstream processing..
1048	MMB- 532	BIOSTATISTICS AND COMPUTER APPLICATIONS	2012	UNIT 1 : Introduction to Biostatistics. Unit – 2: Measures of central tendency Measures of central tendency: Mean, Median, Mode . Unit – 3: Tests of significance. Unit – 4: Introduction to computers and computer applications;. Unit – 5: Net working concepts.
1049	MMB- 533	MICROBIAL METABOLISM	2012	UNIT I : Transport of nutrients in microbes . UNIT II :Photosynthesis. UNIT III : Carbohydrate metabolism . UNIT IV : Lipid metabolism . UNIT V : Nucleotide metabolism .
1050	MMB- 534	APPLIED MICROBIOLOGY	2012	UNIT I : Agricultural Microbiology. UNIT II: Environmental Microbiology. UNIT III : Food Microbiology. UNIT IV : Industrial Microbiology. UNIT V: Microbiology of cheese and beverage fermentation.
1051	MMB- 541	ENZYMOLGY	2012	UNIT : I : Outlines of enzyme classification, nomenclature, assay of enzymes and kinetics of enzyme catalyzed reactions – Michaelis – Menton equation, determination of Km, Vmax and kcat values. Factors affecting enzyme reaction . UNIT II : Enzyme inhibitors, competitive and noncompetitive inhibition. Active site determination. Mechanism of action of ribonuclease, lysozyme and chymotrypsin. Isoenzymes, Regulatory enzymes . UNIT III: Properties of Enzymes. UNIT IV : Enzyme kinetics . UNIT V : Immobilized enzymes
1052	MMB- 542	MICROBIAL BIOTECHNOLOGY	2012	UNIT I : Raw materials used as media for industrial fermentations. Development of inocula for industrial fermentations. Isolation, preservation and strain improvement of industrially-important microorganisms. Bioreactor . UNIT II: Bioprocessing. UNIT III: Industrial production of (1) antibiotics – Streptomycin, penicillin, cephalosporin, and tetracyclin, (2) biomass production of Bacillus megaterium, Acinetobacter cerificans, Candida utilis from hydrocarbons, (3) organic acids – Citric acid, lactic acid, (4) amino acids – L-lysine, (5) enzymes – Amylases, proteases and laccases, stabilization of enzymes, (6) vaccines – rabies, FMD vaccine, hepatitis B, (7) alcohol – ethanol and butanol. Esterification of biofuels, Steroid transformations. UNIT IV : Microbial leaching . UNIT V: Recombinant DNA products

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1053	MPY- 511	MATHEMATICAL METHODS IN PHYSICS	2012	Unit 1 : Complex Analysis . Unit-2: Fourier series, Fourier integrals, Fourier transform, Parseval Relations, Convolution, Applications, Laplace transform, Bromwich integral (without proof) simple applications. Power series and contour integral solutions of second order diff. equations Unit-3: Linear spaces and operators . Unit-4: Coordinate transformation in N-dimensional space. Unit -5: Group of transformations. (Example: symmetry transformation of square), Generators of a finite group, Normal subgroup, Direct product of groups
1054	MPY- 512	CLASSICAL MECHANICS	2012	UNIT 1 : Holonomic and nonholonomic constraints. Unit-2: Conservation principle and Noether's theorem. Conservation of energy, linear momentum and angular momentum as a consequence of homogeneity of time and space and isotropy of space respectively Unit-3: Canonical transformation, integral in variants of poicare. Unit-4: Action angle, variable adiabatic invariance of action variable . Unit-5: Laplace transforms, and their properties, Laplac transform of derivatives and integrals of laplac transform, Laplace, Convolution theorem, Impulsive function Application of laplace transform in solving liner differential equations with constant coefficient with variable coefficient and liner partial differential equation
1055	MPY- 513	CLASSICAL ELECTRODYNAMICS	2012	UNIT 1 : Electrostatics: Electric field; Gauss law, Differential form of Gauss law Boundary- Value Problems in Electrostatics. Unit-2: Magnetostatics. Unit-3: Multipoles, Electrostatics of Macroscopic Media Dielectrics, Time varying fields, Maxwell's equations Conservation Laws. Unit-4: Plane Electromagnetic Waves and Wave Equation , Covariant Form of Electrodynamics Equations. Unit-5 : Radiation by moving charges : Lienard-wiechert Potentials for a point charge, Total power radiated by an accelerated charge, Larmor's formula and its relativistic generalization, Angular distribution of radiation emitted by an accelerated charge, Radiation emitted by a charge in arbitrary extremely relativistic motion.
1056	MPY- 514	QUANTUM MECHANICS	2012	UNIT 1 : States, Amplitudes and Operators, Observable and description of system. Unit-2: Symmetries and Angular momentum, The Co-ordinate Representation. Unit-3: Angular momentum operators and, their eigen values, matrix representations of the angular momentum operators and their eigen states, co-ordinate representations of the orbital angular momentum operators and their eigen state . Unit-4: Hamiltonian matrix and the time evolution of Quantum mechanical States. Unit-5: Interaction with External Fields: Non degenerate first order stationary perturbation method, atom in a weak uniform external electric field and first and second order Stark effect, calculation of the polarizability of the ground state of H-atom and of an isotropic harmonic oscillator. Degenerate stationary perturbation theory
1057	MPY- 521	ATOMIC, MOLECULAR PHYSICS AND PLASMA PHYSICS	2012	UNIT 1 : Transition Between Stationary States Unit-2: Systems with Identical Particles. Unit-3: Hydrogen Atom. Unit-4: Spectroscopy (qualitative). Unit-5: Plasma Physics
1058	MPY- 522	ELECTRONICS DIGITAL CIRCUITS	2012	UNIT 1 : Operational Amplifiers: Differential amplifier - circuit configurations-dual input, balanced output differential amplifier. DC analysis - AC analysis, inverting and noninverting inputs, CMRR - constant current bias level translator. Block diagram of a typical Op-Amp-analysis. Open loop configuration, inverting and non-inverting amplifiers Unit-2 : Op-amp with negative feedback . Unit-3: Oscillators and Wave Shaping Circuits. Unit-4: Digital Electronics. Unit-5: Sequential Logic: Flip -Flops: one-bit memory; The RS Flipflop, JK Flip- Flop, JK master slave Flip -Flops, T Flip -Flop, D Flip- Flop, Shift registers - synchronous and asynchronous counters- cascade counters, Binary counter, Decade counter.
1059	MPY- 523	NUCLEAR PHYSICS	2012	UNIT : I Nucleon-Nucleon Scattering and Potentials . Unit-2: Two Nucleon system and Nuclear Forces. Unit-3: Nuclear shell model, Collective nuclear models. Unit- 4: Interaction of radiation and charged particle with matter (No derivation), Nuclear Reactions. Unit-5: Nuclear gamma and beta decay





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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1066	MPY- 542	NANOTECHNOLOGY	2012	<p>UNIT I : Low dimensional materials. Application in electronics, communication, medicine etc. Electron states in a potential well, spherically symmetric potential, Coulomb potential and periodic potential. Tunneling through a potential barrier. Excitons, biexcitons, dark excitons.</p> <p>UNIT – II: Clusters. Fullerenes, semiconductor and metal clusters, cluster stability. Nanotubes. Electron states in nanoparticles, effective mass approximation, weak confinement, strong confinement, size dependent oscillator strength.</p> <p>UNIT – III: Synthesis of nanomaterials (bottom up approach) by physical techniques. Introduction to vacuum techniques (pumps, gauges, materials). Physical vapour deposition, electron beam evaporation, sputter deposition, laser ablation, ion beam mixing, plasma deposition.</p> <p>UNIT – IV: (Synthesis of nanomaterials by chemical, biological and hybrid routes). Concepts of colloids, LaMer diagram, L.B films, Miceller route, self assembly, biosynthesis, electrophoresis, immobilization in glass, zeolites, polymers.</p> <p>UNIT – V: Analysis Techniques. UV-VIS-IR spectroscopy, Luminescence techniques, X-ray, electron and neutron Diffraction, Small Angle X-ray Scattering, photoemission spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR), X-ray Photoelectron Spectroscopy (XPS).</p>
1067	MSZ- 511	LIFE AND DIVERSITY OF INVERTEBRATES	2012	<p>Unit 1 : Principles of Taxonomy - Binomial nomenclature - classification of the animal kingdom. PROTOZOA: General characters and classification up to class with examples. Type study plasmodium, parasitic protozoans (Entamoeba, Trypanosoma and Leishmania).</p> <p>Unit-2: PORIFERA: General characters and classification up to classes with example; Type study Sycon, Canal system in sponges. COELENTERATA: General characters and classification up to classes with examples; Type study - Obelia, Polymorphism</p> <p>Unit-3: HELMINTHES: General characters and classification up to classes with examples; Type study - Taenia solium. Nematode parasites and diseases - Wuchereria bancrofti, Enterobius vermicularis, Ancylostoma duodenale. ANNELIDA: General characters and classification up to classes with examples; Type study - Earthworm, Trochophore larva, and its evolutionary significance.</p> <p>Unit-4 : ARTHROPODA: General characters and classification up to classes with examples; Type study - Prawn. Peripatus and its affinities.</p> <p>Unit-5: MOLLUSCA: General characters and classification up to classes with examples; Type study - Fresh water Mussel.</p> <p>ECHINODERMATA: General characters and classification up to classes with examples; Type study - Sea star. Echinoderm larvae and their significance.</p>
1068	MSZ- 512	LIFE AND DIVERSITY OF CHORDATES	2012	<p>UNIT I : Salient Features, General classification of Phylum Chordata upto orders; Origin of Chordata. Prochordata: General Characters and affinities of Hemichordata, Cephalochordata &amp; urochordata</p> <p>Unit-2: PISCES: General characters and classification up to orders; Type study : Shark; Parental care. AMPHIBIA: General characters and classification up to orders; Type study : frog; Adaptive features of Anura, urodela &amp; Apoda; Parental care in Amphibia</p> <p>Unit-3: REPTILIA: General characters and classification upto order level; Type study-Calotes; Poison apparatus and biting mechanism of poisonous snakes; Identification of poisonous and non-poisonous snakes.</p> <p>Unit-4: AVES: General characters and classification upto orders; Type study-Pigeon; Characters of Archaeopteryx; Ratitae ; Flight adaptation.</p> <p>Unit-5: MAMMALIA: General characters and classification upto orders; Type study-Rabbit; Flying Mammals; Dentition in mammals ; Aquatic mammals</p>
1069	MSZ- 513	BIOCHEMISTRY	2012	<p>UNIT I : Water. UNIT II : Biomolecules. UNIT III: Bioenergetics and Metabolism of Carbohydrate and Lipids Carbohydrate . UNIT IV: Hormones. UNIT V: Vitamins.</p>
1070	MSZ- 514	CELL AND MOLECULAR BIOLOGY	2012	<p>UNIT I : STRUCTURE AND FUNCTIONS OF CELL ORGANELLES. UNIT II : NUCLEUS. UNIT III : CELL CYCLES. UNIT IV : INFORMATIONAL MACROMOLECULES. UNIT V : INFORMATION TRANSFER.</p>
1071	MSZ- 521	ANIMAL PHYSIOLOGY	2012	<p>UNIT I : NUTRITION. UNIT II : RESPIRATION AND CIRCULATION. UNIT III : EXCRETION AND OSMOREGULATION UNIT IV : COORDINATION. UNIT V: BEHAVIOURAL PHYSIOLOGY</p>
1072	MSZ- 522	GENETICS	2012	<p>UNIT I : MOLECULAR STRUCTURE OF GENETIC MATERIAL. UNIT II: REGULATION OF GENE ACTION. UNIT III : CHROMOSOME AND GENETICS DISORDERS. UNIT IV: GENES IN DEVELOPMENT, RADIATION GENETICS AND POPULATION GENETICS. UNIT V : GENETIC ENGINEERING AND APPLIED GENETICS.</p>
1073	MSZ- 523	DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY	2012	<p>UNIT : I EARLY DEVELOPMENT AND ORGANOGENESIS. UNIT II : GENES AND DEVELOPMENT. UNIT III : REGULATION OF DEVELOPMENT. UNIT IV : IMMUNOGLOBULINS . UNIT V : MECHANISM AND MEDIATORS OF IMMUNE SYSTEM.</p>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1074	MSZ- 524	EVOLUTION	2012	UNIT I : Evidences: The need of evidences for the fact of evolution - evidences from comparative anatomy, embryology, physiology and biochemistry - visual pigments, hemoglobin, protein sequences in phylogeny. Biogeography, Plate tectonics and continental drift - Evidences from systematic, evolutionary taxonomy - Evidences from paleontology - evolutionary trends in fossils, types of fossils. Process of fossilization - Evolution of homeotherms - Evidences from genetics - gene and chromosome homology, hybridization, universality of the genetic code. UNIT II: Mutationism - Views of De Vries and of R.B. Golschmidt; hopeful monsters. Inadequacies of mutationism. Lamarckism - Life of Lamarck - Lamarckian postulates - inadequacies of Lamarckism. Natural selection - In nature and laboratory - Creative aspects of natural selection - modern understanding of selection, stabilizing and diversifying and directional selection. Adaptation - Nature and types of adaptation - Adaptive trends - Quantifying adaptation - Batesian and Mullerian mimicry and evolution. Polymorphism UNIT III: GENETIC BASIS OF EVOLUTION AND SPECIATION . UNIT IV : ORIGIN OF HIGHER TAXA - I. UNIT V: Modes of origin of
1075	MSZ- 531	BIOPHYSICS	2012	UNIT I : STRUCTURE OF BIOMOLECULES. UNIT II: THERMODYNAMICS AND BIOLOGICAL OXIDATION. UNIT III: MICROSCOPY. UNIT IV: PHOTO BIOPHYSICS . UNIT V: BIOPHYSICAL PRINCIPLES APPLIED TO PHYSIOLOGY.
1076	MSZ- 532	MEDICAL LABORATORY TECHNIQUES	2012	UNIT 1 : Instrumentation: The laboratory: Accidents – Universal work precautions (UWP) for laboratory personnel; Sterilization : Introduction – sterilization by heat – cold – ultra violet radiation – Ionizing radiations – Filtration – chemical sterilization – Glass preparation for use. Unit – 2: Knowledge and skill in collecting blood samples. Analysis of blood and basic haematological techniques. Blood cell morphology in health and disease – RBC, WBC, Total count and differential count, Haemoglobin estimation. Unit – 3: Haematocrit, packed cell volume, MCH, MCHC, MCV, Erythrocyte sedimentation rate, RBC fragility test, platelet count. Reticulocytocrit, haemorrhagic disorders, clotting time, Bleeding time, prothrombin time. Unit – 4: Clinical Analysis: Knowledge and skill in the study and analysis of urine. Physical parameter, Colour, Odor, pH, Density. Chemical parameters routinely required to be analysed – Sugar, Albumin, Ketone bodies and their clinical significances pregnancy tests. Unit – 5: Clinical Studies: Analysis of faeces, semen, cerebrospinal fluid for clinical investigation. Study of vectors in the transmission of diseases with suitable examples. Techniques - RIA, ELISA, WESTERN BLOT and WIDAL TEST
1077	MSZ- 533	BIOSTATISTICS AND COMPUTER APPLICATIONS	2012	UNIT I : Classification And Presentation Of Data. UNIT II :Descriptive And Inferential Statistics. UNIT III : Correlation And Regression. UNIT IV : Basic Concept On Computers. UNIT V : Computer Applications.
1078	MSZ- 534	BASIC CONCEPTS OF BIOTECHNOLOGY	2012	UNIT I : Techniques of Genetic Engineering . UNIT II: Cloning Vectors. UNIT III : Plant And Animal Biotechnology. UNIT IV : Fermentation technology, Food biotechnology , Enzyme Biotechnology. UNIT V: Environmental Applications Biotechnology.
1079	MSZ- 541	ENVIRONMENTAL SCIENCE	2012	UNIT : I Ecosystem. UNIT II : Natural Resources And Their Conservation . UNIT III: Energy Resources. UNIT IV : Pollution And Management Pollution . UNIT V : Environmental Education
1080	MSZ- 542	AQUACULTURE AND FARM MANAGEMENT	2012	UNIT I : Introduction to Aquaculture. UNIT II: Biology of important cultivable species and their economics. UNIT III: Survey of seed Resources and Seed & Feed Production . UNIT IV : Culture systems. UNIT V: Farm Management.
1081	BBA 101	English Language	2013	Language Content(a) Structural Items : - Simple, Compound and Complex Sentences. - Co-ordinate Clauses (With, But, or Neither- Nor , Otherwise, Else) - Sub-Ordinate clauses-noun clauses-as subjects, objects and Complement . - Relative Clauses (Restrictive and non Restrictive clauses) - Adverb clauses (open and hypothetical, conditional: With Because, though, Where, So that as long as, as soon) - Comparative clauses (as + adjective/adverb + as no sooner -----that)(b) Tense: - Simple Present Progressive and present Perfect - Simple Past, Progressive and Past Perfect - Indication of futurity(c)- The Passive (Simple Present and Past, Present and Perfect and to Infinitive Structure)(d)- Reported speech - Declarative Sentences - Imperatives - Interrogative wh Question, Yes/No Questions. - Exclamatory sentences.(e)- Module (Will, shall, would, ought, to have to/have to/ have got to/ can could, may-might and need )(f) – Verb Structures (Infinitive and gerundial)(g) – Linking devices Note :- The above Language Items will be Introduced to Express the Following Communicative Functions : (a) - Seeking and imparting information.(b) – Expressing attitudes – Intellectual and emotional \ (c) – Persuasion and Discussion etcUnit – II Reading Comprehension Adequate Practice

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1082	BBA 102	Business Communication	2012	Unit – ICommunication: Definition, Nature, Importance to Manager, Communication Process and its Elements Means of Communication and Methods, Barriers to CommunicationUnit – IIOral Communication: Speeches for Different Occasions Guide Lines, Listening (Problems and Guide Lines)Unit – IIIInterview : Process, Problem Guidelines, Group Discussions, Conference, Responsibility of Chairman and ParticipantsUnit – IVWritten Communication: Essentials of Good Business Letters, Types of Business Letters, Types of Business Letters Business Correspondence, lay out Business Letters, Different Types of drafts for Replies to Requests, Orders, Reply to Orders, Letters of Complaints, Circular Letters, Agency Letters, Foreign Trade Letters and job Application, Various Types of Advertisements, Notices, Agenda and Minutes, Press Releases, Telegrams, Report Writing Structure of Report.Unit – VNon – Verbal Communication: Types and its uses and Importance in Business Communication
1083	BBA 103	Economics	2012	Unit-Introduction to Economics: Definition, Nature and Scope of Economics. Micro and Macro Economics, Role of Economics in Decision Making.Unit-IIDemand Analysis and Supply Analysis: Meaning of Demand, Types of Demand, Law of demand, Determinants of Demand, Demand Function, Elasticity of demand- price elasticity of demand. Income elasticity of demand, Cross Elasticity of demand, Law of Supply, Supply Schedule, Supply Curve, Price elasticity of supplyUnit-IIIProduction Analysis: Production function, Types of Production Function, Law of Returns, Law of variable proportions, Law of Increasing Returns, Law of Constant Returns, Law of Diminishing returns, Returns to scale.Unit-IVMarket Structures: Meaning of Market, Classification of markets, Perfect Competition, Imperfect Competition, Monopolistic Market, Oligopoly Market, and Duopoly Market.Unit-VNational Income: Meaning, Definition and importance of Macro Economics – National Income: Meaning, Definitions: National Income, GNP & NNP, GDP & NDP, Personal Income (PI), Disposable Income (Di), Per Capita Income (PCI), Real National Income (RNI).
1084	BBA 104	Fundamentals of Accounting	2012	Unit – IAccounting: Meaning Scope & Nature, Advantage and limitations of Book Keeping & Accounting.Unit – IIC Conceptual Framework of Accounting: Accounting Principles, Accounting Concepts, Accounting Conventions Systems of Books Keeping, Double Entry System of Books Keeping.Unit – IIIFinal Accounts: Manufacturing Account, Trading Account, Profit & loss Account, Balance Sheet and Adjustments.Unit – IVDepreciation Accounting: Concept, Causes Methods of Providing Depreciation on Different Assets and Depreciation Policy.Unit – VSubsidiary book of account- Introduction, meaning and type cash book, Cash book, Pass book.
1085	BBA 201	Principles of Management	2012	Unit – IConcept of Management: Definition Management, Functions and Responsibilities of Management, Levels of Management, Management Thought and Thinkers, Robert Owen, F.W.Taylor, Henry Fayol etc. Neo Classical Theories,Unit – IIPlanning: Objective, types and level of planning, Strategies and Policies, SWOT analysis, Decision Making-Meaning, ImportanceUnit – IIIOrganizing: Nature and purpose of organizing, Nature& Scope of Staffing, Manpower Planning Organization structure, organization -Line and Staff authority, Delegation of authorityUnit – IVDirecting: Creativity, Innovation Motivation-Motivation Theories, Leadership, Leadership theories Communication, Organization Culture- Managing cultural diversity.Unit – VControlling: Meaning, Process and Control Techniques, Types of control- Maintenance Control, Quality Control, Managing Productivity, Cost Control
1086	BBA 202	Business Statistics	2012	Unit – IMeaning and Definition of Statistics, Statistical Investigations Distrust Laws of Statistics, Scope of Statistics, Lamination of Statistics.Unit – IICollection of data, Presentation of data, Frequency Distribution, Primary and Secondary Data.Unit – IIIMeasures of Central Tendencies : Mean, Median, Mode Geometric, Mean, Harmonic Mean.Unit – IVDispersion – Quartile Deviation, Mean Deviation and Skewness.Unit – VCorrelation Analysis : Karl Pearson's, Spearman's Rank Correlation. Coefficient of Concurrent Deviation
1087	BBA 203	Financial Accounting	2012	Unit – IAnalysis of Financial Statement – Ratio Analysis, Trend Analysis, Comparative Statement, Common Size Statement.Unit – IIMeaning of Fund Flow Statement, Cash Flow Statement BEP AnalysisUnit – IIIMeaning of Single Entry System, Hire Purchase AccountingUnit – IVInventory Valuation – Methods, FIFO, LIFO, HIFO, Average Cost Method, Weighted Average Cost Method.Unit – VCost Accounting – Cost Sheet, Standard Cost – Basic Concepts, Cost Reconciliation Statement.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1088	BBA 204	Business Laws	2012	Unit – IContract Act, Essentials of Valid Contract, Capacity to Contract, Minors Contract, Free – Consent Performance of the ContractUnit – IIUnlawful &Void Agreements, Discharge of Contract, Remedies for breach of Contract.Unit – IIIBailment, Pledge & Agency, Law of Sale of Good Act. Conditions & Warranties.Unit – IVGST- Meaning, Importance, advantage and disadvantage. Impact of GST on Indian economy.Unit – VRights of Unpaid Seller & Suits for Breach of Sale of Goods Contract.
1089	BBA 301	Marketing Management	2012	Unit-INature and Scope of Marketing. Management philosophies. Marketing system and Environment, consumer Behaviour , consumer market and industrial market , Decision making process in Buying.Unit-IIMarket segmentation, grouping of market targeting and positioning, product decisions.Unit-IIIMarketing Mix : Elements of marketing Mix , Product Mix ,Branding and package decisions, promotion mix.Unit-IVPricing decisions, Methods of setting prices, pricing strategies, production.Unit-VChannel of Distribution, Marketing channels and agencies. Marketing research and Marketing information system
1090	BBA 302	Personnel Management	2012	Unit-IConcepts and Functions of personal, management. Structure and Role of Personnel Management, Line & staff Manpower planningUnit-IIStaffing Policy and process: management planning, job analysis, job description, job specification, Recruitment, Selection, Induction, Placement and Promotion.Unit-IIIManpower training and development: Employee training, Performance appraisal. Unit-IVWage and Salary Administration : Job evaluation, Designing salary structure.Unit-VIndustrial disputes & Participative Management, Grievance and Grievance handling procedures, Disciplinary action, Trade unions
1091	BBA 303	Financial Management	2012	Unit-IMeaning of Finance, Finance Function, Approaches to Finance Function, objectives, Financial decisions.Unit-II\Capitalization, Capital, Sources of Capital, over and under capitalization.Unit-IIIFinancial analysis, tools and Techniques, ratio analysis, Fund flow, case flow Analysis.Unit-IVWorking capital management and capital structure.Unit-VCapital Budgeting, Methods of Investment evaluation, pay back Period, Accounting rate of return,discounted cash flow method and internal rate return.
1092	BBA 304	Production Management	2012	Unit-IIntroduction Production function, Nature and Scope of production Management,Unit-IIProduction Process – Intermittent System, continues System, Production Planning and control.Unit-IIIPlant Location and Plant Layout, Productivity Production order and work study.Unit-IVRouting, Scheduling, CPM and PERT, Inventory management,Unit-VDemand Forecast, Quality Control and Plant Maintenance
1093	BBA 305	Business Organization	2012	Unit – IBusiness Organisation – Nature and Purpose of business, Economic Activity –Meaning and Objectives, Characteristics of Business, Essentials of successful Business.Unit - IIForms of Business Organizations – Sole Proprietorship Partnership Types. Formation, Rights & Duties; Co ownership, Joint Hindu Family Firm, Joint Stock Company, Cooperative Organisations – Types & Formation, Factors influencing choice of suitable type.Unit – IIIPromotion of a Company: Formation and Incorporation of a company ,Capital Subscription, Memorandum and Articles of Association, Prospectus, Types of Companies: Classification Exemptions & Privileges of Private Companies.Unit –IVPublic Enterprise : Role of Government , Regulation of Economic Activities, Rationale of Govt. Role Forms of Public Enterprises Public Corporations Govt. Companies , Joint Sector Companies and public Utilities. Small Business: Definition, Scope, Role, Govt, Policy, Operating problems of small Business, Role and Importance.Unit –VSocial Responsibilities of Business: Concept, Business Ethics, Business Values, Social Responsibility of Business in India Corporate Governance: Definition, Need, Importance and Principles of Corporate Governance.
1094	BBA 401	Organizational Behavior	2012	Unit – IIntroduction to Organizational Behaviors- feature, purpose, goal, models of organization behaviorUnit – IIPerception-definition, process, factors, Personality-definition, trait, theories, Learning, Motivation- definition and theoriesUnit – IIILeadership-types, style, theories, group and team, group dynamics, group decision makingUnit – IVOrganization power and politics, conflict- resolution management. Grievance handling, Stress managementUnit – VPerformance evaluation, Organization development Organizational change, Communication, Stress management Culture systems
1095	BBA 402	Business Policy	2012	Unit-IIntroduction to Business Policy & Strategic management. Nature, importance & purpose of business policy.Unit-IIBusiness definition & objectives, Mission & purpose, Characteristic.Unit-IIINature of strategic decision making approaches and process of strategic managementUnit-IVSWOT Analysis, Environmental appraisal organizational appraisal & selective factor & process of strategic choice.Unit-VSocial responsibilities & Strategic Management, Corporate Culture Corporate Policies.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1096	BBA 403	Quantitative Techniques	2012	Unit – I Nature and Importance of quantitative Techniques in statistical data interpretation. Unit – II Standard Deviation, Variation, Covariance. Unit – III Forecasting – Concept, Techniques, Advantages, Disadvantages, Methods. Unit - IV Time Series - Concept, Advantages, Disadvantages, Methods, Simple Average Method, Moving Average Method, Seasonal Variation Method. Unit – V Index Numbers – Simple Average Method, Aggregative Method, Marshall, Fisher Index Number
1097	BBA 404	Research Methodology	2012	Unit – I Introduction: concept, meaning, definition and importance of research in business. Unit – II Types of Research, Applied research, Fundamental research and other types of research. Unit – III Identification & research problem, Deciding Hypothesis, objective and methodology, sampling concept Importance & techniques. Unit – IV Data collection – Data and reference – concept, sources of data, primary data collection – Questionnaire schedule, case analysis, Interview, census & sampling enquiry. Unit – V Tabulation, Interpretation & Report writing, Diagrammatic representation of statistical Data, Charts, Graphs and Diagrams.
1098	BBA 405	Entrepreneurship	2012	Unit I Entrepreneur and Entrepreneurship : Concepts, Characteristics and functions of an Entrepreneur, Types of Entrepreneur, Major Entrepreneurial Competencies, Developing Competencies and Role of enterprises in Economic Development. Unit II Project Identification and Formulation: Criteria for Selecting a particular Project, Scanning Of Business Environment and identifying Projects, Steps in Project Formulation and Project Evaluation (Organizational, Commercial and Legal Aspects). Unit III Preparation of Business Plan / Project Report : Significance, Contents, Formulation, Planning Commission Guidelines for Formulating the Project report and Common Errors in Project Formulation. Unit IV Institutional Finance to Entrepreneurs: commercial Banks, Financing Institutions (IDBI, IFCI, IRBI LIC, UTI, SFC, SIDC, SIDBI and EXIM Bank). Unit V Institutional Support to Entrepreneurs : Needs, Support Institutions. Small, Small Scale Industries, State Small Industries Development Corporation (SSIDC), Small Industries Service Institutes (SISI), Industrial Estates, Specialized Institutes and Technical Consultancy Organizations (TCOs)
1099	BBA 501	Management Information System	2012	Unit – I MIS:- Definition, objectives, benefits, function, role of an MIS, utility. Concept information and system, Information System, Information need, Planning organization and control. Unit – II Computer:- Organization of computer, Its functional units, introduction to computer software, Use of computer in MIS, Application of computer, emerging trends of computer and MIS. Unit – III Process of MIS Development:- Analysis, design, selection of design, development, implementation and maintenance. SDLC, Prototyping. Conversion of manual MIS into computerized MIS. Unit – IV Implementation of MIS, its stages and evaluation and monitoring of the system, Maintenance of the system. Unit – V Decision Making:- Types and phases, process of decision making, DSS, IS Support to decision making process
1100	BBA 502	Retail Concepts and Strategies	2012	Unit – I Introduction to retail management. The concept of retailing. Nature and scope, Function of Retailers. Unit – II The evolution of retail in India, types of Retail Stores, Retail Models and theories of retail development. Unit – III Retail Marketing mix, Retail communication mix. Role of advertising, Sales promotion. Public relations and Personal selling in retailing. Unit – IV Supply chain management in retailing, management of service and quality in retailing. Unit – V Retail stores operations, Mall management, setting objectives for retailers' performance, Management of retail brand. REFERENCE BOOKS: 1. Retailing management by Swapna Pradhan, Tata M
1101	MCA205	Java Programming & Technologies	2020	UNIT I : The Java Environment: History of Java: Comparison of Java and C++; Java as an object oriented language: Java buzzwords; A simple program, its compilation and execution; the concept of CLASSPATH; Basic idea of application and applet; Basics: Data types; Operators- precedence and associativity; Type conversion; The decision making – if, if-else, switch; loops – for, while, do...while; special statements– return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords. Object Oriented Programming in Java: Class; Packages; scope and lifetime; Access specifiers; Constructors; Copy constructor; this pointer; finalize () method; arrays; Memory allocation and garbage collection in java keywords Inheritance: Inheritance basics, method overriding, dynamics method dispatch, abstract classes. UNIT II : Interfaces: defining an interface, implementing & applying interfaces, variables in interfaces, extending interfaces. Multithreading and Exception Handling: Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread. Selfish threads: Basic idea of exception handling: The try, catch and throw, throws, Constructor and

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1102	BSM II	Advertising Management	2012	UNIT-IAdvertising"s Role in the Marketing Process: Legal Ethical and Social Aspects of Advertising; Process of Communication- Wilbur Schramm"s Model.UNIT-IIDagmar Approach- Determination of Target Audience; Building of Advertising Programme-Message, Headlines, Copy, Logo, Appeal, Layout.UNIT-IIICampaign Planning; Media Planning; Budgeting Evaluation-Rationale of Testing Opinion and Aptitude Tests, Recognition, Recall, Experimental Designs; Advertising Organisation- Selection Compensation and Appraisal of an Agency; Electronic Media BuyingUNIT-IVAdvertising campaign-Advertising V/s Consumer behaviour; Sales promotion- Role of Creative strategies; Advertising- Retail, National, Cooperative, Political International, Public Service Advertising.UNIT-VTwo Step Flow of Communication Theory of Cognitive Dissonance and Clues for Advertising Strategists: Stimulation of Primary and Selective Demand- Objective Setting and Market Positioning.
1103	BSF I	Working Capital Management	2012	Unit-1Concept of Working Capital Management, Importance of Working Capital, Kinds of Working Capital, Factors Determining Working Capital, Estimating Working Capital Requirements;Unit-2Management of Cash -Motives for Holding Cash and marketable securities; Cash System, Managing the Cash Flows. Cash Concentration Strategies, Disbursement tools,Unit-3Investment in Marketable Securities; Forecasting Cash Flows; Managing Corporate Liquidity and Financial Flexibility; Measures of Liquidity,Unit-4Receivable Management- Determining the appropriate Receivable Policy, Marginal Analysis, Credit Analysis and Decision, Inventory Management-kinds of Inventories, Benefits and Costs of Holding Inventories, InventoryUnit-5Management and Valuation of Inventory control and Capital Investment Processes
1104	BSF II	Investment Analysis and Portfolio Management	2012	Unit- IOverview of Investment Concept of Investment; Various Investment Alternatives; Application of Investment Alternatives; a Case Study on Investment Alternatives.Unit-IIOverview of Risk Management Concept of Risk Management; Analysis of Risk Management; a Case Study on Risk Management.Unit-IIITrading of Securities Introduction to Markets and their Functions; Development of Securities Market in India; SEBI and its Role in Primary and Secondary Market; SEBI and its Functions.Unit-IVPortfolio Management Introduction to Portfolio Management; Relation between Risk and Return; Optimal Portfolio; Capital Asset Pricing Model; its Valuation and Validity; Case Study.Unit-VPortfolio analysis: concept, advantage of optimum portfolio management.
1105	BSHR I	Human Resource Management	2012	Unit-IIntroduction : Nature and Concept of HRM: Scope Human Resource Management, Personnel Management, Human Resource Development, Importance of HRM and present day challenges, Understanding the present day scenario, strategic HRM Human Resource Planning: The process of Human Resource Planning, Limitations.Unit-IIRecruitment &selection : Job Analysis, Job description, job specification, recruitment, source of recruitment selection, placement and induction and socializationUnit-IIIITraining & development. Types and method, job change – career planning, promotion, demotion, transfer, retirementUnit-IVCompensation Function: Job evaluation – Merit rating – Methods" of wage, payment, incentive compensation – Types, advantages, perquisites. Wage system in India – Minimum wage, fair wage, living wage.Unit-VMaintenance and Integration Functions: Employee grievances and their redressed, suggestion schemes, administration of discipline.
1106	BSHR II	Training and Development	2012	UNIT-I Training process- an overview; role, responsibilities and challenges to training manager;organization and management of training function; training needs assessment and action research;UNIT-IIITraining climate and pedagogy; developing training modules; training methods and techniques; facilities planning and training aids; training communication; training evaluation; training and development in India.UNIT IIIITraining and Development Methodologies : Overview of Training Methodologies- Logic and Process of Learning; Principles of Learning; Individual differences in learning, learning process, Skills of an Effective Trainer; Use of Audio-Visual Aids in training; Computer Aided Instructions- Distance Learning, Open Learning, E- Learning; Technologies Convergence and Multimedia Environment.UNIT IVDesigning Training and Development Programs: Organization of Training and Development programs, Training design, kinds of training and development programs- competence based and role based training; orientation and socialization; diversity training, choice of training and development methods.UNIT VEvaluation of Training and Development: Reasons for evaluating Training and development programs, Problems in evaluation; Evaluation planning and data collection, different evaluation frameworks, Problems of Measurement and Evaluation.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1107	BSBF I	Introduction to Banking System	2012	UNIT – IIntroduction to Indian Banking System, Reserve Bank- Legal framework and main functions, Different types of accounts, Banker customer relationship, customer services in banks, KYC norms and antimoney laundering.UNIT – IITechnology in banks, Payment and settlement system in banks- New age clearing, national gateways, international gateways, Retail banking, Treasury management, priority sector lending.UNIT – IIIReserve Bank of India- Legal framework and main functions Commercial Banking, public, private, foreign, co-operative sector Different types of bank accounts.UNIT – IVTypes of Banks, Commercial banks, industrial banks, Cooperative banks and rural banks, marketing of banking and insurance services, Contemporary issues in banking and insurance.UNIT – VCheques, types of cheque, online payment system, debit and credit payment system.
1108	BSBF II	Financial Institutions and Market	2012	UNIT-IIntroduction to Indian financial system: Role/ functions, component, constituents,/ development, role in economic development, weaknesses of Indian financial system. Financial Services: Concept, Nature & Scope of Financial Services.UNIT-IIFundamentals of Mutual Funds, Merchant Banking, underwriting Securitization of debt, leasing, hire purchase, venture capital, factoring & forfeiting, Discounting, Credit rating & Credit CardUNIT-IIIFinancial Institutions: Fundamentals & Basic Concept Role & important of Financial institutions, Banking financial institute, non Banking Financial institutions.UNIT-IVWorking and organization of Different Financial institutions in India: RBI, IFCL, ICICI, IDBI, UTI, LICUNIT-VHire purchase, venture capital, factoring & forfeiting, Discounting, Credit rating & Credit Card
1109	BBA 601	Environmental Mangement	2012	Unit – IThe Multi disciplinary nature of environmental studies Definition. Scope and importance Need for public awareness Natural Resources.\Unit-IIRenewable and non-renewable resources: Natural resources and associated Problems. Forest resources Use and over- exploitation, deforestation, case studies.Unit – IIIConcept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.Unit – IVIntroduction Definition: genetic, species and ecosystem diversity. Biogeographically classification of India. Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.Unit – VEnvironmental Pollution Definition, Causes, effects and control measures of:- Air pollution, Water pollution , Soil pollution, Marine pollution, Noise pollution, Thermal pollution , Nuclear hazards.
1110	BBA 602	E-Commerce	2012	Unit I:Framework for understanding e- business: Introduction to e- commerce, Environmental forces affecting planning and practice, Ethical, legal and social concerns.Unit II:Developing e- Business Frame work: Developing e- Business Models, Introduction to Internet, www. Concepts, Building of e- commerce websites, software hardware and tools.Unit III:Planning, Implementing and Controlling of e- Business: Creating the Marketing Mix, Organizational and Managerial issues, Financial Planning and Working with Investors, Implementation and Control of the e- Business Plan.Unit IV:Understanding of Key terms of E- Commerce: Electronic Commerce & Banking, Electronic Payment Systems, Electronic Payment Technology, On- line credit card, E- Commerce SecurityUnit-VNetwork Infrastructure for E-Commerce – I: Local Area Network (LAN), Ethernet: IEEE 802.3: Local Area Network (LAN) Protocols, Wide Area Network (WAN), The Internet, TCP/IP Reference Model, Domain Names, Hyper Text Markup Language(HTML), Simple Exercises in HTML
1111	BSM III	International Marketing	2012	UNIT-IInternational Marketing –definition ,concept and setting; Distinction between international Trade ,Marketing and Business ;Economic environment of international Marketing ;International Institutions –World Bank, IMF, WTO, UNCGTAD, Common Markets, Free Trade Zones, Economic Communities.UNIT-IIConstraints on International Marketing –Fiscal and non FiscalBarriers ,Non Tariff Barriers; Trading Partners - Bilateral Trade Agreements, Commodity Agreements and GSP; India and World Trade ,Import and Export Policy ,UNIT-IIIPublic Sector Trading Agencies, ECGC, Commodity Boards etc. Procedure and Documents –Registration of exporters, Export Quotations, Production and clearance of goods for export ,UNIT-IVInternational Marketing mix-Identification of markets ,Product policy , International product life cycle, promotion strategy, pricing strategy and distribution strategy; various forms of international business ; marketing of joint ventures and turnkey projectsUNIT-VDirection and Quantum of India's Exports; Institutional Infrastructure for Export Promotion; Export Promotion councils. Shipping and Transportation ,Insurance ,Negotiation of Documents; Instruments of Payments-Open Account , Bills of Exchange ; Letter of credit-Export finance



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1112	BSM IV	Sales and Distribution Management	2012	UNIT-IIntroduction: definition, objectives, Functions and Classification of Sales Management. The Sales Organization: Purpose, Principles and Policies of Sales Organization, Setting up of the Sales Organization, Typical Sales Organization Structure.UNIT-IIManagement of Sales Force: Recruiting and Selecting Sales Personnel, Developing and Conducting Sales Training Programmes, Designing and Administering Compensation Plans, Supervision of Salesman, Motivating Sales Personnel, Sales meetings and contests.UNIT-IIISales Forecasting, Methods, Designing Territories and allocating Sales efforts, objectives and quotas for Sales Personnel, Developing and managing Sales evaluation programme.UNIT-IVDistribution: Overview of Marketing Channels, their Structure, Functions and Relationships; Channel Intermediaries-Wholesaling and Retailing; Logistics of Distribution; Channel Planning.UNIT-VOrganizational Patterns in Marketing Channels; Managing Marketing Channels; Marketing Channel Policies and Legal issues; Information System and Channel Management; Assessing Performance of Marketing Channels; International Marketing Channels.
1113	BSF III	International Financial Management	2012	UNIT-IMultinational Financial Management –An overview, Evolution of the international Monetary and International Finance System,UNIT-IIMultinational Capital budgeting Application and interpretation, Cost of Capital Structure of the multinational Firm, Dividend Policy of the Multinational FirmUNIT-IIITypes of Foreign Exchange Market, Organization of the Foreign Exchange Market UNIT-IVCorporate Exposure Management, Parameters and Constraints On Exposure ManagementUNIT-VManaging short-term assets and liabilities, long-run Investment Decision, The foreign Investment Decision.
1114	BSF IV	Indian Financial System	2012	Unit IIntroduction to Financial System: meaning, functions, role of financial system in economic development and growth.Unit IIFinancial Markets, Meaning, Role, Functions, classification of financial markets Money Market: Commercial Bill market; Treasury Bill market, Capital Market: Primary Market, Secondary Market.Unit IIIFinancial Institutions and Instruments, Financial Institutions Meaning, Functions and Role of Financial Institutions; Banking and Non-banking Financial Institutions.Unit IVFinancial Instruments Meaning, importance and classification of Financial instruments; Short-term, Mediumterm and Long Term Instruments; Primary and Secondary Securities; Innovative Instruments.Unit VFinancial Services, Meaning, importance and types of Financial Services; Fund Based services and Fee Based services
1115	BSHR 3	Industrial Relations	2012	UNIT-IIndustrial Relations Perspectives; Industrial Relations and The Emerging Socio-economic Scenario; Industrial Relations and the state; Legal Framework of Industrial RelationsUNIT-IIRole and Future of Trade Unions; Trade Union and the Employee; Trade Union and the Management ; Discipline and grievance Management; Negotiation and Collective Settlements; Participative Management and Co-ownership; Productive Bargaining and Gain Sharing; Employee Empowerment and Quality Management; Industrial Relations and Technological Change.UNIT-IIIConceptual and Theoretical Understanding of Economic Theory Related to Reward Management; Competitive Imperatives; Productivity, Quality , Service, Speed , Learning; Planning for improved Competitiveness; Diagnosis and Bench marking, Obtaining Commitment;UNIT-IVUnderstanding tools Used in Designing, Improving and Implementing Compensation Packages; Compensation Designs for Specific type of Human Resources like Compensation of Chief Executives, Senior Managers, R&D Staff,etc; Understanding different components of Compensation Packages like Fringe Benefits, Incentives and RetirementUNIT-VCompensation Practices of MNC"s and Strategic Compensation Systems: Statutory Provisions governing different Components of Reward System: Working of different Institutions
1116	BSHR IV	Compensation Management	2012	UNIT-IConceptual and Theoretical understanding of Economic theory related to reward management; Competitive Imperatives; Productivity, Quality, Service, Speed, Learning, Planning for Improved Competitiveness; Diagnosis and Benchmarking- Determination of Inter and Intra-industry Compensation differentials; Internal and external Equity in compensation system.UNIT-IIUnderstanding tools used in Designing, Improving and Implementing Compensation packages; Compensation designs for Specific Type of Human Resources like Compensation of Chief Executives, Senior managers, R & D Staff. UNIT-IIIUnderstanding different components of compensation packages like fringe benefits, incentives and Retirement Plans; Compensation Practices of Multinational Corporations and Strategic Compensation Systems.UNIT-IVStatutory Provisions governing Different Components of Reward systems. Working of different Institutions Related to Reward System Like Wage Boards, pay Commissions etc.UNIT-VCompensation Practices of MNC"s and Strategic Compensation Systems; Statutory Provisions governing different Components of Reward System; Working of different Institutions related to Reward System like Wage boards, Pay Commissions.

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1117	BSBF III	Banking and Insurance	2012	UNIT-I Banker – Customer Relationship: Definition and Meaning of “Banker” and “Customer” – Permitted activities of Commercial Banks in India – General and Special Features of their relationship, Their rights and duties. UNIT-II Deposit Accounts: Opening Operations and Closure, Fixed Deposit Account, Recurring Account, Savings Account, Current Account, Deposit Schemes for NRIs. UNIT-III Accounting conventions, basic accounting principles, bank reconciliation statements, procedure leading to preparation of final accounts, self-balancing ledgers, Accounting in banking companies. UNIT – IV Introduction and Scope of Insurance- Historical perspective, Conceptual Framework, Meaning, Nature and Scope of Insurance, Classification of Insurance Business viz., Life Insurance and General Insurance. UNIT – V Financial Aspects of Insurance Management-Role of Financial Institutions, Insurance Companies. Important Life Insurance Products and General Insurance Products Determination of Premiums and Bonuses Various Distribution Channels
1118	BSBF IV	Marketing of Financial Services	2012	Unit II Indian banking system, Scheduled & Non-scheduled Banks, Commercial Banking System. Unit III Insurance- Concept, Types, Contract of Indemnity, IRDA. Unit IIII Venture Capital, Factoring for Failing and Bill Discounting, Insurance. Unit IV Mutual Funds- Meaning, Types, AMFI, Mutual Funds in India. Unit V Other Financial services Leasing and Hire Purchase; Debt Securitization; Housing Finance, Credit Rating; Credit Cards.
1119	BPT-101	HUMAN ANATOMY	2015	General Anatomy: Unit - 1 Introduction to Anatomy, terms and terminology, Regions of Body, cavities and Systems outline, Surface anatomy – musculo-skeletal and cardiopulmonary, Cell Structure and function of cell organelles (Brief outline only), Connective tissue & its modification, tendons, membranes, Special connective tissue, Bone structure, blood supply, growth, ossification, and classification Unit - 2 Upper extremity Unit - 3 Lower Extremity Unit - 4 Spine Unit - 5 Thorax Unit - 6 CNS: Unit - 7 Kinesiology : Basic Concepts, Muscular system, Joints, Machinery Musculoskeletal system, Principles of Motion, Principles of force and work, Basics of the development of motor skill, Principles of stability, Postural principles
1120	BPT-102	HUMAN PHYSIOLOGY	2015	UNIT - 1 GENERAL PHYSIOLOGY: Structure of cell membrane, Transport across cell membrane, Functional morphology of the cell, Intercellular communication, Homeostasis UNIT - 2 CARDIOVASCULAR SYSTEM. UNIT - 3 RESPIRATORY SYSTEM . UNIT - 4 CARDIO RESPIRATORY ADJUSTMENTS IN HEALTH & DISEASE. UNIT - 5 BLOOD. UNIT - 6 RENAL SYSTEM. UNIT - 7 DIGESTIVE SYSTEM UNIT - 8 NERVE - MUSCLE AND SYNAPTIC & JUNCTION TRANSMISSION . UNIT - 9 NERVOUS SYSTEM. UNIT - 10 HIGHER FUNCTIONS OF NERVOUS SYSTEM . UNIT - 11- SPECIAL SENSES. UNIT - 12 ENDOCRINE. UNIT - 13 REPRODUCTIVE SYSTEM. UNIT- 14 EXERCISE PHYSIOLOGY UNIT - 15 SKIN AND BODY TEMPERATURE REGULATION
1121	BPT-103	FUNDAMENTALS OF MEDICAL ELECTRONICS & PRINCIPLES OF BIOELECTRICAL MODALITIES	2015	UNIT- 1 Mechanics - Definition of mechanics and Biomechanics. UNIT - 2 Force UNIT -3 Friction, UNIT- 4 Gravity UNIT 5- Equilibrium UNIT 6- Levers UNIT- 7 Pulleys UNIT- 8 Elasticity UNIT- 9 Springs UNIT- 10 biomechanical modalities UNIT- 11 Posture
1122	BPT-104	FUNDAMENTALS OF MEDICAL ELECTRONICS & PRINCIPLES OF BIOELECTRICAL MODALITIES	2015	Section – A: FUNDAMENTALS OF MEDICAL ELECTRONICS & MAGNETISM DC Currents , A. C. currents, Capacitors , Rheostat , Effects of electric Current, Electric shock, Magnetism, Electromagnetic induction. Section – B: Electronic Devices Thermionic Valves, Semiconductor Devices, Electronic Circuits , A.C. AND D.C. meters , Therapeutic Energies , Electromagnetic spectrum. Section – C: Bioelectrical Modalities Medical Instrumentation For Physical Therapy: Brief description of generation, circuit diagrams and testing, Low frequency currents, Direct currents, Medium frequency currents, Short wave Diathermy-continuous and pulsed, Microwave Diathermy, Ultrasound, Actino-therapy – Infrared- Types of generators , UVR-generators , types, dosimetry and LASER- Productions & instrumentation, classification and physiological effects.



### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1123	BPT- 105	PSYCHOLOGY & SOCIOLOGY	2015	<p>PSYCHOLOGY (PART - A)</p> <p>UNIT- 1 What is psychology? Fields of application of psychology, influence of heredity and environment on the individual. UNIT- 2 Learning UNIT- 3 Memory, UNIT- 4 Thinking UNIT- 5 Motivation UNIT- 6 Emotions UNIT -7 Attitudes UNIT -8 Intelligence UNIT - 9 Personality, UNIT - 10 Development and growth of behavior in infancy and childhood, adolescence, adulthood and old age, UNIT- 11 Behavior UNIT - 12 Counseling . UNIT- 13 Psychotherapy.</p> <p>SOCIOLOGY (PART - B)</p> <p>UNIT- 1 Introduction and scope of Sociology, Its relation with Anthropology, Psychology, Social Psychology and ethics, Methods of Sociology</p> <p>UNIT - 2 Social Factors. UNIT- 3 Socialization. UNIT- 4 Social Groups UNIT - 5 The family UNIT- 6 Rural community UNIT- 7 Urban community UNIT- 8 Culture and Health</p> <p>UNIT-9 Social problems of disabled UNIT- 10 Population explosion - Poverty and unemployment, Beggary, Juvenile delinquency, Prostitution, Alcoholism, Problems of women in employment, UNIT- 11 Social security UNIT - 12 Social worker: Meaning of social work; the role of a medical social worker.</p>
1124	BPT-201	Pathology & Microbiology	2015	<p>SECTION A: PATHOLOGY - UNIT- 1 Aims and objectives of study of pathology, Concept of Diseases, Classification of Lesions, Brief outline of cell injury, degeneration, necrosis and gangrene, Brief concepts of inflammation and Repair, Degeneration, Necrosis and Gangrenes. UNIT- 2 Inflammation, UNIT - 3 Vitamin Deficiency Diseases UNIT- 4 Vascular disturbances: Oedema, Thrombosis, Embolism, Hemorrhage and Shock. UNIT-5 Blood Disorder: Anemia, Leukemia, Hemorrhagic disorders, UNIT- 6 Neoplasia. UNIT 7- Respiratory system diseases - Pneumonia, Bronchitis, Bronchiectasis, COPD, Asthma, Emphysema, Pulmonary Tuberculosis, Lung cancers, Restrictive Lung disease and Occupational Lung diseases, UNIT- 8 Cardiovascular system: - IHD, myocardial infarction, CCF, HT, Rheumatic heart disease, Congenital heart disease, Arteriosclerosis, Thrombo-angitis, Vasomotor- Raynaud's, venous thrombosis, Gangrene, Lymph edema. UNIT- 9 Alimentary system - Peptic ulcer, Carcinoma of stomach, Ulcerative lesions of Intestine. UNIT - 10 Liver - Hepatitis, Cirrhosis and Hepatoma, UNIT-11 Pancreas - Pancreatitis, Carcinoma of Pancreas, Diabetes. UNIT - 12 CNS and PNS: Meningitis, Encephalitis, Parkinson's, Amyotrophic lateral sclerosis, Ataxias, Multiple Sclerosis, stroke, Neuropathies, Poliomyelitis and post-polio syndrome, Myasthenia Gravis, brief outline of C.N.S. Tumours and peripheral nerve lesions. UNIT- 13 Musculoskeletal system - osteomalacia, Osteoporosis, Osteomyelitis, Osteoarthritis, rheumatoid arthritis, Gout, spondyloarthropathy, Osteonecrosis, bone tumors, Myofascial pain syndrome, Poliomyelitis, Myopathies, Volkman's ischemic contracture, UNIT- 14 Skin - Scleroderma, Psoriasis, Autoimmune disorders. UNIT-</p>
1125	BPT-202	BIOCHEMISTRY & PHARMACOLOGY	2015	<p>SECTION- A BIOCHEMISTRY - UNIT-1 Basic Biophysics: Osmosis, Viscosity, Surface tension, Dialysis with special emphasis on their biomedical implication.</p> <p>UNIT-2 General Biochemistry with Biomedical functions</p> <p>Nutrition: ; Carbohydrates, Proteins and Lipid caloric requirement and balance diet, Carbohydrates and Metabolism ; Lipids. Essential fatty acids, cholesterol, Blood lipids. lipoproteins and Metabolism. Proteins and Metabolism. Formation and fate of ammonia, Nucleic Acids- Nucleosides and Nucleotides. General Biochemistry of muscle contraction and relaxation.</p> <p>UNIT - 3 Bioenergetics - Plasma Membrane, laws of thermodynamics . Concept of free energy charge. High-energy compounds and Respiratory chain.</p> <p>UNIT- 4 General Metabolism - Carbohydrate metabolism: Glycolysis, TCA, Glycogen metabolism, blood sugar regulation, Diabetes and Diabetic Ketoacidosis, Lipids Metabolism: Beta-oxidation of Fatty acids, Fatty acid synthesis, cholesterol synthesis, Ketosis and Fatty liver, Protein Metabolism: General reaction of Amino acids, Formation and fate of Ammonia, Urea cycle, Purine and Pyrimidine: Only catabolism of Purine to be Stressed in detail with special emphasis on Gout. General breakdown of Pyrimidine and associated disorders.</p> <p>UNIT-5 General outline of fluid compartments of the body with their water and electrolyte content and balance, Dehydration.</p> <p>SECTION : B - PHARMACOLOGY -UNIT-1 General Pharmacology - drug, Pharmacokinetics and Pharmacodynamics, Broad</p>

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1126	BPT-203	MEDICINE INCLUDING PAEDIATRICS & GERIATRICS	2015	<p>UNIT- 1 Infections - Bacterial – Tetanus, Typhoid, Viral – Herpes simplex, Herpes Zoster, Measles, Hepatitis –B. and HIV, Protozal – Filariasis, Malaria, Amoebiasis.</p> <p>UNIT- 2 Diseases of blood- Anaemias, Bleeding Disorder with emphasis to Haemophilia, Lymphadenopathy and splenomegaly, Leukaemia, Diseases of Liver; Jaundice, Viral Hepatitis, Cirrhosis of Liver, GIT Diseases; Peptic Ulcer, Diarrhea and Dysentery, Renal Diseases;acute and Chronic renal Failure, Urinary Tract Infection, Acute Nephritis, Nephrotic Syndrome.</p> <p>UNIT- 3 Nutritional and Metabolic Disease; Diabetes mellitus ,Obesity ,Hyper and Hypo-thyroidism, Calcium Homeostasis, Gigantism and Acromegaly.</p> <p>UNIT- 4 Diseases of Bones, Joints and Connective tissue;Auto immune diseases, Rheumatic fever and Rheumatoid arthritis , Systemic Lupus Erythematosus, Polyarteritis Nodosa, Dermatomyositis, Scleroderma, Osteoarthritis.</p> <p>UNIT-5 Genetics and Diseases: Common inherited disorders, Prevention of genetic disorders.</p> <p>UNIT -6 PAEDIATRICS- Normal Growth and development of child , growth and development disorders, Common infectious diseases in children: Tetanus, diphtheria, Mycobacterial, measles, chicken pox, gastroenteritis, HIV, and Malaria</p> <p>UNIT-7 Immunization programmes , Child and nutrition - malnutrition syndrome, Vitamins and Minerals deficiencies - Cerebral palsy, Poliomyelitis, Muscular dystrophy, Childhood rheumatism, Acute CNS infections, respiratory conditions, cardiac conditions.</p>
1127	BPT-204	GENERAL SURGERY, OBSTETRICS & GYNECOLOGY	2015	<p>SECTION:A- GENERAL SURGERY - UNIT- 1 Introduction: general Anesthesia, Blood transfusion and physiological response of the body, Wounds, scars, ulcers, boils, carbuncles etc, Pre- and post –operative physical examination, investigations, postoperative complications and their management.UNIT - 2 Abdominal surgery: Nephrectomy, Appendectomy, Herniorrhaphy, Mastectomy, Thyroidectomy, Colostomy, Adrenalectomy, Cystectomy, Hysterectomy, Prostatectomy, Cholecystectomy, Ileostomy, Incisional hernia and its prevention. UNIT-3 Burns. UNIT-4 Plastic Surgery, Cineplasty, Skin grafting, Surgery of Hand , Burns and plastic surgery management. UNIT-5 Ophthalmology: Errors of Refraction, Squint, Conjunctivitis, Trachoma, Corneal ulcers, Iritis, Cataract, Retinitis, Detachment of retina and Glaucoma. UNIT -6 E.N.T.-: sinusitis, Rhinitis, Acute and ChronicOtitis, Otosclerosis, Mastoidectomy and loss of hearing.</p> <p>SECTION:B OBSTETRICS AND GYNECOLOGY - Anatomy and physiology of female reproductive system , clinical examination, investigation, diagnosis, prognosis of female reproductive system disorders. Menstruation and its disorders. Physiological changes.</p> <p>UNIT-1 Introduction to Exercise Therapy, Exercise and physiology of body, Psychogenic and Pharmacological aspects of exercise, Classification of movements:- Active voluntary movements : Free, assisted and resisted;Involuntary movements, Passive movements.</p> <p>Voluntary Movements :- Free exercises, assisted exercises, Resisted exercise ; SET system , Relaxed passive movement,Muscle strength , Prevention of muscle weakness/paralysis. Type of muscle work and contractions, Torque of muscle work, Muscle assessment M.R.C. grading, muscle strengthening/re-education , Strengthening technique, Endurance training, Therapeutic Gymnasium., Manual Muscle Testing, Joint movement, Principles of mobilization of joint, increasing its range of motion, technique of mobilization of stiff joint. Accessory movements, Manipulation therapy, Co-ordination: Balance – Static and Dynamic, Hydrostatics and Hydrodynamics. UNIT- 2 Hydrotherapy, Hydrotherapy regimes of exercises, Hydrotherapy exercise for all age groups, Types of pools and baths, Soft tissue manipulations Techniques of application, Kneading and picking up, rolling (back) Clapping, Tapping, Friction, Isometric exercise and Isotonic exercise, Exercises of the shoulder and hip and evaluation, Exercise of</p>
1128	BPT-205	EXERCISE THERAPY INCLUDING YOGA	2015	<p>UNIT-1 Introduction to Exercise Therapy, Exercise and physiology of body, Psychogenic and Pharmacological aspects of exercise, Classification of movements:- Active voluntary movements : Free, assisted and resisted;Involuntary movements, Passive movements.</p> <p>Voluntary Movements :- Free exercises, assisted exercises, Resisted exercise ; SET system , Relaxed passive movement,Muscle strength , Prevention of muscle weakness/paralysis. Type of muscle work and contractions, Torque of muscle work, Muscle assessment M.R.C. grading, muscle strengthening/re-education , Strengthening technique, Endurance training, Therapeutic Gymnasium., Manual Muscle Testing, Joint movement, Principles of mobilization of joint, increasing its range of motion, technique of mobilization of stiff joint. Accessory movements, Manipulation therapy, Co-ordination: Balance – Static and Dynamic, Hydrostatics and Hydrodynamics. UNIT- 2 Hydrotherapy, Hydrotherapy regimes of exercises, Hydrotherapy exercise for all age groups, Types of pools and baths, Soft tissue manipulations Techniques of application, Kneading and picking up, rolling (back) Clapping, Tapping, Friction, Isometric exercise and Isotonic exercise, Exercises of the shoulder and hip and evaluation, Exercise of</p>
1129	BPT-206	ELECTROTHERAPY	2015	<p>UNIT-1 LOW FREQUENCY CURRENTS: Nerve Muscle Physiology, Faradic Current, Galvanic Current, Electro-Diagnosis. , TENS.UNIT- 2 MEDIUM FREQUENCY CURRENTS: Interferential therapy, Dosimetry.UNIT-3 HIGH FREQUENCY CURRENT: Short Wave Diathermy, Pulsed S.W.D., Microwave Diathermy.UNIT-4 ACTINOTHERAPY: Infra-Red, Ultraviolet Radiation,LASER, ULTRASONIC THERAPY,THERMAL THERAPY MODALITIES,Paraffin wax bath therapy,Hydro collator packs (Heating pad, and Moist heat),ULTRASONIC THERAPY,Bio Feedback. UNIT-5 Advanced electrotherapy, Combined therapy-Microwave with traction, Ultrasonic therapy with stimulation,IFT or TENS-Principles, uses, indications etc.</p>

  
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1130	BPT-301	NEUROLOGY INCLUDING PSYCHIATRY & NEUROSURGERY	2015	Section: A NEUROLOGY - UNIT-1 Nervous system: Disorders of Neurological functions in the light of Anatomy and Physiology. UNIT-2 Reflexes:- Physiology of reflexes, genesis of spasticity, rigidity, postural reflex. UNIT-3 Bladder and Bowel Control. UNIT-4 Clinical assessment of a neurological patient. UNIT-5 Headache, migraine, raised intra-cranial pressure, Cranial Nerves and special senses. UNIT-6 Inflammatory conditions- meningitis, Poliomyelitis, syphilis, rabies, viral encephalitis. UNIT-7 Disorders of cerebral circulation- Stroke, Hypertensive encephalopathy. UNIT-8 Demyelinating diseases - acute disseminated encephalomyelitis, multiple sclerosis Movement disorders/ Extra pyramidal syndromes - Parkinson's disease, Chorea, Athetosis, Dystonia, Hemiballismus, Spasmodic Torticollis, Tremors and Writer's Cramps, Cerebellar Ataxia, Friedreich's Ataxia UNIT-9 Convulsive disorders - epilepsy (GM, PM, Psychomotor), tetany. UNIT-10 Developmental and degenerative syndromes - cerebral palsy, kernicterus, hereditary ataxias, motor neuron disease, Peroneal muscular atrophy. UNIT-11 Disorders of Spinal cord and Cauda Equina- spinal cord injury, paraplegia, quadriplegia, spina-bifida, transverse myelitis, Non-compressive myelopathies, Neurogenic bladder and bowel. UNIT-12 Peripheral nerve disorders - traumatic/ compression or entrapment neuropathy, polyneuritis, AIDP, CIDP, GB syndrome, diabetic polyneuropathy and spinal radiculopathies. Special emphasis on brachial and lumbo- sacral plexuses and major nerves - radial, ulnar, median, femoral, and sciatic nerve. UNIT-13 Autonomic nervous system- clinical features of
1131	BPT-302	ORTHOPAEDICS	2015	UNIT-1 Introduction to Orthopedics. UNIT-2 Fractures and Dislocations. UNIT-3 Fracture healing, Calcium-phosphorus metabolism UNIT-4 Fracture disease, Volkmann's ischaemic contracture, Sudeck's osteodystrophy, Myositis ossificans, Ligament injuries, Shoulder- hand syndrome etc. UNIT-5 Spinal column: fractures, management and complications of Spinal injuries spinal deformities like Scoliosis, Kyphosis, and Lordosis etc. UNIT-6 Injuries of upper limb and lower limb. UNIT-7 Congenital anomalies and other deformities.
1132	BPT-303	APPLIED BIO-MECHANICS & KINESIOLOGY	2015	UNIT- 1 Introduction: Biomechanics, Scope and Importance of Biomechanics in Physiotherapy and Bioengineering, Kinematics and Kinetics: motion, Axes and planes, force, Statics and Dynamics, Inertia, force system, Muscle force, Friction force, Torque, Anatomic Pulley, Gravity, Stability and Equilibrium, Linear and Angular Equilibrium. UNIT-2 Biomechanics of Bone, collagenous tissue and muscle, Biomechanics of Spine, Biomechanics of Upper Extremity, Biomechanics of Lower Extremity UNIT-3 Biomechanics of Locomotion and Gait, Biomechanics of Activities of Daily Living, Work Analysis. UNIT-4 Posture, Biomechanics of postural deviations, effect of age, disease, occupation and pregnancy on good posture. KINESIOLOGY: UNIT-1 Joint structure and function; Types of joints, Joint functions, Kinesiology: Origin of human movement and its significances, Analysis of movement - kinetics and kinematics, Body links and motion parts. UNIT-2 General effects of injury and disease on joint functioning, Joint range of motion, axis and plane of motion, Joint movements, mobility and stability, restrictions and limitations, end feels, Abnormal deviations in joints in disease and injury of the following joint complexes: Shoulder joint complex, Elbow joint complex, Wrist and hand complex Hip joint complex, Knee joint complex Ankle-foot complex Vertebral
1133	BPT-304	PHYSIOTHERAPEUTIC IN NEUROLOGY & NEUROSURGERY	2015	UNIT-1 Neuroanatomy and Physiology- Symptomatology of Neurological disorders, Role of investigations in differential diagnosis, diagnosis and clinical examination of C.N.S. functions including cranial nuclei, Principles of examination of higher function and applicability in training. UNIT - 2 Physiotherapy evaluation of a neurological patient, electro diagnostic procedures, interpretations and prognosis in different neurological conditions. UNIT-3 Developmental disorders of CNS, Early detection of brain damaged child, Risk babies, Neuropediatric examination. Developmental programmes and Delayed milestones, Neuro-developmental screening test, Minimum Brain Damage, Sensory, Motor, Functional Psycho-social behaviours of a child. UNIT - 4 Developmental physiotherapy programs (Neurodevelopmental approaches), reeducation and retraining techniques in neurological conditions, approaches, like: Bobath's, Rood's, PNF, Vojta techniques, biofeedback, Brunnstorm, Motor Relearning programming, Primitive patterns and abnormal motor behaviour due to brain damage, its control and training with reference to gait and hand function, UNIT-5 Assessment and principles of therapeutic management of following neurological conditions: Stroke, meningitis, encephalitis, basal ganglion diseases, Parkinson's disease, Cerebral palsy, Ataxia, Cerebellar Ataxia, Friedreich's Ataxia
1134	BPT-305	PHYSIOTHERAPEUTIC IN ORTHOPAEDIC CONDITIONS	2015	UNIT-1 Traumatology and Orthopedics: - Classification of fractures, causes and types, Signs and symptoms, Complications, Healing and factors affecting, Principles of fracture management. Principles of Physiotherapy management, management of complication. Dislocation - Common sites, signs and symptoms, Principles of Physiotherapy evaluation and Management of an orthopaedic patient. UNIT-2 General principles of physiotherapy in fracture management including complications at different stages, Post fracture - assessment and PT management, Specific fractures and their complete physiotherapy assessment and management, Upper Limb: Scapula, Clavicle, Humerus, Ulna and Radius, Colle's fracture and Crush injuries of Hand, Lower Limb: Fracture of Pelvis, Neck of Femur, Shaft of Femur, Patella, Tibia and Fibula, Pott's Fracture, Fractures of Tarsal and Metatarsal bones, Management of Fracture of Spine with or without neurological deficit, Soft Tissue injuries: Assessment and therapeutic management of Sprains, strains, ligament and cartilage tear (Tear of semilunar cartilage and cruciate ligament of knee)/rupture, Synovitis, Capsulitis, Volkmann's ischaemic contracture. Rotator cuff tendinitis, Ankle sprains, Tennis elbow, Golfer's Elbow, Posttraumatic osteoarthritis. UNIT-2 Orthopaedic Surgery: General principles of assessment, physiotherapy management in

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1135	BPT-306	PHYSICAL EVALUATION, DIAGNOSIS & PRESCRIPTION	2015	<p>UNIT-1 General principles of Human development &amp; maturation, Aspects: physical, motor, sensory, cognitive, emotional, cultural, social. UNIT-2 Factors influencing human development &amp; growth: Biological, environmental, inherited, Principles of maturation - in general and anatomical directional pattern cephalo - caudal, proximo - distal, centro - lateral, mass to specific pattern, gross to fine motor development, Reflex maturation tests. UNIT-3 Development in specific fields: Oromotor development, sensory development, neurodevelopment of hand function, Electrodiagnosis. UNIT-4 Investigation : Principles, methods, views, type of following investigative procedure- Skull XRay, CT, MRI, Evoked potential, lumbar puncture, CSF examination, EMG, NCV. UNIT-5 Bioelectricity-Physiology of generation &amp; propagation of action potential, volume conduction, therapeutic current-as a tool for electrodiagnosis</p> <p>Higher functions, cranial nerves, sensations &amp; sensory organization, body image, Muscle tone, Voluntary movement and voluntary control tests . UNIT-6 Abnormal movements , Reflexes: superficial &amp; deep, Primitive Reflexes, muscle strength, Myotomes and Dermatomes, Upper motor and lower motor neuron lesions , Nerve entrapments. UNIT-7 Test for disorder of programme and coordination tests , balance, posture, gait, Neural control of bladder, Perceptual motor dysfunction, Investigative Methods in Modern Medicine like EEG, MRI, CT Scan. UNIT-8 Assessment of Musculoskeletal Dysfunction- Postures and postural disorder , Tightness,</p>
1136	BPT-401	COMMUNITY PT, REHABILITATION & DISABILITY PREVENTION	2015	<p>Community PT &amp; Community Medicine- UNIT-1 General Concepts of health and diseases . The role of socio-economic and cultural environment in health and disease. Epidemiology and scope. Role of Epidemiological investigation in public health. UNIT-2 Public Health Administration, The National Health Programmes, Health Problems of vulnerable groups, Occupational Health. Family Welfare Programme, Mental Health , Communicable diseases , Control and prevention of communicable diseases, universal immunization programme.</p> <p>UNIT-3 Programmes - ARI, Diarrhoea and Polio Control Programmes. International Health Agencies and National NGOs, Non-communicable diseases, Blindness, Accidents, Cancer, IHD, Hypertension, Stroke (CVA), Vital and health statistics. UNIT-4 Introduction of Rehabilitation &amp; History, Epidemiology of disability , Principles of Rehabilitation &amp; concept of team approach with roles of each individual participant. UNIT-5 Organization of Rehabilitation unit. Disability prevention evaluation &amp; principles of Rehabilitation Management. UNIT-6 Role of Physiotherapy in Rehabilitation UNIT-7 Introduction to Occupational therapy, Activities of daily living, functional assessment &amp; training for functional independence, Rehabilitation, infrastructure and role of CBR, Assessment of disability in rural &amp; urban setups. UNIT-8 Health care delivery system &amp; preventive measures with specific reference to disabling conditions. Community education program., Application of Physiotherapy skills at community level with special reference to the need at rural level. UNIT-9 Role of voluntary Organizations in CBR: Charitable Organizations, Voluntary</p>
1137	BPT-402	RESEARCH METHODOLOGY & BIOSTATISTICS	2015	<p>UNIT-1 Introduction to Research methodology, Research problem, Research design, Measurement &amp; scaling techniques, Methods of data collection, Computer technology: Introduction to Computers, computer application in research computers &amp; researcher. UNIT-2 BIOSTATISTICS, Variables and their types, Measurement scales, Tabulation of Data, Types of diagrams - histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve. UNIT-3 Measures of Central Tendency: Need for measures of central Tendency, Definition and calculation of Mean - ungrouped and grouped, interpretation and calculation of Median-ungrouped and grouped, Meaning and calculation of Mode, Geometric mean &amp; Harmonic mean, Guidelines for the use of various measures of central tendency, Measures of Dispersion : Range, mean deviation, standard deviation &amp; variance. UNIT-4 Probability and Standard Distributions: Meaning of probability of standard distribution, the binomial distribution, the normal distribution, Divergence from normality-skewness, kurtosis. Correlation &amp; regression : Significance, correlation coefficient, linear regression &amp; regression equation. UNIT 5- Testing of Hypotheses , Level of significance, Degree of freedom, Chi square test, test of Goodness of fit, Student's t-test, Analysis of variance &amp; covariance, Analysis of covariance</p>
1138	BPT-403	CARDIOTHORACIC DISEASES AND SURGERIES	2015	<p>UNIT-1 Respiratory System- Respiratory diseases including diseases of chest wall, Chronic Bronchitis and Emphysema, Bronchial asthma , Pneumonia , Tuberculosis , Lung abscess and Bronchiectasis, Chest wall deformities, Pulmonary diseases associated with Occupational Lung Diseases, Respiratory failure. UNIT-2 Cardiothoracic surgery : Valvotomy and Valve Replacement. Open heart surgery/ cardiac bypass surgery, Surgery of pericardium, Heart transplantation, Pacemaker, Coronary angioplasty, Balloon angioplasty and vascular surgery . UNIT-3 Thoracic Surgery- fracture of ribs, Flail chest, stove in chest, Pneumothorax, Haemothorax, Lung contusion and Laceration and injury to vessels and bronchus.</p> <p>UNIT-4 Lobectomy, Pneumonectomy, segmentectomy, pleuro-pneumonectomy, Thoracoplasty, decortication, Tracheostomy. UNIT-5 Outline clinical features and management of carcinoma of lung, management of endotracheal tubes, tracheal Suction, Weaning the patient from ventilator, Extubation and Post-extubation care. cardio-pulmonary Resuscitation, cardiac Massage, Artificial respiration, defibrillators and their use.</p>

  
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1139	BPT-404	PHYSIOTHERAPEUTIC IN GENERAL & CARDIOTHORACIC CONDITIONS	2015	UNIT-1 Exercise tolerance Testing ,UNIT-2 Physiotherapy techniques to increase lung volume UNIT-3 Mechanical aids - Incentive Spirometry, CPAP,IPPB, Physiotherapy techniques to decrease the work of breathing UNIT-4 Breathing re-education – Breathing control techniques, mechanical aids – IPPB, CPAP, BiPAP UNIT-5 Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilization and Breathing exercises, Postural Drainage, UNIT-6 Manual techniques - Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, UNIT-7 Mechanical Aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning . UNIT-8 Drug therapy – Drugs to prevent and treat inflammation,Bronchospasm,Breathlessness, sputum clearance, inhibit coughing, improve ventilation, reduce pulmonary hypertension, delivery doses, Inhaled Nebulizers. UNIT-9 Management of wound ulcers UNIT-10, Physiotherapy in dermatology - assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hemorrhoids. UNIT-11 Care of amputated hand and foot. Evaluation, planning and
1140	BPT- 405	SPORTS PHYSIOTHERAPY	2015	UNIT-1 Physiological effects of exercise on body systems - Muscular system, Endocrine system, Cardio-respiratory system, Nervous system. UNIT-2 SPORTS INJURIES- Spine – PIVD, Kissing spine, cervical whiplash injuries, facet joint syndrome, SI joint dysfunction, Hip – muscle strain, piriformis syndrome, ITB syndrome, osteitis pubis, Knee – menisci, cruciate, collateral, osteochondritis, chondromalacia patellae, biceps femoris tendonitis, swimmers knee, patello-femoral pain syndrome, Leg & ankle – shin splint, achilles tendonitis & rupture, TA bursitis, ankle sprain, plantar fasciitis, turf toe syndrome, Head & face – maxillofacial injuries, helmet compressionsyndrome. UNIT-3 Sports injuries Shoulder – instability, rotator cuff injury, biceps tendonitis and rupture, pectoralis major rupture, scapular dyskinesis and acromio-clavicular joint injuries, Elbow – tennis elbow, golfer's elbow, Wrist and hand – carpal tunnel syndrome, gamekeeper's thumb . UNIT-4 Principles of injury prevention, Principles of training & Rehabilitation in sports injuries. UNIT-5 Sports in Special age groups: Female athletic triad, Younger athlete, children with chronic illness and nutrition. Older athlete.
1141	BPT- 406	PT ETHICS, MANAGEMENT AND ADMINISTRATION	2015	UNIT-1 PT Ethics, History of physiotherapy, Ethical principles in healthcare, Ethical principles related to physiotherapy, scope of practice, enforcing standards in health profession-promoting qualitycare. UNIT-2 Professional ethics in research, education and patient caredelivery, Informed consentissues,Medical ethics and economics in clinicaldecision-making. UNIT-3 Rules of professional conduct. UNIT-3 Rule of WHO &WCPTConfidentiality and responsibility, malpractice and negligence, provision of services and, advertising. UNIT-4 legal aspects: consumer protection act, legal responsibility of physiotherapist for their action in professional context and understanding liability and obligations in case of medico-legalaction. UNIT-5 Rules of professional conduct and scope ofpractice, Personal & professional standards &accreditation. UNIT-6 , Laws and legal concepts – protection from malpractice claims , consumer protectionact, Liability &document. UNIT-7 Management &Administration; Planning health careservices, Promoting & building a newhospital, Technology advances and high quality patientcare, Hospital facilities, staff resources, Equipment planning and financialplanning. Hospital organization, operational plan and functionalplan. Decision
1142	BP101T	HUMAN ANATOMY AND PHYSIOLOGY-I	2016	Unit 1: • Cellular level of organization Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine • Tissue level of organization Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.Unit 2:• Integumentary system Structure and functions of skin • Skeletal system Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction • Joints Structural and functional classification, types of joints movements and its articulationUnit 3: • Body fluids and blood • Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system. • Lymphatic system Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic systemUnit 4: Peripheral nervous system: Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves. • Special senses Structure and functions of eye, ear, nose and tongue and their disordersUnit 5: Cardiovascular system

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1143	BP102T	PHARMACEUTICAL ANALYSIS	2016	<p>Unit 1: i) Different techniques of analysis                      ii) Methods of expressing concentration                      iii) Primary and secondary standards.                      iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate                      (b) Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures                      (c) Pharmacopoeia, Sources of impurities in medicinal agents, limit tests. Unit 2: Acid base titration: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves                      Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl                      Unit 3: Precipitation titrations: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.                      Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.                      Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.                      Basic Principles, methods and application of diazotisation titration. Unit 4: Redox titrations                      (a) Concepts of oxidation and reduction                      (b) Types of redox titrations (Principles and applications)                      Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate                      Unit 5: • Electrochemical methods of analysis                      • Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications.                      • Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride)</p>
1144	BP103	PHARMACEUTICS- I	2016	<p>Unit 1: Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.                      • Dosage forms: Introduction to dosage forms, classification and definitions                      • Prescription: Definition, Parts of prescription, handling of Prescription and Errors in prescription.                      • Posology: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area. Unit 2: • Pharmaceutical calculations: Weights and measures – Imperial &amp; Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.                      • Powders: Definition, classification, advantages and disadvantages, Simple &amp; compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.                      • Liquid dosage forms: Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques                      Unit 3: • Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.                      • Biphasic liquids:                      • Suspensions: Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension &amp; stability problems and methods to overcome.                      • Emulsions: Definition, classification, emulsifying agent, test for the identification of type of emulsion, Methods of</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

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1145	BP104T	PHARMACEUTICAL INORGANIC CHEMISTRY	2016	<p>Unit 1: • Impurities in pharmaceutical substances: Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate                      General methods of preparation, assay for the compounds superscripted with asterisk (*), properties and medicinal uses of inorganic compounds belonging to the following classes                      Unit 2: • Acids, Bases and Buffers: Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.                      • Major extra and intracellular electrolytes: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.                      • Dental products: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.                      Unit 3: • Gastrointestinal agents                      Acidifiers: Ammonium chloride* and Dil. HCl                      Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture                      Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite                      Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations                      Unit 4: • Miscellaneous compounds                      Expectorants: Potassium iodide, Ammonium chloride*. Emetics: Copper sulphate*, Sodium potassium tartarate                      Haematinics: Ferrous sulphate*, Ferrous gluconate                      Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite</p>
1146	BP105T	COMMUNICATION SKILLS	2016	<p>Unit 1: • Communication Skills: The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context</p> <ul style="list-style-type: none"> <li>• Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers</li> <li>• Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment                      Unit 2: • Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication</li> <li>• Communication Styles: Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style                      Unit 3: • Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations</li> <li>• Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication                      • Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message                      Unit 4:</li> </ul>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1147	BP 106RBT	REMEDIAL BIOLOGY	2016	<p>Unit 1: Living world:</p> <ul style="list-style-type: none"> <li>• Binomial nomenclature • Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus, Unit 2: Body fluids and circulation</li> <li>• Composition of blood, blood groups, coagulation of blood</li> <li>• Composition and functions of lymph</li> <li>• Human circulatory system</li> <li>• Structure of human heart and blood vessels</li> <li>• Cardiac cycle, cardiac output and ECG</li> </ul> <p>Digestion and Absorption</p> <ul style="list-style-type: none"> <li>• Human alimentary canal and digestive glands</li> <li>• Role of digestive enzymes</li> <li>• Digestion, absorption and assimilation of digested food</li> </ul> <p>Breathing and respiration</p> <ul style="list-style-type: none"> <li>• Human respiratory system</li> <li>• Mechanism of breathing and its regulation</li> <li>• Exchange of gases, transport of gases and regulation of respiration</li> <li>• Respiratory volumes</li> </ul> <p>Unit 3: Excretory products and their elimination</p> <ul style="list-style-type: none"> <li>• Modes of excretion</li> <li>• Human excretory system- structure and function</li> <li>• Urine formation</li> <li>• Renin-angiotensin system</li> </ul> <p>Neural control and coordination</p> <ul style="list-style-type: none"> <li>• Definition and classification of nervous system</li> <li>• Structure of a neuron</li> <li>• Generation and conduction of nerve impulse</li> <li>• Structure of brain and spinal cord</li> <li>• Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata</li> </ul> <p>Chemical coordination and regulation</p>
1148	BP 106RMT	REMEDIAL MATHEMATICS	2016	<p>Unit 1: • Partial fraction Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics</p> <ul style="list-style-type: none"> <li>• Logarithms Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems.</li> </ul> <p>Unit 2: • Matrices and Determinant: Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley-Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations</p> <p>Unit 3: • Calculus Differentiation: Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula)</p> <p>Unit 4: • Analytical Geometry Introduction: Signs of the Coordinates, Distance formula, Straight Line: Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope - intercept form of a straight line</p> <p>Integration: Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application</p> <p>Unit 5: Differential Equations: Some basic definitions, Order and</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1149	BP 201T	HUMAN ANATOMY AND PHYSIOLOGY-II	2016	<p>Unit 1: • Nervous system Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)</p> <p>Unit 2: • Digestive system Anatomy of GI Tract with special reference to anatomy and functions of stomach, ( Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine  and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT. • Energetics  Formation and role of ATP, Creatinine Phosphate and BMR. Unit 3: • Respiratory system 10 hours  Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration  Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.  • Urinary system Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney. Unit 4: • Endocrine system Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal</p>
1150	BP202T	PHARMACEUTICAL ORGANIC CHEMISTRY –I	2016	<p>Unit 1: • Classification, nomenclature and isomerism Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerisms in organic compounds Unit 2: • Alkanes*, Alkenes* and Conjugated dienes* SP3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP2 hybridization in alkenes E1 and E2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E1 versus E2 reactions, Factors affecting E1 and E2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation. Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement Unit 3: • Alkyl halides* SN1 and SN2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations. SN1 versus SN2 reactions, Factors affecting SN1 and SN2 reactions Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform. • Alcohols*- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol Unit 4: • Carbonyl compounds* (Aldehydes and ketones) Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of</p>

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1151	BP203 T	BIOCHEMISTRY	2016	<p>Unit 1: • Biomolecules Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.</p> <p>• Bioenergetics Energy rich compounds; classification; biological significances of ATP and cyclic AMP Unit 2: • Carbohydrate metabolism Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus</p> <p>• Biological oxidation Electron transport chain (ETC) and its mechanism.</p> <p>Oxidative phosphorylation &amp; its mechanism and substrate phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers Unit 3: • Lipid metabolism <math>\beta</math>-Oxidation of saturated fatty acid (Palmitic acid), Formation and utilization of ketone bodies; ketoacidosis De novo synthesis of fatty acids (Palmitic acid) Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity. • Amino acid metabolism General reactions of amino acid metabolism: Transamination, deamination &amp; decarboxylation, urea cycle and its disorders Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alpeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice Unit 4: • Nucleic acid metabolism and genetic information transfer</p>

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1152	BP 204T	PATHOPHYSIOLOGY	2016	<p>Unit 1: • Basic principles of Cell injury and Adaptation: Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis &amp; Alkalosis, Electrolyte imbalance</p> <p>• Basic mechanism involved in the process of inflammation and repair: Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis</p> <p>Unit 2: • Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis)</p> <p>• Respiratory system: Asthma, Chronic obstructive airways diseases.</p> <p>• Renal system: Acute and chronic renal failure</p> <p>Unit 3: • Haematological Diseases: Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia</p> <p>• Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones</p> <p>• Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.</p> <p>• Gastrointestinal system: Peptic Ulcer</p> <p>Unit 4: • Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.</p> <p>• Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout</p> <p>• Principles of cancer: classification, etiology and pathogenesis of cancer</p> <p>• Diseases of bones and joints: Rheumatoid Arthritis, Osteoporosis, Gout</p>
1153	BP205 T	COMPUTER APPLICATIONS IN PHARMACY	2016	<p>Unit 1: Concept of Information Systems and Software : Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project</p> <p>Unit 2: Web technologies: Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products. Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database</p> <p>Unit 3: Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring</p> <p>Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System</p> <p>Unit 4: Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery</p> <p>Unit 5: Computers as data analysis in Preclinical development: Chromatographic data analysis (CDS) Laboratory Information management System (LIMS) and Text Information Management</p>
1154	BP 206 T	ENVIRONMENTAL SCIENCES	2016	<p>Unit 1: Renewable and non-renewable resources: Natural resources and associated problems</p> <p>a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.</p> <p>Unit 2: Ecosystems &amp; Concept of an ecosystem.</p> <p>Unit 3: Environmental Pollution: Air pollution; Water pollution; Soil pollution</p>

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1155	BP301T	PHARMACEUTICAL ORGANIC CHEMISTRY -II	2016	<p>Unit 1: • Benzene and its derivatives                      A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule                      B. Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.                      C. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction                      D. Structure and uses of DDT, Saccharin, BHC and Chloramine                      Unit 2: • Phenols* - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols                      • Aromatic Amines* - Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts                      • Aromatic Acids* -Acidity, effect of substituents on acidity and important reactions of benzoic acid.                      Unit 3: • Fats and Oils                      a. Fatty acids – reactions.                      b. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.                      c. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination.                      Unit 4: • Polynuclear hydrocarbons: medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives                      Unit 5: • Cycloalkanes*</p>
1156	BP302T	PHYSICAL PHARMACEUTICS-I	2016	<p>Unit 1: Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation &amp; association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications                      Unit 2: States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols                      – inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid- crystalline, amorphous &amp; polymorphism.                      Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications                      Unit 3: Surface and interfacial phenomenon: Liquid interface, surface &amp; interfacial tensions,                      surface free energy, measurement of surface &amp; interfacial tensions, spreading coefficient, adsorption at liquid</p>

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1157	BP 303 T	PHARMACEUTICAL MICROBIOLOGY	2016	<p>Unit 1: Introduction to Prokaryotes and Eukaryotes            Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total &amp; viable count).            Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy. Unit 2: Identification of bacteria using staining techniques (simple, Gram's &amp; Acid fast staining) and biochemical tests (IMViC).            Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization.            Evaluation of the efficiency of sterilization methods. Equipments employed in large scale sterilization. Sterility indicators            Unit 3: Classification and mode of action of disinfectants            Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions            Evaluation of bactericidal &amp; Bacteriostatic.            Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP. Unit 4: Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.            Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids.            Assessment of a new antibiotic Unit 5: Types of spoilage, factors affecting the microbial spoilage of pharmaceuticals</p>
1158	BP 304 T	PHARMACEUTICAL ENGINEERING	2016	<p>Unit 1: • Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.            • Size Reduction: Objectives, Mechanisms &amp; Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill &amp; end runner mill.            • Size Separation: Objectives, applications &amp; mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter &amp; elutriation tank. Unit 2: • Heat Transfer: Objectives, applications &amp; Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection &amp; radiation. Heat interchangers &amp; heat exchangers. • Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator &amp; Economy of multiple effect evaporator.            • Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation &amp; molecular distillation Unit 3: • Drying: Objectives, applications &amp; mechanism of drying process, measurements &amp; applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer, spray dryer, fluidized bed dryer</p>

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1159	BP401T.	PHARMACEUTICAL ORGANIC CHEMISTRY -III	2016	<p>Unit 1: Stereo isomerism                      Optical isomerism –                      Optical activity, enantiomerism, diastereoisomerism, meso compounds Elements of symmetry, chiral and achiral molecules                      DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers                      Reactions of chiral molecules                      Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute                      Unit 2: Geometrical isomerism                      Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)                      Methods of determination of configuration of geometrical isomers.                      Conformational isomerism in Ethane, n-Butane and Cyclohexane.                      Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.                      Stereospecific and stereoselective reactions                      Unit 3: Heterocyclic compounds:                      Nomenclature and classification                      Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene                      Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene                      Unit 4: Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrazole, Imidazole, Oxazole and Thiazole.                      Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives                      Unit 5: Reactions of synthetic importance                      Metal hydride reduction (NaBH<sub>4</sub> and LiAlH<sub>4</sub>), Clemmensen reduction, Birch reduction, Wolff Kishner reduction.                      Oppenauer-oxidation and Dakin reaction.                      Beckmann rearrangement and Schmidt rearrangement, Claisen, Schmidt condensation</p>



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1160	BP402T	MEDICINAL CHEMISTRY – I	2016	<p>Unit 1: Physicochemical properties in relation to biological action                      Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism.                      Drug metabolism                      Drug metabolism principles- Phase I and Phase II.                      Factors affecting drug metabolism including stereo chemical aspects.</p> <p>Unit 2: Drugs acting on Autonomic Nervous System                      Adrenergic Neurotransmitters:                      Biosynthesis and catabolism of catecholamine.                      Adrenergic receptors (Alpha &amp; Beta) and their distribution.</p> <p>Sympathomimetic agents: SAR of Sympathomimetic agents                      Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine,</p> <p>Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.</p> <ul style="list-style-type: none"> <li>• Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine.</li> <li>• Agents with mixed mechanism: Ephedrine, Metaraminol.</li> </ul> <p>Adrenergic Antagonists:                      Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide.                      Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.</p> <p>Unit 3: Cholinergic neurotransmitters:                      Biosynthesis and catabolism of acetylcholine.                      Cholinergic receptors (Muscarinic &amp; Nicotinic) and their distribution.</p> <p>Parasympathomimetic agents: SAR of Parasympathomimetic agents                      Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine.</p>
1161	BP 403 T.	PHYSICAL PHARMACEUTICS-II	2016	<p>Unit 1: Colloidal dispersions: Classification of dispersed systems &amp; their general characteristics, size &amp; shapes of colloidal particles, classification of colloids &amp; comparative account of their general properties. Optical, kinetic &amp; electrical properties. Effect of electrolytes, coacervation, peptization &amp; protective action.</p> <p>Unit 2: Rheology: Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers</p> <p>Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus</p> <p>Unit 3: Coarse dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.</p> <p>Unit 4: Micromeritics: Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

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1162	BP 404 T.	PHARMACOLOGY-I	2016	<p>Unit 1: 1. General Pharmacology</p> <p>a. Introduction to Pharmacology- Definition, essential drugs concept and routes of drug administration, Agonists, antagonists( competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.</p> <p>b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination</p> <p>Unit 2: General Pharmacology</p> <p>a. Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein-coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action.</p> <p>b. Adverse drug reactions.</p> <p>c. Drug interactions (pharmacokinetic and pharmacodynamic)</p> <p>d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.</p> <p>Unit 3: 2. Pharmacology of drugs acting on peripheral nervous system</p> <p>a. Organization and function of ANS.</p> <p>b. Neurohumoral transmission, co-transmission and classification of neurotransmitters.</p> <p>c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics.</p> <p>d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).</p> <p>e. Local anesthetic agents.</p> <p>f. Drugs used in myasthenia gravis and glaucoma</p> <p>Unit 4: 3. Pharmacology of drugs acting on central nervous system</p> <p>a. Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine.</p> <p>b. General anesthetics and pre-anesthetics.</p> <p>c. Sedatives, hypnotics and centrally acting muscle relaxants.</p> <p>d. Anti-epileptics</p> <p>e. Alcohols and disulfiram</p> <p>Unit 5: 3. Pharmacology of drugs acting on central nervous system</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1163	BP 405 T	.PHARMACOGNOSY AND PHYTOCHEMISTRY I	2016	<p>Unit 1: Introduction to Pharmacognosy:                      (a) Definition, history, scope and development of Pharmacognosy                      (b) Sources of Drugs – Plants, Animals, Marine &amp; Tissue culture                      (c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).</p> <p>Classification of drugs:                      Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs</p> <p>Quality control of Drugs of Natural Origin:                      Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.</p> <p>Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida. Unit 2: Cultivation, Collection, Processing and storage of drugs of natural origin:                      Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications.                      Polyploidy, mutation and hybridization with reference to medicinal plants</p> <p>Conservation of medicinal plants Unit 3: Plant tissue culture:                      Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.                      Applications of plant tissue culture in pharmacognosy. Edible vaccines Unit 4: Introduction to secondary metabolites:                      Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins Unit 5: Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1164	BP501T	MEDICINAL CHEMISTRY – II	2016	<p>Unit 1: Antihistaminic agents: Histamine, receptors and their distribution in the humanbody  H1-antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines succinate, Clemastine fumarate, Diphenylpyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium  H2-antagonists: Cimetidine*, Famotidine, Ranitidin.  Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole  Anti-neoplastic agents:  Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiotepa  Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine  Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin Plant products: Etoposide, Vinblastin sulphate, Vincristin sulphate Miscellaneous: Cisplatin, Mitotane. Unit 2: Anti-anginal:  Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole.  Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.</p> <p>Diuretics:  Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.  Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide,  Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol  Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride. Unit 3: Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcaïnide hydrochloride, Amiodarone, Sotalol.</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1165	BP 502 T	Industrial PharmacyI	2016	<p>Unit 1: Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances.</p> <p>a. Physical properties: Physical form (crystal &amp; amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism</p> <p>b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization BCS classification of drugs &amp; its significant</p> <p>Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.</p> <p>Unit 2: Tablets:</p> <p>a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.</p> <p>b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.</p> <p>c. Quality control tests: In process and finished product tests</p> <p>Liquid orals: Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia</p> <p>Unit 3: Capsules:</p> <p>a. Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.</p> <p>b. Soft gelatin capsules: Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.</p> <p>Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets</p> <p>Unit 4: Parenteral Products:</p> <p>a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1166	BP503.T	. PHARMACOLOGY-II	2016	<p>Unit 1: 1. Pharmacology of drugs acting on cardio vascular system</p> <p>a. Introduction to hemodynamic and electrophysiology of heart.</p> <p>b. Drugs used in congestive heart failure</p> <p>c. Anti-hypertensive drugs.</p> <p>d. Anti-anginal drugs.</p> <p>e. Anti-arrhythmic drugs.</p> <p>f. Anti-hyperlipidemic drugs.</p> <p>Unit 2: 1. Pharmacology of drugs acting on cardio vascular system</p> <p>a. Drug used in the therapy of shock.</p> <p>b. Hematinics, coagulants and anticoagulants.</p> <p>c. Fibrinolytics and anti-platelet drugs</p> <p>d. Plasma volume expanders</p> <p>2. Pharmacology of drugs acting on urinary system</p> <p>a. Diuretics</p> <p>b. Anti-diuretics.</p> <p>Unit 3: 3. Autocoids and related drugs</p> <p>a. Introduction to autacoids and classification</p> <p>b. Histamine, 5-HT and their antagonists.</p> <p>c. Prostaglandins, Thromboxanes and Leukotrienes.</p> <p>d. Angiotensin, Bradykinin and Substance P.</p> <p>e. Non-steroidal anti-inflammatory agents</p> <p>f. Anti-gout drugs</p> <p>g. Antirheumatic drugs</p> <p>Unit 4: 5. Pharmacology of drugs acting on endocrine system</p> <p>a. Basic concepts in endocrine pharmacology.</p> <p>b. Anterior Pituitary hormones- analogues and their inhibitors.</p> <p>c. Thyroid hormones- analogues and their inhibitors.</p> <p>d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D.</p> <p>d. Insulin, Oral Hypoglycemic agents and glucagon.</p> <p>e. ACTH and corticosteroids.</p> <p>Unit 5: 5. Pharmacology of drugs acting on endocrine system</p> <p>a. Androgens and Anabolic steroids.</p>

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1167	BP504 T	PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)	2016	<p>Unit 1: Metabolic pathways in higher plants and their determination            a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway.            b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.            Unit 2: General introduction, composition, chemistry &amp; chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites:</p> <p>Alkaloids: Vinca, Rauwolfia, Belladonna, Opium,            Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta            Steroids, Cardiac Glycosides &amp; Triterpenoids: Liquorice, Dioscorea, Digitalis            Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander,            Tannins: Catechu, Pterocarpus            Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony            Glycosides: Senna, Aloes, Bitter Almond            Iridoids, Other terpenoids &amp; Naphthaquinones: Gentian, Artemisia, taxus, carotenoids            Unit 3: Isolation, Identification and Analysis of Phytoconstituents</p> <p>a) Terpenoids: Menthol, Citral, Artemisin            b) Glycosides: Glycyrrhetic acid &amp; Rutin            c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine            d) Resins: Podophyllotoxin, Curcumin            Unit 4: Industrial production, estimation and utilization of the following phytoconstituents: Forskolol, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vinorelbine and Vinorelbine Unit 5: Poison of Phytoconstituents</p>
1168	BP 505 T	PHARMACEUTICAL JURISPRUDENCE (Theory)	2016	<p>Unit 1: Drugs and Cosmetics Act, 1940 and its rules 1945:            Objectives, Definitions, Legal definitions of schedules to the Act and Rules            Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties.            Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,            Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.            Unit 2: Drugs and Cosmetics Act, 1940 and its rules 1945.            Detailed study of Schedule G, H, M, N, P, T, U, V, X, Y, Part XII B, Sch F &amp; DMR (OA) Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties            Labeling &amp; Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.            Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors            Unit 3: • Pharmacy Act –1948: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties            • Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent &amp; Proprietary Preparations. Offences and Penalties.            • Narcotic Drugs and Psychotropic substances Act-1985 and Rules: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic &amp; Psychotropic Consultative Committee, National Fund for Controlling the Drug</p>



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1169	BP601T	MEDICINAL CHEMISTRY – III (	2016	<p>Unit 1: Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.  <math>\beta</math>-Lactam antibiotics: Penicillin, Cephalosporins, <math>\beta</math>- Lactamase inhibitors, Monobactams                      Aminoglycosides: Streptomycin, Neomycin, Kanamycin                      Tetracyclines: Tetracycline, Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline                      Unit 2: Antibiotics                      Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes. Macrolide: Erythromycin Clarithromycin, Azithromycin.                      Miscellaneous: Chloramphenicol*, Clindamycin.</p> <p>Prodrugs: Basic concepts and application of prodrugs design.</p> <p>Antimalarials: Etiology of malaria.                      Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine.                      Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.                      Miscellaneous: Pyrimethamine, Artesunete, Artemether, Atovoquone.                      Unit 3: Synthetic anti tubercular agents:                      Isoniozid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.*                      Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine Streptomycine, Capreomycin sulphate.</p> <p>Urinary tract anti-infective agents                      Quinolones: SAR of quinolones, Nalidixic Acid, Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin                      Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine.</p> <p>Antiviral agents:                      Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.                      Unit 4:                      Antifungal agents:</p>

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1170	BP602 T.	PHARMACOLOGY-III	2016	<p>Unit 1: 1. Pharmacology of drugs acting on Respiratory system</p> <ol style="list-style-type: none"> <li>Anti -asthmatic drugs</li> <li>Drugs used in the management of COPD</li> <li>Expectorants and antitussives</li> <li>Nasal decongestants</li> <li>Respiratory stimulants</li> </ol> <p>Unit 2: 2. Chemotherapy</p> <ol style="list-style-type: none"> <li>General principles of chemotherapy.</li> <li>Sulfonamides and cotrimoxazole.</li> <li>Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolins, tetracycline and aminoglycosides</li> </ol> <p>Unit 3: 3. Chemotherapy</p> <ol style="list-style-type: none"> <li>Antitubercular agents</li> <li>Antileprotic agents</li> <li>Antifungal agents</li> <li>Antiviral drugs</li> <li>Anthelmintics</li> <li>Antimalarial drugs</li> <li>Antiamoebic agents</li> </ol> <p>Unit 4: 3. Chemotherapy</p> <ol style="list-style-type: none"> <li>Urinary tract infections and sexually transmitted diseases.</li> <li>Chemotherapy of malignancy.</li> </ol> <p>4. Immunopharmacology</p> <ol style="list-style-type: none"> <li>Immunostimulants</li> <li>Immunosuppressant</li> </ol> <p>Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars</p> <p>Unit 5: 5. Principles of toxicology</p> <ol style="list-style-type: none"> <li>Definition and basic knowledge of acute, subacute and chronic toxicity.</li> <li>Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity</li> <li>General principles of treatment of poisoning</li> <li>Clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning.</li> </ol> <p>6. Chronopharmacology</p>

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1171	BP 603 T	HERBAL DRUG TECHNOLOGY (Theory)	2016	<p>Unit 1: Herbs as raw materials            Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation Source of Herbs            Selection, identification and authentication of herbal materials Processing of herbal raw material            Biodynamic Agriculture            Good agricultural practices in cultivation of medicinal plants including Organic farming. Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.            Indian Systems of Medicine            a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy            b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma. Unit 2: Nutraceuticals            General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases.            Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina</p> <p>Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper &amp; Ephedra. Unit 3: Herbal Cosmetics Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.</p> <p>Herbal excipients:            Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors &amp; perfumes.</p> <p>Herbal formulations :            Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes Unit 4:</p>
1172	BP 604 T	BIOPHARMACEUTICS AND PHARMACOKINETICS	2016	<p>Unit 1: Biopharmaceutics            Absorption; Mechanisms of drug absorption through GIT, factors influencing drug absorption though GIT, absorption of drug from Non per oral extra-vascular routes, Distribution Tissue permeability of drugs, binding of drugs, apparent volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs Unit 2: Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs            Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, in-vitro drug dissolution models, in-vitro-in-vivo correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs. Unit 3: Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - <math>KE</math>, <math>t_{1/2}</math>, <math>V_d</math>, <math>AUC</math>, <math>K_a</math>, <math>Cl_t</math> and <math>CLR</math>- definitions methods of eliminations, understanding of their significance and application Unit 4: Multicompartment models: Two compartment</p>

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1173	BP 605 T	PHARMACEUTICAL BIOTECHNOLOGY	2016	<p>Unit 1: a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.                      b) Enzyme Biotechnology- Methods of enzyme immobilization and applications.                      c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries.                      d) Brief introduction to Protein Engineering.                      e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.                      f) Basic principles of genetic engineering. Unit 2: a) Study of cloning vectors, restriction endonucleases and DNA ligase.                      b) Recombinant DNA technology. Application of genetic engineering in medicine.                      c) Application of r DNA technology and genetic engineering in the production of:                      i) Interferon ii) Vaccines- hepatitis- B iii) Hormones-Insulin.                      d) Brief introduction to PCR Unit 3: Types of immunity- humoral immunity, cellular immunity</p> <p>a) Structure of Immunoglobulins                      b) Structure and Function of MHC                      c) Hypersensitivity reactions, Immune stimulation and Immune suppressions.                      d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.                      e) Storage conditions and stability of official vaccines                      f) Hybridoma technology- Production, Purification and Applications                      g) Blood products and Plasma Substitutes. Unit 4: a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting.                      b) Genetic organization of Eukaryotes and Prokaryotes                      c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.                      d) Introduction to Microbial biotransformation and applications.                      e) Mutation: Types of mutation/mutants. Unit 5: a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.                      b) Large scale production fermenter design and its various controls.</p>
1174	BP606T	PHARMACEUTICAL QUALITY ASSURANCE	2016	<p>Unit 1: Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP                      Total Quality Management (TQM): Definition, elements, philosophies                      ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines                      Quality by design (QbD): Definition, overview, elements of QbD program, tools ISO 9000 &amp; ISO14000: Overview, Benefits, Elements, steps for registration NABL accreditation : Principles and procedures Unit 2: Organization and personnel: Personnel responsibilities, training, hygiene and personal records. Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.                      Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials. Unit 3: Quality Control: Quality control test for containers, rubber closures and secondary packing materials.                      Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities Unit 4: Complaints: Complaints and evaluation of complaints. Handling of return</p>

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1175	BP701T	INSTRUMENTAL METHODS OF ANALYSIS	2016	<p>Unit 1: UV Visible spectroscopy Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations. Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode. Applications - Spectrophotometric titrations, Single component and multi component analysis Fluorimetry Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications Unit 2: Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications Flame Photometry-Principle, interferences, instrumentation and applications</p> <p>Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications Nepheloturbidometry- Principle, instrumentation and applications Unit 3: Introduction to chromatography Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications. Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications. Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications Electrophoresis- Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary chromatography, applications Unit 4: Gas chromatography - Introduction, theory, instrumentation, derivatization</p>
1176	BP702T	INDUSTRIAL PHARMACYII (Theory)	2016	<p>Unit 1: Pilot plant scale up techniques: General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology Unit 2: Technology development and transfer: WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R &amp; D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues Unit 3: Regulatory affairs: Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development</p>

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1177	BP703T	PHARMACY PRACTICE (Theory)	2016	<p>Unit 1: a) Hospital and it's organization Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.</p> <p>b) Hospital pharmacy and its organization Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.</p> <p>c) Adverse drug reaction Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.</p> <p>d) Community Pharmacy Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store. Unit 2:a) Drug distribution system in a hospital Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.</p> <p>b) Hospital formulary Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.</p> <p>c) Therapeutic drug monitoring Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian</p>
1178	BP704T	NOVEL DRUG DELIVERY SYSTEMS (Theory)	2016	<p>Unit 1: Controlled drug delivery systems: Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations</p> <p>Polymers: Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems. Unit 2: Microencapsulation: Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications</p> <p>Mucosal Drug Delivery system: Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems</p> <p>Implantable Drug Delivery Systems: Introduction, advantages and disadvantages, concept of implants and osmotic pump</p> <p>Unit 3: Transdermal Drug Delivery Systems: Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches</p> <p>Gastroretentive drug delivery systems: Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications</p> <p>Nasopulmonary drug delivery system: Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers</p> <p>Unit 4: Targeted drug Delivery: Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies</p>

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1179	BP801T	BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)	2016	<p>Unit 1: Introduction: Statistics, Biostatistics, Frequency distribution  Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems  Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples  Unit 2: Regression: Curve fitting by the method of least squares, fitting the lines <math>y = a + bx</math> and <math>x = a + by</math>, Multiple regression, standard error of regression- Pharmaceutical Examples  Probability: Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems  Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples  Parametric test: t-test (Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way), Least Significance difference  Unit 3: Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test</p> <p>Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism  Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph  Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases  Unit 4: Blocking and confounding</p>
1180	BP802T	SOCIAL AND PREVENTIVE PHARMACY	2016	<p>Unit 1: Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.</p> <p>Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.</p> <p>Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health</p> <p>Hygiene and health: personal hygiene and health care; avoidable habits  Unit 2: Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse  Unit 3: National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National programme for prevention and control of deafness, Universal immunization programme, National programme for</p>

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1181	BP803ET	PHARMA MARKETING MANAGEMENT (Theory)	2016	<p>Unit 1: Marketing: Definition, general concepts and scope of marketing; Distinction between marketing &amp; selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior.</p> <p>Pharmaceutical market: Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation &amp; targeting. Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist. Analyzing the Market; Role of market research. Unit 2: Product decision: Classification, product line and product mix decisions, product life cycle, product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry. Unit 3: Promotion: Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products. Unit 4: Pharmaceutical marketing channels: Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.</p> <p>Professional sales representative (PSR): Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR. Unit 5: Pricing: Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority).</p>
1182	BP804 ET	PHARMACEUTICAL REGULATORY SCIENCE (Theory)	2016	<p>Unit 1: New Drug Discovery and development Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development. Unit 2: Regulatory Approval Process Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA. Regulatory authorities and agencies Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications) Unit 3: Registration of Indian drug product in overseas market Procedure for export of pharmaceutical products, Technical documentation, Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical Document (eCTD), ASEAN Common Technical Document (ACTD) research. Unit 4: Clinical trials Developing clinical trial protocols, Institutional Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors &amp; Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safety monitoring in clinical trials Unit 5: Regulatory Concepts Basic terminology, guidance, guidelines, regulations, Laws and Acts, Orange book, Federal Register, Code of Federal</p>



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1183	BP 805T	PHARMACOVIGILANCE (Theory)	2016	<p>Unit 1: • History and development of Pharmacovigilance</p> <ul style="list-style-type: none"> <li>• Importance of safety monitoring of Medicine</li> <li>• WHO international drug monitoring programme</li> <li>• Pharmacovigilance Program of India(PvPI)</li> </ul> <p>Introduction to adverse drug reactions</p> <ul style="list-style-type: none"> <li>• Definitions and classification of ADRs</li> <li>• Detection and reporting</li> <li>• Methods in Causality assessment</li> <li>• Severity and seriousness assessment</li> <li>• Predictability and preventability assessment</li> <li>• Management of adverse drug reactions</li> </ul> <p>Basic terminologies used in pharmacovigilance</p> <ul style="list-style-type: none"> <li>• Terminologies of adverse medication related events</li> <li>• Regulatory terminologies</li> </ul> <p>Unit 2: Drug and disease classification</p> <ul style="list-style-type: none"> <li>• Anatomical, therapeutic and chemical classification of drugs</li> <li>• International classification of diseases</li> <li>• Daily defined doses</li> <li>• International Non proprietary Names for drugs</li> </ul> <p>Drug dictionaries and coding in pharmacovigilance</p> <ul style="list-style-type: none"> <li>• WHO adverse reaction terminologies</li> <li>• MedDRA and Standardised MedDRA queries</li> <li>• WHO drug dictionary</li> <li>• Eudravigilance medicinal product dictionary</li> </ul> <p>Information resources in pharmacovigilance</p> <ul style="list-style-type: none"> <li>• Basic drug information resources</li> <li>• Specialised resources for ADRs</li> </ul> <p>Establishing pharmacovigilance programme</p>
1184	BP 806 ET	QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)	2016	<p>Unit 1: Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms</p> <p>WHO guidelines for quality control of herbal drugs. Evaluation of commercial crude drugs intended for use</p> <p>Unit 2: Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine.</p> <p>WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines WHO Guidelines on GACP for Medicinal Plants.</p> <p>Unit 3: EU and ICH guidelines for quality control of herbal drugs.</p> <p>Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines</p> <p>Unit 4: Stability testing of herbal medicines.</p> <p>Application of various chromatographic techniques in standardization of herbal products.</p> <p>Preparation of documents for new drug application and export registration GMP requirements and Drugs &amp; Cosmetics Act provisions.</p> <p>Unit 5: Regulatory requirements for herbal medicines.</p> <p>WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems Comparison of various Herbal Pharmacopoeias.</p> <p>Role of chemical and biological markers in standardization of herbal products</p>

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1185	BP 807 ET	COMPUTER AIDED DRUG DESIGN (Theory)	2016	<p>Unit 1: Introduction to Drug Discovery and Development            Stages of drug discovery and development            Lead discovery and Analog Based Drug Design            Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation.            Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies            Unit 2: Quantitative Structure Activity Relationship (QSAR)            SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammett's substituent constant and Taft's steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.            Unit 3: Molecular Modeling and virtual screening techniques            Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,            Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. De novo drug design.            Unit 4: Informatics &amp; Methods in drug design            Introduction to Bioinformatics, cheminformatics, ADME databases, chemical, biochemical and pharmaceutical</p>
1186	BP808ET	CELL AND MOLECULAR BIOLOGY (Elective subject)	2016	<p>Unit 1: a) Cell and Molecular Biology: Definitions theory and basics and Applications.            b) Cell and Molecular Biology: History and Summation.            c) Properties of cells and cell membrane.            d) Prokaryotic versus Eukaryotic            e) Cellular Reproduction            f) Chemical Foundations – an Introduction and Reactions (Types)            Unit 2: a) DNA and the Flow of Molecular Information            b) DNA Functioning            c) DNA and RNA            d) Types of RNA            e) Transcription and Translation            Unit 3: a) Proteins: Defined and Amino Acids            b) Protein Structure            c) Regularities in Protein Pathways            d) Cellular Processes            e) Positive Control and significance of Protein Synthesis            Unit 4: a) Science of Genetics            b) Transgenics and Genomic Analysis            c) Cell Cycle analysis            d) Mitosis and Meiosis            e) Cellular Activities and Checkpoints            Unit 5: a) Cell Signals: Introduction            b) Receptors for Cell Signals            c) Signaling Pathways: Overview            d) Misregulation of Signaling Pathways            e) Protein-Kinases: Functioning</p>

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1187	BP809ET	COSMETIC SCIENCE(Theory)	2016	<p>Unit 1: Classification of cosmetic and cosmeceutical products            Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs            Cosmetic excipients: Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application            Skin: Basic structure and function of skin.            Hair: Basic structure of hair. Hair growth cycle.            Oral Cavity: Common problem associated with teeth and gums.            Unit 2: Principles of formulation and building blocks of skin care products:            Face wash,            Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmeceuticals. Antiperspirants &amp; deodorants- Actives &amp; mechanism of action.            Principles of formulation and building blocks of Hair care products:            Conditioning shampoo, Hair conditioner, anti-dandruff shampoo. Hair oils.            Chemistry and formulation of Para-phenylene diamine based hair dye. Principles of formulation and building blocks of oral care products: Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.            Unit 3: Sun protection, Classification of Sunscreens and SPF.            Role of herbs in cosmetics:            Skin Care: Aloe and turmeric Hair care: Henna and amla.            Oral care: Neem and clove            Analytical cosmetics: BIS specification and analytical methods for shampoo, skin- cream and toothpaste.            Unit 4: Principles of Cosmetic Evaluation: Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties            Soaps, and syndet bars. Evolution and skin benefits            Unit 5: Oily and dry skin, causes leading to dry skin, skin moisturization. Basic understanding of the terms Comedogenic, dermatitis.</p>
1188	BP810 ET	PHARMACOLOGICAL SCREENING METHODS	2016	<p>Unit 1: Laboratory Animals:            Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals.            Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.            Unit 2: Preclinical screening models            a. Introduction: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study.            b. Study of screening animal models for            Diuretics, nootropics, anti-Parkinson's, antiasthmatics, Preclinical screening models: for CNS activity- analgesic, antipyretic, anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease            Unit 3: Preclinical screening models: for ANS activity, sympathomimetics, sympatholytics, parasymphathomimetics, parasymphatholytics, skeletal muscle relaxants, drugs acting on eye, local anaesthetics            Unit 4: Preclinical screening models: for CVS activity- antihypertensives, diuretics, antiarrhythmic, antidyslipidemic, anti aggregatory, coagulants, and anticoagulants            Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics.            Unit 5: Research methodology and Bio-statistics.</p>

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1189	BP 811 ET	ADVANCED INSTRUMENTATION TECHNIQUES	2016	<p>Unit 1: Nuclear Magnetic Resonance spectroscopy Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications Mass Spectrometry- Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications Unit 2: Thermal Methods of Analysis: Principles, instrumentation and applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC) X- Ray Diffraction Methods: Origin of X-rays, basic aspects of crystals, X- ray Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications. Unit 3: Calibration and validation-as per ICH and USFDA guidelines Calibration of following Instruments  Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer,  Fluorimeter, Flame Photometer, HPLC and GC Unit 4: Radio immune assay: Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay <del>Extraction techniques: General principle and procedure involved in the solid phase extraction and liquid-liquid</del></p>
1190	BP812 ET	DIETARY SUPPLEMENTS AND NUTRACEUTICALS	2016	<p>Unit 1: a. Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc. b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community. c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds Unit 2: Phytochemicals as nutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following a) Carotenoids- <math>\alpha</math> and <math>\beta</math>-Carotene, Lycopene, Xanthophylls, leutin b) Sulfides: Diallyl sulfides, Allyl trisulfide. c) Polyphenolics: Resveratrol d) Flavonoids- Rutin , Naringin, Quercetin, Anthocyanidins, catechins, Flavones e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum f) Phyto estrogens : Isoflavones, daidzein, Geebustin, lignans g) Tocopherols h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like. Unit 3: a) Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids.  b) Dietary fibres and complex carbohydrates as functional food ingredients.. Unit 4: a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing. b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione, Vitamin C, Vitamin E, Lipoic acid, melatonin</p>

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1191	(MPH 101T)	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES	2016	<p>Unit 1: 1. a. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV- Visible spectroscopy.</p> <p>b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy</p> <p>c. Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.</p> <p>d. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications. Unit 2: 2 NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup>C NMR. Applications of NMR spectroscopy. Unit 3: 3 Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy Unit 4: 4 Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following:</p> <p>a) Paper chromatography b) Thin Layer chromatography  c) Ion exchange chromatography d) Column chromatography  e) Gas chromatography f) High Performance Liquid chromatography  g) Affinity chromatography Unit 5: 5 a. Electrochromatography: Principle, Instrumentation, Working conditions, factors</p>
1192	(MPH 102T)	DRUG DELIVERY SYSTEMS	2016	<p>Unit 1: Sustained Release (SR) and Controlled Release (CR) formulations: Introduction &amp; basic concepts, advantages/ disadvantages, factors influencing, Physicochemical &amp; biological approaches for SR/CR formulation, Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application Dosage Forms for Personalized Medicine: Introduction, Definition, Pharmacogenetics, Categories of Patients for Personalized Medicines: Customized drug delivery systems, Bioelectronic Medicines, 3D printing of pharmaceuticals, Telepharmacy. Unit 2: 2 Rate Controlled Drug Delivery Systems: Principles &amp; Fundamentals, Types, Activation; Modulated Drug Delivery Systems; Mechanically activated, pH activated, Enzyme activated, and Osmotic activated Drug Delivery Systems Feedback regulated Drug Delivery Systems; Principles &amp; Fundamentals. Unit 3: 3 Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal Drug Delivery Systems: Principle of muco adhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations. Unit 4: 4 Ocular Drug Delivery Systems: Barriers of drug permeation, Methods to overcome barriers. Unit 5: 5 Transdermal Drug Delivery Systems: Structure of skin and barriers, Penetration enhancers, Transdermal Drug Delivery Systems: Formulation and evaluation Unit 6: 6 Protein and Peptide</p>
1193	(MPH 103T)	MODERN PHARMACEUTICS	2016	<p>Unit 1: a. Preformation Concepts – Drug Excipient interactions - different methods, kinetics of stability, Stability testing. Theories of dispersion and pharmaceutical Dispersion (Emulsion and Suspension, SMEDDS) preparation and stability Large and small volume parental – physiological and formulation consideration, Manufacturing and evaluation.</p> <p>b. Optimization techniques in Pharmaceutical Formulation: Concept and parameters of optimization, Optimization techniques in pharmaceutical formulation and processing. Statistical design, Response surface method, Contour designs, Factorial designs and application in formulation Unit 2: 2 Validation : Introduction to Pharmaceutical Validation, Scope &amp; merits of Validation, Validation and calibration of Master plan, ICH &amp; WHO guidelines for calibration and validation of equipments, Validation of specific dosage form, Types of validation. Government regulation, Manufacturing Process Model, URS, DQ, IQ, OQ &amp; P.Q. of facilities. Unit 3: 3 cGMP &amp; Industrial Management: Objectives and policies of current good manufacturing practices, layout of buildings, services, equipments and their maintenance Production management: Production organization, , materials management, handling and transportation, inventory management and control, production and planning control. Sales forecasting, budget and cost control</p>

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1194	(MPH 104T)	REGULATORY AFFAIRS	2016	<p>Unit 1: a. Documentation in Pharmaceutical industry: Master formula record, DMF (Drug Master File), distribution records. Generic drugs product development Introduction , Hatch- Waxman act and amendments, CFR (CODE OF FEDERAL REGULATION) ,drug product performance, in-vitro, ANDA regulatory approval process, NDA approval process, BE and drug product assessment, in -vivo, scale up process approval changes, post marketing surveillance, outsourcing BA and BE to CRO.</p> <p>b. Regulatory requirement for product approval: API, biologics, novel, therapies obtaining NDA, ANDA for generic drugs ways and means of US registration for foreign drugs</p> <p>Unit 2:2 CMC, post approval regulatory affairs. Regulation for combination products and medical devices.CTD and ECTD format, industry and FDA liaison. ICH - Guidelines of ICH-Q, S E, M. Regulatory requirements of EU, MHRA, TGA and ROW countries.</p> <p>Unit 3:3 Non clinical drug development: Global submission of IND, NDA, ANDA. Investigation of medicinal products dossier, dossier (IMPD) and investigator brochure (IB).</p> <p>Unit 4:4 Clinical trials: Developing clinical trial protocols. Institutional review board / independent ethics committee Formulation and working procedures informed Consent process and</p>
1195	(MPH 201T)	MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS) (NTDS)	2016	<p>Unit 1: Targeted Drug Delivery Systems: Concepts, Events and biological process involved in drug targeting. Tumor targeting and Brain specific delivery.</p> <p>Unit 2: 2 Targeting Methods: introduction preparation and evaluation.</p> <p>Nano Particles &amp; Liposomes: Types, preparation and evaluation.</p> <p>Unit 3: 3 Micro Capsules / Micro Spheres: Types, preparation and evaluation , Monoclonal Antibodies ; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes</p> <p>Unit 4: 4 Pulmonary Drug Delivery Systems : Aerosols, propellents, Containers</p> <p>Types, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation.</p> <p>Unit 5: 5 Nucleic acid based therapeutic delivery system : Gene therapy, introduction (ex-vivo &amp; in-vivo gene therapy). Potential target diseases for gene therapy (inherited disorder and cancer). Gene expression systems (viral and nonviral gene transfer). Liposomal gene delivery systems.</p> <p>Biodistribution and Pharmacokinetics. knowledge of therapeutic antisense molecules and aptamers as drugs of future</p>
1196	(MPH 202T)	ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS	2016	<p>Unit 1: Drug Absorption from the Gastrointestinal Tract: Gastrointestinal tract, Mechanism of drug absorption, Factors affecting drug absorption, pH-partition theory of drug absorption. Formulation and physicochemical factors: Dissolution rate, Dissolution process, Noyes-Whitney equation and drug dissolution, Factors affecting the dissolution rate. Gastrointestinal absorption: role of the dosage form: Solution (elixir, syrup and solution) as a dosage form ,Suspension as a dosage form, Capsule as a dosage form, Tablet as a dosage form ,Dissolution methods ,Formulation and processing factors, Correlation of in vivo data with in vitro dissolution data.</p> <p>Transport model: Permeability-Solubility-Charge State and the pH Partition Hypothesis, Properties of the Gastrointestinal Tract (GIT), pH Microclimate Intracellular pH Environment, Tight-Junction Complex.</p> <p>Unit 2: 2 Biopharmaceutic considerations in drug product design and In Vitro Drug Product Performance: Introduction, biopharmaceutic factors affecting drug bioavailability, rate-limiting steps in drug absorption, physicochemical nature of the drug formulation factors affecting drug product performance, in vitro: dissolution and drug release testing, compendial methods of dissolution, alternative methods of dissolution testing meeting dissolution requirements problems of variable control in</p>

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1197	(MPH 203T)	COMPUTER AIDED DRUG DEVELOPMENT	2016	Unit 1: a. Computers in Pharmaceutical Research and Development: A General Overview: History of Computers in Pharmaceutical Research and Development. Statistical modeling in Pharmaceutical research and development: Descriptive versus Mechanistic Modeling, Statistical Parameters, Estimation, Confidence Regions, Nonlinearity at the Optimum, Sensitivity Analysis, Optimal Design, Population Modeling b. Quality-by-Design In Pharmaceutical Development: Introduction, ICH Q8 guideline, Regulatory and industry views on QbD, Scientifically based QbD - examples of application. Unit 2: 2 Computational Modeling Of Drug Disposition: Introduction ,Modeling Techniques: Drug Absorption, Solubility, Intestinal Permeation, Drug Distribution ,Drug Excretion, Active Transport; P-gp, BCRP, Nucleoside Transporters, hPEPT1, ASBT, OCT, OATP, BBB-Choline Transporter. Unit 3: 3 Computer-aided formulation development:: Concept of optimization, Optimization parameters, Factorial design, Optimization technology & Screening design. Computers in Pharmaceutical Formulation: Development of pharmaceutical emulsions, microemulsion drug carriers Legal Protection of Innovative Uses of Computers in R&D, The Ethics of Computing in Pharmaceutical Research, Computers in Market analysis Unit 4: 4 a. Computer-aided biopharmaceutical characterization: Gastrointestinal absorption simulation. Introduction, Theoretical background, Model construction, Parameter sensitivity analysis, Virtual trial, Fed vs. fasted state, In vitro dissolution and in vitro in
1198	(MPH 204T)	COSMETICS AND COSMECEUTICALS	2016	Unit 1: Cosmetics – Regulatory : Definition of cosmetic products as per Indian regulation. Indian regulatory requirements for labeling of cosmetics Regulatory provisions relating to import of cosmetics, Misbranded and spurious cosmetics. Regulatory provisions relating to manufacture of cosmetics – Conditions for obtaining license, prohibition of manufacture and sale of certain cosmetics, loan license, offences and penalties. Unit 2: 2 Cosmetics - Biological aspects : Structure of skin relating to problems like dry skin, acne, pigmentation, prickly heat, wrinkles and body odor. Structure of hair and hair growth cycle. Common problems associated with oral cavity. Cleansing and care needs for face, eye lids, lips, hands, feet, nail, scalp, neck, body and under-arm. Unit 3: 2 Formulation Building blocks: Building blocks for different product formulations of cosmetics/cosmeceuticals. Surfactants – Classification and application. Emollients, rheological additives: classification and application. Antimicrobial used as preservatives, their merits and demerits. Factors affecting microbial preservative efficacy. Building blocks for formulation of a moisturizing cream, vanishing cream, cold cream, shampoo and toothpaste. Soaps and syndetbars. Perfumes; Classification of perfumes. Perfume ingredients listed as allergens in EU regulation Controversial ingredients: Parabens, formaldehyde liberators, dioxane Unit 4: 4 Design of
1199	(MRA 101T)	GOOD REGULATORY PRACTICES	2016	Unit 1: Current Good Manufacturing Practices: Introduction, US cGMP Part 210 and Part 211. EC Principles of GMP (Directive 91/356/EEC) Article 6 to Article 14 and WHO cGMP guidelines GAMP-5; Medical device and IVDs Global Harmonization Task Force(GHTF) Guidance docs. Unit 2: 2 Good Laboratory Practices: Introduction, USFDA GLP Regulations (Subpart A to Subpart K), Controlling the GLP inspection process, Documentation, Audit, goals of Laboratory Quality Audit, Audit tools, Future of GLP regulations, relevant ISO and Quality Council of India(QCI) Standards Unit 3: 3 Good Automated Laboratory Practices: Introduction to GALP, Principles of GALP, GALP Requirements, SOPs of GALP, Training Documentation, 21 CFR Part 11, General check list of 21CFR Part 11, Software Evaluation checklist, relevant ISO and QCI Standards. Unit 4: 4 Good Distribution Practices: Introduction to GDP, Legal GDP requirements put worldwide, Principles, Personnel, Documentation, Premises and Equipment, Deliveries to Customers, Returns, Self-Inspection, Provision of information, Stability testing principles, WHO GDP, USP GDP (Supply chain integrity), relevant CDSCO guidance and ISO standards Unit 5: 5 Quality management systems: Concept of Quality Total Quality Management, Quality by design, Six Sigma concept, Out of Specifications (OOS), Change control

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1200	(MRA 102T)	DOCUMENTATION AND REGULATORY WRITING	2016	Unit 1: Documentation in pharmaceutical industry: Exploratory Product Development Brief (EPDB) for Drug substance and Drug product, Product Development Plan (PDP), Product Development Report (PDR), Master Formula Record, Batch Manufacturing Record and its calculations, Batch Reconciliation, Batch Packaging Records, Print pack specifications, Distribution records, Certificate of Analysis (CoA), Site Master File and Drug Master Files (DMF). Unit 2:2 Dossier preparation and submission: Introduction and overview of dossiers, contents and organization of dossier, binders and sections, compilation and review of dossier. Paper submissions, overview and modules of CTD, electronic CTD submissions; Electronic submission: Planning electronic submission, requirements for submission, regulatory bindings and requirements, Tool and Technologies, electronic dossier submission process and validating the submission, Electronic Submission Gateway (ESG). Non eCTD electronic submissions (NeeS), Asian CTD formats (ACTD) submission. Organizing, process and validation of submission. Submission in Sugam system of CDSCO. Unit 3:3 Audits: Introduction, Definition, Summary, Types of audits, GMP compliance audit, Audit policy, Internal and External Audits. <del>Second Party Audits. External third party audits. Auditing strategies. Preparation and conducting audit</del>
1201	(MRA 103T)	CLINICAL RESEARCH REGULATIONS	2016	Unit 1: Clinical Drug Development Process <ul style="list-style-type: none"> <li>• Different types of Clinical Studies</li> <li>• Phases of clinical trials, Clinical Trial protocol</li> <li>• Phase 0 studies</li> <li>• Phase I and subtype studies (single ascending, multiple ascending, dose escalation, methods, food effect studies, drug – drug interaction, PK end points</li> <li>• Phase II studies (proof of concept or principle studies to establish efficacy)</li> <li>• Phase III studies (Multi ethnicity, global clinical trial, registration studies)</li> <li>• Phase IV studies (Post Marketing Studies; PSUR)</li> </ul> Clinical Investigation and Evaluation of Medical Devices & IVDs Different Types of Studies Key Concepts of Medical Device Clinical Evaluation Key concepts of Clinical Investigation Unit 2:2 Ethics in Clinical Research: <ul style="list-style-type: none"> <li>• Historical Perspectives: Nuremberg Code, Thalidomide study, Nazis Trials, Tuskegee Syphilis Study, The Belmont Report, The declaration of Helsinki</li> <li>• Origin of International Conference on Harmonization - Good Clinical Practice (ICH-GCP) guidelines.</li> <li>• The ethics of randomized clinical trials</li> <li>• The role of placebo in clinical trials</li> <li>• Ethics of clinical research in special population</li> <li>• Institutional Review Board/Independent Ethics Committee/Ethics Committee – composition, roles, responsibilities, review and approval process and ongoing monitoring of safety data</li> <li>• Data safety monitoring boards.</li> <li>• Responsibilities of sponsor, CRO, and investigator in ethical conduct of clinical research</li> <li>• Ethical principles governing informed consent process</li> <li>• Patient Information Sheet and Informed Consent Form</li> <li>• The informed consent process and documentation</li> </ul> Unit 3:3 Regulations governing Clinical Trials India: Clinical Research regulations in India – Schedule Y & Medical Device Guidance USA: Regulations to conduct drug studies in USA (FDA)



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1202	(MRA 104T)	REGULATIONS AND LEGISLATION FOR DRUGS & COSMETICS, MEDICAL DEVICES, BIOLOGICALS & HERBALS, AND FOOD & NUTRACEUTICALS IN INDIA AND INTELLECTUAL PROPERTY RIGHTS	2016	<p>Unit 1: 1. Biologicals &amp; Herbals, and Food &amp; Nutraceuticals Acts and Rules (with latest amendments):</p> <ol style="list-style-type: none"> <li>1. Drugs and Cosmetics Act 1940 and Rules 1945: DPCO and NPPA</li> <li>2. Other relevant provisions (rules schedules and guidelines for approval of Drugs &amp; Cosmetics, Medical Devices, Biologicals &amp; Herbals, and Food &amp; Nutraceuticals in India</li> </ol> <p>Other relevant Acts: Narcotics Drugs and Psychotropic Substances Act; Medicinal and Toilet Preparations (Excise Duties) Act, 1955; Pharmacy Act, 1948; Drugs and Magic Remedies (Objectionable Advertisements) Act, 1955; Prevention of Cruelty to Animals Act.</p> <p>Unit 2:2 Regulatory requirements and approval procedures for Drugs &amp; Cosmetics Medical Devices, Biologicals &amp; Herbals, and Food &amp; Nutraceuticals</p> <p>CDSCO (Central Drug Standard Control Organization) and State Licensing Authority: Organization, Responsibilities</p> <ul style="list-style-type: none"> <li>• Rules, regulations, guidelines and standards for regulatory filing of Drugs &amp; Cosmetics, Medical Devices, Biologicals &amp; Herbals, and Food &amp; Nutraceuticals</li> <li>• Format and contents of Regulatory dossier filing Clinical trial/ investigations</li> </ul> <p>Unit 3:3 Indian Pharmacopoeial Standards, BIS standards and ISO and other relevant standards</p> <p>Unit 4:4 Bioavailability and Bioequivalence data (BA &amp;BE), BCS Classification of Drugs, Regulatory Requirements for Bioequivalence study</p> <p>Stability requirements: ICH and WHO</p> <p>Guidelines for Drug testing in animals/Preclinical Studies</p> <p>Animal testing: Rationale for conducting studies, CPCSEA Guidelines</p> <p>Ethical guidelines for human participants ICMR, DPT Guidelines for Stem Cell Research</p> <p>Unit 5:5 Intellectual Property</p>
1203	(MRA 201T)	REGULATORY ASPECTS OF DRUGS & COSMETICS	2016	<p>Unit 1: USA &amp; CANADA: Organization structure and functions of FDA. Federal register and Code of Federal Regulations (CFR), History and evolution of United States Federal, Food, Drug and Cosmetic Act (FFDCA), Hatch Waxman act and Orange book, Purple book, Drug Master Files (DMF) system in US, Regulatory Approval</p> <p>Process for Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA), Supplemental New Drug Application (SNDA); Regulatory requirements for Orphan drugs and Combination Products, Changes to an approved NDA / ANDA. Regulatory considerations for manufacturing, packaging and labeling of pharmaceuticals in USA. Legislation and regulations for import, manufacture, distribution and sale of cosmetics in USA and Canada.</p> <p>Unit 2:2 European Union &amp; Australia: Organization and structure of EMA &amp; EDQM, General guidelines, Active Substance Master Files (ASMF) system in EU, Content and approval process of IMPD, Marketing Authorization procedures in EU (Centralized procedure, Decentralized procedure, Mutual recognition procedure and National Procedure). Regulatory considerations for manufacturing, packaging and labeling of pharmaceuticals in EU, Eudralex directives for human medicines, Variations &amp; extensions, Compliance of European Pharmacopoeia (CEP)/ Certificate of Suitability (CoS), Marketing Authorization (MA) transfers, Qualified Person (QP) in EU. Legislation and regulations for import, manufacture, distribution and sale of cosmetics in European Union &amp; Australia</p> <p>Unit 3:3 Japan: Organization of the PMDA, Pharmaceutical Laws and regulations, types of registration applications, DMF system in Japan, drug regulatory approval process, Regulatory considerations for manufacturing, packaging and labeling of pharmaceuticals in Japan, Post marketing surveillance in Japan. Legislation and regulations for import, manufacture, distribution and sale of cosmetics in Japan</p> <p>Unit 4:4 Emerging Markets: Introduction, Countries covered, Study of the world map, study of</p>
1204	(MRA 202T)	REGULATORY ASPECTS OF HERBAL AND BIOLOGICALS	2016	<p>Unit 1: India : Introduction, Applicable Regulations and Guidelines , Principles for Development of Similar Biologics, Data Requirements for Preclinical Studies, Data Requirements for Clinical Trial Application, Data Requirements for Market Authorization Application, Post-Market Data for Similar Biologics, Pharmacovigilance. GMP and GDP.</p> <p>Unit 2:2 USA: Introduction to Biologics; biologics, biological and biosimilars, different biological products, difference between generic drug and biosimilars, laws, regulations and guidance on biologics/ biosimilars, development and approval of biologics and biosimilars (IND, PMA, BLA, NDA, 510(k), pre-clinical and clinical development considerations, advertising, labelling and packing of biologics</p> <p>Unit 3:3 European Union: Introduction to Biologics; directives, scientific guidelines and guidance related to biologics in EU, comparability/ biosimilarity assessment, Plasma master file, TSE/ BSE evaluation, development and regulatory approval of biologics (Investigational medicinal products and biosimilars), pre-clinical and clinical development considerations; stability, safety, advertising, labelling and packing of biologics in EU</p> <p>Unit 4:4 Vaccine regulations in India. US and European Union: Clinical evaluation, Marketing</p>

  
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1205	(MRA 203T)	REGULATORY ASPECTS OF MEDICAL DEVICES	2016	Unit 1: Medical Devices: Introduction, Definition, Risk based classification and Essential Principles of Medical Devices and IVDs. Differentiating medical devices IVDs and Combination Products from that of pharmaceuticals, History of Medical Device Regulation, Product Lifecycle of Medical Devices and Classification of Medical Devices. IMDRF/GHTF: Introduction, Organizational Structure, Purpose and Functions, Regulatory Guidelines, Working Groups, Summary Technical Document (STED), Global Medical Device Nomenclature (GMDN).Unit 2:2 Ethics: Clinical Investigation of Medical Devices, Clinical Investigation Plan for Medical Devices, Good Clinical Practice for Clinical Investigation of medical devices (ISO 14155:2011) Quality: Quality System Regulations of Medical Devices: ISO 13485, Quality Risk Management of Medical Devices: ISO 14971, Validation and Verification of Medical device, Adverse Event Reporting of Medical deviceUnit 3:3 USA: Introduction, Classification, Regulatory approval process for Medical Devices (510k) Premarket Notification, Pre-Market Approval (PMA), Investigational Device Exemption (IDE) and In vitro Diagnostics, Quality System Requirements 21 CFR Part 820, Labeling requirements 21 CFR Part 801, Post marketing surveillance of MD and Unique Device Identification (UDI). Basics of In vitro diagnostics, classification and approval process.Unit 4:4 European Union: Introduction, Classification, Regulatory approval process for Medical Devices (Medical Device Directive, Active Implantable Medical Device Directive) and In vitro Diagnostics (In Vitro Diagnostics Directive). CE certification process
1206	(MRA 204T)	REGULATORY ASPECTS OF FOOD & NUTRACEUTICALS	2016	Unit 1: Nutraceuticals: Introduction, History of Food and Nutraceutical Regulations, Meaning of Nutraceuticals, Dietary Supplements, Functional Foods, Medical Foods, Scope and Opportunities in Nutraceutical Market.Unit 2: 2 Global Aspects: WHO guidelines on nutrition. NSF International: Its Role in the Dietary Supplements and Nutraceuticals Industries, NSF Certification, NSF Standards for Food And Dietary Supplements. Good Manufacturing Practices for Nutraceuticals.Unit 3: 3 India : Food Safety and Standards Act, Food Safety and Standards Authority of India: Organization and Functions, Regulations for import, manufacture and sale of nutraceutical products in India, Recommended Dietary Allowances (RDA) in India.Unit 4: 4 USA: US FDA Food Safety Modernization Act, Dietary Supplement Health and Education Act. U.S. regulations for manufacture and sale of nutraceuticals and dietary supplements, Labelling Requirements and Label Claims for Dietary Supplements, Recommended Dietary Allowances (RDA) in the U.S.Unit 5: 5 European Union: European Food Safety Authority (EFSA): Organization and Functions. EU Directives and regulations for manufacture and sale of nutraceuticals and dietary supplements. Nutrition labelling. European Regulation on Novel Foods and Novel Food Ingredients. Recommended Dietary Allowances (RDA) in Europe

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1207	(MPL 101T)	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES	2016	<p>Unit 1: UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy, Difference/ Derivative spectroscopy. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy, Data Interpretation. Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence (Characteristics of drugs that can be analysed by fluorimetry), Quenchers, Instrumentation and Applications of fluorescence spectrophotometer. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications. Unit 2: 2 NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup>C NMR. Applications of NMR spectroscopy. Unit 3: 3 Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy. Unit 4: 4 Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution, isolation of drug from excipients, data interpretation and applications of the following:</p> <ul style="list-style-type: none"> <li>j) Thin Layer chromatography</li> <li>k) High Performance Thin Layer Chromatography</li> <li>l) Ion exchange chromatography</li> <li>m) Column chromatography</li> <li>n) Gas chromatography</li> <li>o) High Performance Liquid chromatography</li> <li>p) Ultra High Performance Liquid chromatography</li> <li>q) Affinity chromatography</li> </ul>

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1208	(MPL 102T)	ADVANCED PHARMACOLOGY - I	2016	<p>Unit 1: 1. General Pharmacology</p> <p>a. Pharmacokinetics: The dynamics of drug absorption, distribution, biotransformation and elimination. Concepts of linear and non-linear compartment models. Significance of Protein binding.</p> <p>b. Pharmacodynamics: Mechanism of drug action and the relationship between drug concentration and effect. Receptors, structural and functional families of receptors, quantitation of drug receptors interaction and elicited effects.</p> <p>Unit 2: 2 Neurotransmission</p> <p>a. General aspects and steps involved in neurotransmission.</p> <p>b. Neurohumoral transmission in autonomic nervous system (Detailed study about neurotransmitters- Adrenaline and Acetyl choline).</p> <p>c. Neurohumoral transmission in central nervous system (Detailed study about neurotransmitters- histamine, serotonin, dopamine, GABA, glutamate and glycine).</p> <p>d. Non adrenergic non cholinergic transmission (NANC). Co- transmission Systemic Pharmacology</p> <p>A detailed study on pathophysiology of diseases, mechanism of action, pharmacology and toxicology of existing as well as novel drugs used in the following systems</p> <p>Autonomic Pharmacology</p> <p>Parasympathomimetics and lytics, sympathomimetics and lytics, agents affecting neuromuscular junction</p> <p>Unit 3: 3 Central nervous system Pharmacology</p> <p>General and local anesthetics</p> <p>Sedatives and hypnotics, drugs used to treat anxiety.</p> <p>Depression, psychosis, mania, epilepsy, neurodegenerative diseases.</p> <p>Narcotic and non-narcotic analgesics.</p> <p>Unit 4: 4 Cardiovascular Pharmacology</p> <p>Diuretics, antihypertensives, antiischemics, anti- arrhythmics, drugs for heart failure and hyperlipidemia. Hematinics, coagulants , anticoagulants, fibrinolytics and anti- platelet drugs</p> <p>Unit 5: 5 Autocoid Pharmacology</p> <p>The physiological and pathological role of Histamine, Serotonin, Kinins Prostaglandins Opioid autocoids.</p> <p>Pharmacology of Antibiotics, FHT antagonists</p>
1209	(MPL 103T)	PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS - I	2016	<p>Unit 1: Laboratory Animals</p> <p>Common laboratory animals: Description, handling and applications of different species and strains of animals.</p> <p>Transgenic animals: Production, maintenance and applications Anaesthesia and euthanasia of experimental animals.</p> <p>Maintenance and breeding of laboratory animals. CPCSEA guidelines to conduct experiments on animals</p> <p>Good laboratory practice.</p> <p>Bioassay-Principle, scope and limitations and methods</p> <p>Unit 2: 2 Preclinical screening of new substances for the pharmacological activity using in vivo, in vitro, and other possible animal alternative models.</p> <p>General principles of preclinical screening. CNS Pharmacology: behavioral and muscle co ordination, CNS stimulants and depressants, anxiolytics, anti-psychotics, anti epileptics and nootropics. Drugs for neurodegenerative diseases like Parkinsonism, Alzheimers and multiple sclerosis. Drugs acting on Autonomic Nervous System.</p> <p>Unit 3: 3 Preclinical screening of new substances for the pharmacological activity using in vivo, in vitro, and other possible animal alternative models.</p> <p>Respiratory Pharmacology: anti-asthmatics, drugs for COPD and anti allergics. Reproductive Pharmacology: Aphrodisiacs and antifertility agents Analgesics, antiinflammatory and antipyretic agents. Gastrointestinal drugs: anti ulcer, anti -emetic, anti- diarrheal and laxatives.</p> <p>Unit 4: 4 Preclinical screening of new substances for the pharmacological activity using in vivo, in vitro, and other possible animal alternative models.</p> <p>Cardiovascular Pharmacology: antihypertensives, antiarrhythmics, antianginal, antiatherosclerotic agents and diuretics. Drugs for metabolic disorders like anti-diabetic, antidyslipidemic agents. Anti cancer agents. Hepatoprotective screening methods.</p> <p>Unit 5: 5 Preclinical screening of new substances for the pharmacological activity using in vivo, in vitro, and other possible animal alternative models.</p> <p>Immunomodulators, Immunosuppressants and immunostimulants</p>

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1210	(MPL 104T)	CELLULAR AND MOLECULAR PHARMACOLOGY	2016	<p>Unit 1: Cell biology            Structure and functions of cell and its organelles            Genome organization. Gene expression and its regulation, importance of siRNA and micro RNA, gene mapping and gene sequencing            Cell cycles and its regulation.            Cell death- events, regulators, intrinsic and extrinsic pathways of apoptosis.            Necrosis and autophagy.</p> <p>Unit 2: 2 Cell signaling            Intercellular and intracellular signaling pathways.            Classification of receptor family and molecular structure ligand gated ion channels; G-protein coupled receptors, tyrosine kinase receptors and nuclear receptors.            Secondary messengers: cyclic AMP, cyclic GMP, calcium ion, inositol 1,4,5-trisphosphate, (IP3), NO, and diacylglycerol.            Detailed study of following intracellular signaling pathways: cyclic AMP signaling pathway, mitogen-activated protein kinase (MAPK) signaling, Janus kinase (JAK)/signal transducer and activator of transcription (STAT) signaling pathway.</p> <p>Unit 3: 3 Principles and applications of genomic and proteomic tools DNA electrophoresis, PCR (reverse transcription and real time), Gene sequencing, micro array technique, SDS page, ELISA and western blotting, Recombinant DNA technology and gene therapy            Basic principles of recombinant DNA technology-Restriction enzymes, various types of vectors. Applications of recombinant DNA technology.            Gene therapy- Various types of gene transfer techniques, clinical applications and recent advances in gene therapy.</p> <p>Unit 4: 4 Pharmacogenomics            Gene mapping and cloning of disease gene.            Genetic variation and its role in health/ pharmacology Polymorphisms affecting drug metabolism            Genetic variation in drug transporters            Genetic variation in G protein coupled receptors            Applications of proteomics science: Genomics, proteomics, metabolomics, functionomics, nutrigenomics            Immunotherapeutics            Types of immunotherapeutics, humanisation antibody therapy, Immunotherapeutics in clinical practice</p> <p>Unit 5: 5 a. Cell culture techniques</p>

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1211	(MPL 201T)	ADVANCED PHARMACOLOGY - II	2016	<p>Unit 1: Endocrine Pharmacology Molecular and cellular mechanism of action of hormones such as growth hormone, prolactin, thyroid, insulin and sex hormones Anti-thyroid drugs, Oral hypoglycemic agents, Oral contraceptives, Corticosteroids. Drugs affecting calcium regulation Unit 2:2 Chemotherapy Cellular and molecular mechanism of actions and resistance of antimicrobial agents such as <math>\beta</math>-lactams, aminoglycosides, quinolones, Macrolide antibiotics. Antifungal, antiviral, and anti-TB drugs. Unit 3:3 Chemotherapy Drugs used in Protozoal Infections Drugs used in the treatment of Helminthiasis Chemotherapy of cancer Immunopharmacology Cellular and biochemical mediators of inflammation and immune response. Allergic or hypersensitivity reactions. Pharmacotherapy of asthma and COPD. Immunosuppressants and Immunostimulants Unit 4:4 GIT Pharmacology Antiulcer drugs, Prokinetics, antiemetics, anti-diarrheals and drugs for constipation and irritable bowel syndrome. Chronopharmacology Biological and circadian rhythms, applications of chronotherapy in various diseases like cardiovascular disease, diabetes, asthma and peptic ulcer Unit 5:5 Free radicals Pharmacology Generation of free radicals, role of free radicals in etiopathology of various diseases such as diabetes, neurodegenerative diseases and cancer. Protective activity of certain important antioxidant Recent Advances in Treatment: <i>Alzheimer's disease, Parkinson's disease, Cancer, Diabetes mellitus</i></p>
1212	(MPL 202T)	PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-II	2016	<p>Unit 1: Basic definition and types of toxicology (general, mechanistic, regulatory and descriptive) Regulatory guidelines for conducting toxicity studies OECD, ICH, EPA and Schedule Y OECD principles of Good laboratory practice (GLP) History, concept and its importance in drug development Unit 2:2 Acute, sub-acute and chronic- oral, dermal and inhalational studies as per OECD guidelines. Acute eye irritation, skin sensitization, dermal irritation &amp; dermal toxicity studies. Test item characterization- importance and methods in regulatory toxicology studies Unit 3:3 Reproductive toxicology studies, Male reproductive toxicity studies, female reproductive studies (segment I and segment III), teratogenicity studies (segment II) Genotoxicity studies (Ames Test, in vitro and in vivo Micronucleus and Chromosomal aberrations studies) In vivo carcinogenicity studies Unit 4:4 IND enabling studies (IND studies)- Definition of IND, importance of IND, industry perspective, list of studies needed for IND submission. Safety pharmacology studies- origin, concepts and importance of safety pharmacology. Tier1- CVS, CNS and respiratory safety pharmacology, HERG assay. Tier2- GI, renal and other studies Unit 5:5 Toxicokinetics, Toxicokinetic evaluation in preclinical studies, saturation kinetics Importance and applications of</p>

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1213	(MPL 203T)	PRINCIPLES OF DRUG DISCOVERY	2016	<p>Unit 1: An overview of modern drug discovery process: Target identification, target validation, lead identification and lead Optimization. Economics of drug discovery.</p> <p>Target Discovery and validation-Role of Genomics, Proteomics and Bioinformatics. Role of Nucleic acid microarrays, Protein microarrays, Antisense technologies, siRNAs, antisense oligonucleotides, Zinc finger proteins. Role of transgenic animals in target validation. Unit 2:2 Lead Identification- combinatorial chemistry &amp; high throughput screening, in silico lead discovery techniques, Assay development for hit identification.</p> <p>Protein structure</p> <p>Levels of protein structure, Domains, motifs, and folds in protein structure. Computational prediction of protein structure: Threading and homology modeling methods. Application of NMR and X-ray crystallography in protein structure prediction</p> <p>Unit 3:3 Rational Drug Design</p> <p>Traditional vs rational drug design, Methods followed in traditional drug design, High throughput screening, Concepts of Rational Drug Design, Rational Drug Design Methods: Structure and Pharmacophore based approaches Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening, Unit 4:4 Molecular docking: Rigid docking, flexible docking, manual docking; Docking based screening. De novo drug design. Quantitative analysis of Structure Activity Relationship</p> <p>History and development of QSAR, SAR versus QSAR, Physicochemical parameters, Hansch analysis, Fee Wilson</p>
1214	(MPL 204T)	CLINICAL RESEARCH AND PHARMACOVIGILANCE	2016	<p>Unit 1: Regulatory Perspectives of Clinical Trials:</p> <p>Origin and Principles of International Conference on Harmonization - Good Clinical Practice (ICH-GCP) guidelines</p> <p>Ethical Committee: Institutional Review Board, Ethical Guidelines for Biomedical Research and Human Participant- Schedule Y, ICMR</p> <p>Informed Consent Process: Structure and content of an Informed Consent Process Ethical principles governing informed consent process</p> <p>Unit 2:2 Clinical Trials: Types and Design Experimental Study- RCT and Non RCT, Observation Study: Cohort, Case Control, Cross sectional</p> <p>Clinical Trial Study Team</p> <p>Roles and responsibilities of Clinical Trial Personnel: Investigator, Study Coordinator, Sponsor, Contract Research Organization and its management</p> <p>Unit 3:3 Clinical Trial Documentation- Guidelines to the preparation of documents, Preparation of protocol, Investigator Brochure, Case Report Forms, Clinical Study Report Clinical Trial Monitoring- Safety Monitoring in CT</p> <p>Adverse Drug Reactions: Definition and types. Detection and reporting methods. Severity and seriousness assessment. Predictability and preventability assessment, Management of adverse drug reactions; Terminologies of ADR.</p> <p>Unit 4:4 Basic aspects, terminologies and establishment of pharmacovigilance</p> <p>History and progress of pharmacovigilance, Significance of safety monitoring, Pharmacovigilance in India and international aspects. WHO international drug monitoring programme. WHO and Regulatory terminologies of ADR</p>

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1215	(MPG 101T)	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES	2016	<p>Unit 1: UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy.</p> <p>IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy</p> <p>Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.</p> <p>Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications.</p> <p>Unit 2: NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup>C NMR. Applications of NMR spectroscopy.</p> <p>Unit 3: Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy.</p> <p>Unit 4: Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution, isolation of drug from excipients, data interpretation and applications of the following:</p> <ol style="list-style-type: none"> <li>Thin Layer chromatography</li> <li>High Performance Thin Layer Chromatography</li> <li>Ion exchange chromatography</li> <li>Column chromatography</li> <li>Gas chromatography</li> <li>High Performance Liquid chromatography</li> <li>Ultra High Performance Liquid chromatography</li> <li>Affinity chromatography</li> <li>Gel Chromatography</li> </ol> <p>Unit 5: Electrophoresis: Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following:</p> <ol style="list-style-type: none"> <li>Paper electrophoresis</li> </ol>



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1216	(MPG 102T)	ADVANCED PHARMACOGNOSY - I	2016	<p>Unit 1: Plant drug cultivation: General introduction to the importance of Pharmacognosy in herbal drug industry, Indian Council of Agricultural Research, Current Good Agricultural Practices, Current Good Cultivation Practices, Current Good Collection Practices, Conservation of medicinal plants- Ex-situ and In- situ conservation of medicinal plants. Unit 2:2 Marine natural products: General methods of isolation and purification, Study of Marine toxins, Recent advances in research in marine drugs, Problems faced in research on marine drugs such as taxonomical identification, chemical screening and their solution. Unit 3:3 Nutraceuticals: Current trends and future scope, Inorganic mineral supplements, Vitamin supplements, Digestive enzymes, Dietary fibres, Cereals and grains, Health drinks of natural origin, Antioxidants, Polyunsaturated fatty acids, Herbs as functional foods, Formulation and standardization of nutraceuticals, Regulatory aspects, FSSAI guidelines, Sources, name of marker compounds and their chemical nature, medicinal uses and health benefits of following</p> <p>i) Spirulina ii) Soya bean iii) Ginseng iv) Garlic v) Broccoli vi) Green and Herbal Tea vii) Flax seeds viii) Black cohosh ix) Turmeric. Unit 4:4 Phytopharmaceuticals: Occurrence, isolation and characteristic features (Chemical nature, uses in pharmacy, medicinal and health benefits) of following.</p> <p>a) Carotenoids - i) <math>\alpha</math> and <math>\beta</math> - Carotene ii) Xanthophyll (Lutein)  b) Limonoids - i) d-Limonene ii) <math>\alpha</math> - Terpineol  c) Saponins - i) Shatavarins  d) Flavonoids - i) Resveratrol ii) Rutin iii) Hesperidin iv) Naringin v) Quercetin  e) Phenolic acids- Ellagic acid  f) Vitamins  g) Tocotrienols and Tocopherols  h) Andrographolide, Glycolipids, Gugulipids, Withanolides, <del>Wogonin, Taxol</del></p>
1217	(MPG 103T)	PHYTOCHEMISTRY	2016	<p>Unit 1: Biosynthetic pathways and Radio tracing techniques: Constituents &amp; their Biosynthesis, Isolation, Characterization and purification with a special reference to their importance in herbal industries of following phytopharmaceuticals containing drugs:</p> <p>a) Alkaloids: Ephedrine, Quinine, Strychnine, Piperine, Berberine, Taxol, Vinca alkaloids.  b) Glycosides: Digitoxin, Glycyrrhizin, Sennosides, Bacosides, Quercetin.  c) Steroids: Hecogenin, guggulosterone and withanolides  d) Coumarin: Umbelliferone.  e) Terpenoids: Cucurbitacins Unit 2:2 Drug discovery and development: History of herbs as source of drugs and drug discovery, the lead structure selection process, structure development, product discovery process and drug registration, Selection and optimization of lead compounds with suitable examples from the following source : artemesin, andrographolides. Clinical studies emphasising on phases of clinical trials, protocol design for lead molecules. Unit 3:3 Extraction and Phytochemical studies: Recent advances in extractions with emphasis on selection of method and choice of solvent for extraction, successive and exhaustive extraction and other methods of extraction commonly used like microwave assisted extraction, Methods of fractionation. Separation of phytoconstituents by latest CCCET, SCFE techniques including preparative HPLC and Flash column chromatography. Unit 4:4 Phytochemical finger printing: HPTLC and LCMS/GCMS applications in the characterization of herbal extracts. Structure elucidation of</p>

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1218	(MPG 104T)	INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY	2016	<p>Unit 1: Herbal drug industry: Infrastructure of herbal drug industry involved in production of standardized extracts and various dosage forms. Current challenges in upgrading and modernization of herbal formulations. Entrepreneurship Development, Project selection, project report, technical knowledge, Capital venture, plant design, layout and construction. Pilot plant scale –up techniques, case studies of herbal extracts. Formulation and production management of herbals. Unit 2:2 Regulatory requirements for setting herbal drug industry: Global marketing management. Indian and international patent law as applicable herbal drugs and natural products. Export - Import (EXIM) policy, TRIPS.</p> <p>Quality assurance in herbal/natural drug products. Concepts of TQM, GMP, GLP, ISO-9000. Unit 3:3 Monographs of herbal drugs: General parameters of monographs of herbal drugs and comparative study in IP, USP, Ayurvedic Pharmacopoeia, Siddha and Unani Pharmacopoeia, American herbal pharmacopoeia, British herbal pharmacopoeia, WHO guidelines in quality assessment of herbal drugs. Unit 4:4 Testing of natural products and drugs: Herbal medicines - clinical laboratory testing. Stability testing of natural products. protocols Unit 5:5 Patents: Indian and</p>
1219	(MPG 201T)	MEDICINAL PLANT BIOTECHNOLOGY	2016	<p>Unit 1: Introduction to Plant biotechnology: Historical perspectives, prospects for development of plant biotechnology as a source of medicinal agents. Applications in pharmacy and allied fields. Genetic and molecular biology as applied to pharmacognosy, study of DNA, RNA and protein replication, genetic code, regulation of gene expression, structure and complicity of genome, cell signaling, DNA recombinant technology. Unit 2:2 Different tissue culture techniques: Organogenesis and embryogenesis, synthetic seed and monoclonal variation, Protoplast fusion, Hairy root multiple shoot cultures and their applications. Micro propagation of medicinal and aromatic plants. Sterilization methods involved in tissue culture, gene transfer in plants and their applications. Unit 3:3 Immobilisation techniques &amp; Secondary Metabolite Production: Immobilization techniques of plant cell and its application on secondary metabolite Production. Cloning of plant cell: Different methods of cloning and its applications. Advantages and disadvantages of plant cell cloning. Secondary metabolism in tissue cultures with emphasis on production of medicinal agents. Precursors and elicitors on production of secondary metabolites Unit 4:4 Biotransformation and Transgenesis:</p>
1220	(MPG 202T)	ADVANCED PHARMACOGNOSY - II	2016	<p>Unit 1: Herbal remedies - Toxicity and Regulations: Herbals vs Conventional drugs, Efficacy of Herbal medicine products, Validation of herbal therapies, Pharmacodynamic and Pharmacokinetic issues. Unit 2:2 Adulteration and Deterioration: Introduction, Types of Adulteration/ Substitution of Herbal drugs, Causes and Measures of Adulteration, Sampling Procedures, Determination of Foreign Matter, DNA Finger printing techniques in identification of drugs of natural origin, detection of heavy metals, pesticide residues, phytotoxin, microbial contamination in herbs and their formulations. Unit 3:3 Ethnobotany and Ethnopharmacology: Ethnobotany in herbal drug evaluation, Impact of Ethnobotany in traditional medicine, New development in herbals, Bio-prospecting tools for drug discovery, Role of Ethnopharmacology in drug evaluation, Reverse Pharmacology. Unit 4:4 Analytical Profiles of herbal drugs: Andrographis paniculata, Boswellia serata, Coleus forskholii, Curcuma longa, Embelica officinalis, Psoralea corylifolia. Unit 5:5 Biological screening of herbal drugs: Introduction and Need for Phyto-Pharmacological Screening, New Strategies for evaluating Natural Products, In vitro evaluation techniques for Antioxidants, Antimicrobial and Anticancer drugs. In vivo evaluation techniques for Anti-inflammatory, Antulcer, Anticancer, Wound healing</p>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1221	(MPG 203T)	INDIAN SYSTEMS OF MEDICINE	2016	<p>Unit 1: Fundamental concepts of Ayurveda, Siddha, Unani and Homoeopathy systems of medicine Different dosage forms of the ISM. Ayurveda: Ayurvedic Pharmacopoeia, Analysis of formulations and bio crude drugs with references to: Identity, purity and quality. Siddha: Gunapadam (Siddha Pharmacology), raw drugs/Dhatu/Jeevam in Siddha system of medicine, Purification process (Suddhi).Unit 2:2 Naturopathy, Yoga and Aromatherapy practices a) Naturopathy - Introduction, basic principles and treatment modalities. b) Yoga - Introduction and Streams of Yoga. Asanas, Pranayama, Meditations and Relaxation techniques. c) Aromatherapy - Introduction, aroma oils for common problems, carrier oils.Unit 3:3 Formulation development of various systems of medicine Salient features of the techniques of preparation of some of the important class of Formulations as per Ayurveda, Siddha, Homeopathy and Unani Pharmacopoeia and texts. Standardization, Shelf life and Stability studies of ISM formulations.Unit 4:4 Schedule T – Good Manufacturing Practice of Indian systems of medicine Components of GMP (Schedule – T) and its objectives, Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records. Quality assurance in ISM formulation industry - GAP, GMP and GLP. Preparation of documents for new drug application and export registration. <del>Challenges in monitoring the safety of herbal medicines: Regulation, quality assurance and control. National/Regional</del></p>
1222	(MPG 204T)	HERBAL COSMETICS	2016	<p>Unit 1: Introduction: Herbal/natural cosmetics, Classification &amp; Economic aspects. Regulatory Provisions relation to manufacture of cosmetics: - License, GMP, offences &amp; Penalties, Import &amp; Export of Herbal/natural cosmetics, Industries involved in the production of Herbal/natural cosmetics.Unit 2:2 Commonly used herbal cosmetics, raw materials, preservatives, surfactants, humectants, oils, colors, and some functional herbs, preformulation studies, compatibility studies, possible interactions between chemicals and herbs, design of herbal cosmetic formulation.Unit 3:3 Herbal Cosmetics : Physiology and chemistry of skin and pigmentation, hairs, scalp, lips and nail, Cleansing cream, Lotions, Face powders, Face packs, Lipsticks, Bath products, soaps and baby product, Preparation and standardisation of the following : Tonic, Bleaches, Dentifrices and Mouth washes &amp; Tooth Pastes, Cosmetics for Nails.Unit 4:4 Cosmeceuticals of herbal and natural origin: Hair growth formulations, Shampoos, Conditioners, Colorants &amp; hair oils, Fairness formulations, <del>vanishing &amp; foundation creams anti-sun burn preparations moisturizing creams deodorants</del>Unit 5:5 Analysis of <del>sexual relationships fatality</del>Unit 4:CPCSEA guidelines for laboratory animal facility: Goals, veterinary care</p>
1223	MRM 301T	Research Methodology & Biostatistics	2016	<p>Unit 1: General Research Methodology: Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques.Unit 2:Biostatistics: Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests (students "t" test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxon rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values.Unit 3:Medical Research: History, values in medical ethics, autonomy, beneficence, non-maleficence, double effect, conflicts between autonomy and beneficence/non-maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, <del>sexual relationships fatality</del>Unit 4:CPCSEA guidelines for laboratory animal facility: Goals, veterinary care</p>
1224	MCA303	Cloud Computing	2020	<p>UNIT I : Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering &amp; Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS Cloud computing platforms: Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing. UNIT II :Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Web services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi-entity support, Multi-schema approach, Multitenance using cloud data stores, Data access control for enterprise applications. UNIT III: Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, Big Table, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model. Parallel efficiency of Map-Reduce. Relational operations using Map-Reduce. Enterprise batch</p>

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1225	MCA304	Net Framework Technology	2020	UNIT I : Introduction to VB.NET, Event Driven Programming, NET as better Programming Platform NET Framework, NET Architecture, The Just-In-Time Compiler, NET Framework class library introduction VB.NET Development Environment, Creating Applications, Building Projects Using simple components, Running VB.NET applications, Mastering VB Language. Data, Operators, Conditionals and Loops. Procedures, Error Handling, Classes and Objects. UNIT II :Windows Applications in VB .NET. Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons. List Boxes, Combo Boxes. Picture Boxes, Scrollbars, Splitters, Timer Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars. Object Oriented Programming in VB .NET, Class and Object, Properties, methods and events. Constructors and Destructors. UNIT III : Method overloading, Inheritance, Access modifiers: Public, Private, Protected, Friend. Overloading and Overriding. Interfaces, Polymorphism UNIT IV : File handling, File handling using File Stream, Stream Writer, Stream Reader, Binary Reader, Binary Writer classes. File and Directory Classes. UNIT V : Databases in VB .NET Database: Connections. Data adapters
1226	MCA305-EI(a)	Elective I: EI(a) : Distributed Systems	2020	UNIT I :Introduction to Distributed Systems: Goals of Distributed Systems, Hardware and Software concepts, the client server model, Remote procedure call, remote object invocation, message and stream oriented Communications. UNIT II : Process and synchronization in Distributed Systems: Threads, clients, servers, code migration, clock Synchronization, mutual exclusion, Bully and Ring Algorithm, Distributed transactions. UNIT III : Consistency, Replication, fault tolerance and security: Object replication, Data centric consistency Model, client-centric consistency models, Introduction to fault tolerance, process resilience, recovery, Distributed security architecture, security management, KERBEROS, secure socket layer, cryptography UNIT IV : Distributed Object Based and File Systems: CORBA, Distributed COM, Goals and Design Issues of Distributed file system, types of distributed file system, sun network file system. UNIT V : Distributed shared memory, DSM servers, shared memory consistency model, distributed document Based systems: the World Wide Web, distributed co-ordination based systems: JINI Implementation: JAVA RMI OLE ActiveX Orbix Vishrokes. Object oriented programming with SOM
1227	MCA305 -EI(b)	Elective I: EI(b) : Embedded Systems	2020	UNIT I : Princeton (Von Neumann) and Harvard Architecture, CISC and RISC architecture, General-purpose processor, microcontroller, Embedded processor, Digital Signal processor, Application specific processor, Super scalar, VLIW, pipelined Architecture. Definition of Embedded System, classification of embedded system, skills required for an Embedded System Designer, Trends in embedded system various examples of an embedded system, Challenges to design embedded system, embedded system development design methodology. UNIT II : Hardware units required to design embedded system like power source, clock oscillator circuit, Real time clock and timer, reset circuit, watchdog timer, memories, interrupts, DAC and ADC, LCD and LED display, PWM, Keypad/keyboard, pulse dialer, modem and transceiver. UNIT III: Embedded Software: Development tools for embedded software, Assemblers, Compilers, Editor, Interpreter, Cross Assembler, Simulator, Emulator, Locator, Linker, Profiler, Coding strategies for obtaining optimized time and space requirements, Debugging Embedded Software, Software in high level language, coding of software in machine language, Software for Device drivers and device management. UNIT IV : Introduction to Real Time Operating System, comparison of RTOS with O.S. Tasks and Task States, Task and Data Semaophores and Share data, Interrupt
1228	MCA305 - EI(c)	Elective I: EI(c) : Network Security	2020	UNIT I : Classical Encryption Techniques: Symantec Cipher model, substitution Techniques, transposition Techniques, rotor machines, steganography. Block Ciphers and the Data Encryption standards: Simplified DES, block cipher principles, the data Encryption standard, the strength of DES, differential and linear cryptanalysis, block cipher design principles, block cipher modes of operation. Advanced Encryption Standard: Evaluation Criteria for AES, the AES cipher. Contemporary symmetric ciphers: Triple DES, blowfish. Confidentiality using symmetric encryption: Placement of Encryption function, traffic confidentiality, key Distribution, and random number generation. UNIT II : Public key Encryption and Hash functions: Prime numbers, Fermat's and Euler's Theorems, testing for Primality, the Chinese remainder theorem, discrete logarithms. Public key cryptography and RSA: Principles of Public key cryptosystems, the RSA algorithm. Key Management other public key cryptosystems: Key management, diffie-Hallman keyexchange, elliptic curve arithmetic, and elliptic curve cryptography. UNIT III: Message authentication and Hash function: Authentication Requirements, Authentication functions, message authentication codes, hash functions, security of hash function and MACs. Hash Algorithms: MD5 message digest algorithm, secure Hash algorithm, ripemd-160, HMAC

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1229	MCA305- EI(d)	Elective I: EI(d) : Network Programming	2020	UNIT I :Communication protocol, Internet Protocols, Novell, System Network Architecture, UUCP, IPX/SPX for LANS, protocol comparisons. UNIT II : Berkeley sockets Overview, UNIX domain protocols, socket address, socket system call, reserved ports, passing file descriptions, I/O asynchronous and multiplexing, socket implementation. UNIT III: Winsock programming Using windows socket, API window socket and blocking I/O, other window extension, network Dependent UNRI, DLL. Sending and receiving data over connection/termination UNIT IV: Novell IPX/SPX Novell's windows drivers, netware C interface for windows, IPX/SPX procedure, datagram Communication, connection oriented communication with SPX, IPX/ SPX implementation of DLL. UNIT V: Programming Applications Time and data routines, trivial file transfer protocol, remote login.
1230	MCA305 - EI(e)	Elective I: EI(e) : SIMULATION AND MODELING	2020	UNIT I :Introduction to modeling and simulation: Modeling and simulation methodology, system modeling, concept of simulation, continuous and discrete time simulation. UNIT II : Basic concept of probability and random variables continuous and discrete random variables, Distribution of random variables: discrete and continuous, Compartmental models: linear nonlinear and stochastic models. UNIT III: Introduction to Queuing Theory: Characteristics of queuing system, Poisson's formula, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc. STELLA, POWERSIM.
1231	MCA305 - EI(f)	Elective I: EI(f) : A WEB TECHNOLOGY AND E-COMMERCE	2020	UNIT I :Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET. UNIT II : Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability, Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines. UNIT III: Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, information-selling on the web. UNIT IV: Internet payment system: Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex E-Governance: E-Governance architecture.
1232	MCA305 - EI(g)	Elective I: EI(g) : Optimization Techniques	2020	UNIT I :Operation Research: Meaning, Scope of operations research in Computer Science, Methodology of Operations Research, Types of Models, Advantages and Limitations of Models. UNIT II : Linear programming: Meaning of linear programming General mathematical formulation of Linear programming, Graphic Analysis, Simplex method, Big M and 2- phase Methods, imitations of linear programming. Assignment problems: Definition, Formulation and Solution of Assignment problems, Route selection. UNIT III: Transportation Model: Definition, Formulation, Methods to find initial basic feasible solution. (N-W corner, ROW/ column/ matrix Minima, VAM) Optimization (Model & Stepping stone Method), Time Minimization. UNIT IV: Theory of Games: Detention Solution of Games, (Arithmetic Algebraic, Graphical linear programming) UNIT V: Replacement Theory: Need, Criteria for replacement, Single unit replacement and Group replacement.
1233	MCA305 - EI(h)	Elective I: EI(h) : Computer Graphics	2020	UNIT I :What is Graphics, Application of Graphics, Elements of Graphics Workstation, Graphics I/P Devices- Keyboard, Trackball, Joystick, Light Pen, Digitizing Tables, Mouse, Touch Panels, Image Scanners. Graphics Display Devices-Raster Scan System, Random Scan System, Arch Of Vector and Raster Scan Display, Refresh CRT, Gray S Hade. UNIT II : DRAWING GEOMETRY: Point – Plotting, Coordinate System, Point Plotting, Line Drawing –Line Segments, Line Drawing Algo: DDA Algo, Bresenham's Line Algorithm. Circle Drawing Polygon Representation Ellipse, Rectangle, Filling – Filled Area Primitives, Scan Line Polygon Fill Algo, Flood Fill Algo, Boundary Fill Algorithm UNIT III: 2D Geometric Transformation : Translation, Rotation, Scaling, Geometric Transformation, Coordinate Transform and Composite Transformation, 2D Viewing Transformation & Clipping : World Coordinate System (WCS), Normalized Device Coordinate System , Windows Viewing View Ports Viewing, Point Clipping, Line Segment Clipping, Coahen – Sutherland, Line Clipping, Polygon Clipping. UNIT IV: 3D Geometric Transformation 3D Geometric Transformation: Translation, Rotation, Scaling, Coordinate Transform Geometric Transformation Composite Transformation, 3D Display Methods – Parallel Projection, Perspective Projection 3D Viewing & Clipping. UNIT V: Segment Segment Table

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1234	MCA101	Software Engineering	2020	UNIT-I: System concepts and Information system environment: The system concept, characteristics of system, elements of system, The System Development Life Cycle, The Role of System Analyst. Introduction system planning & initial investigation, various information Gathering tools feasibility study conreitions & structures tools of system analysis, various methods of Process design, form design methodologies, introduction to information system testing, quality assurance security & destruct computer various (deleting recovery).UNIT-II: Software Process, Product and Project: The Product: Software, Software Myths, The process: Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Component – Based Development, Fourth Generation Techniques, Software process and Project Metrics: Software measurement UNIT-III: Software Project Planning and Design: Software Project Planning: Project planning objectives, Decomposition Techniques, Empirical estimation Models, The Make/Buy Decision., Risk analysis. Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure Design methodology. UNIT-IV: <del>Software Quality Assurance and Testing: Software Quality Assurance: Quality Concepts: The Quality Movement</del>
1235	MCA201	Artificial Intelligence & Applications	2020	UNIT-I: General Issues and Overview of AI: The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP Programming: Syntax and numeric functions, Basic list manipulation functions, predicates and Conditionals, input output and local variables, iteration and recursion, property lists and arrays. UNIT-II: Problem Solving, Search and Control Strategies: General problem solving, production systems, control strategies forward and backward chaining, Exhaustive searches depth first breadth first search. Heuristic Search Techniques Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem Reduction & AO* algorithm, constraint satisfaction problems. UNIT-III: Knowledge Representations First order predicate calculus, skolemization, resolution principle & unification, interface mechanisms, Horn"s clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency. UNIT-IV: Natural Language processing: Parsing techniques, context free grammar, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammar, semantic <del>analysis. Game playing minimax search procedure. alpha-beta cutoffs. additional refinements. Planning Overview an</del>
1236	MCA301	Data Warehousing and Mining	2020	UNIT-I: Motivation, importance, Data type for Data Mining: relation Databases, Data Warehouses, Transactional Databases, advanced database system and its applications, Data mining Functionalities: Concept/ Class Description, Association Analysis classification & Prediction, Cluster Analysis, Outlier Analysis, Evolution Analysis, Classification of Data Mining Systems, Major Issues in Data Mining. UNIT-II: Data Warehouse and OLAP Technology for Data Mining: Differences between Operational Databases Systems and Data Warehouses, a multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology UNIT-III: Data Preprocessing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Languages, and System Architectures, Concept Description: Characterization and Comparison, Analytical Characterization. UNIT-IV: Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single-Dimensional Boolean Association Rules from Transactional Databases: the Apriori algorithm, Generating Association rules from <del>Frequent items. Improving the efficiency of Apriori. Mining Multilevel Association Rules. Multidimensional Association</del>
1237	BCM-602	Good & Service Tax and Custom Duty	2021	Unit-1: CGST/ SGSTUnit-2: Filling of ReturnsUnit-3: Demand and recovery Under GSTUnit-4: Zero Related SupplyUnit-5:Custom DutyS
1238	MCA-401	Advance Java Programming	2012	UNIT I :Java Database Connectivity: JDBC Product, Types of Drivers, Two-Tier Client/Server Model, Three-Tier Client/ Sever Model, Basic Steps of JDBC, Creating and Executing SQL Statement, Set Object, Working with Database Meta Data, Interface. Servlets: Servlet Interaction & Advanced Servlets, Life cycle of Servlet, Java Servlet development Kit, Javax. servlet package. JavaServer Pages: JSP, Understanding the Client-Server Model, Understanding Web server software, Configuring the JSP Server. UNIT II :RMI: Designing RMI application, Executing RMI application, EJB: Types of Enterprise Java beans, Session Bean & Entity Bean, Features of Session Bean, Life-cycle of Stateful Seession Bean, Features of Entity Bean, Life-cycle of Entity Bean, Container-managed Transactions & Bean-managed Transactions, Implementing a container-manged Entity Bean. UNIT III :XML: What is XML,XML Syntax Rules, Struts: Introduction to the : Apache Struts, MVC Architecture, Struts Architecture, Introduction to the Struts Controller, Introduction to the Struts Action Class,Using Struts ActionFrom Class, Using Struts HTML Tags, Introduction to Struts. <del>Hibernate: Introduction to Hibernate 2.0 Hibernate Architecture. First Hibernate Application UNIT IV: <del>Applets: Applet</del></del>

  
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1239	MCA - 402	Mobile Computing	2012	UNIT I :Overview of OSI Model : Significance of layered Model , PDUs, SDUs, IDUs, Higher layer Protocols. Switching and Components. Introduction, Applications, history, of wired & wireless Communication systems. Radio Transmission: frequencies ,signal propagation, antenna , types of modulation, FHSS, DSSS. Multiple Access technology for Wireless Communication : FDMA, TDMA, CDMA Cellular System: Introduction, types UNIT II :Mobile Data Communication: Cellular Telephony, Structure, Fading, Small scale fading, Multi-path Fading, Speech Coding, Error Coding and Correction, Hand off Management, Switching and authentication, MTSO interconnections, frequency hopping, frequency reuse. Circuit Switched Data Services & Packet Switched Data Services on Cellular Networks, Personal Communication Systems (PCS) Architecture, Digital Enhanced Cordless Telecommunications (DECT,) Personal Access Comm. System (PACS). UNIT III :Digital Cellular Systems and Standards: GSM System overview, Architecture, GSM Protocol Model, GSM Mobility Management, SMS security aspects. Broadcast System <del>Overview, General Packet Service (GPRS) Architecture, GPRS Network Interface and Procedures (2.5 G), 2G Mobile Services</del>
1240	MCA -403	Object Oriented Analysis And Design	2012	UNIT I :INTRODUCTION :An overview – Object basics – Object state and properties ,Behavior – Methods, Messages – Information hiding , Class hierarchy ,Relationships ,Associations – Aggregations- Identity – Dynamic binding – Persistence , Metaclasses – Object oriented system development life cycle. UNIT II :METHODOLOGY AND UML :Introduction ,Survey , Rumbugh, Booch, Jacobson methods – Patterns, Frameworks , Unified approach – Unified modeling language – Static and Dynamic models – ,UML diagrams– Class diagram ,Usecase diagrams ,Dynamic modeling – Model organization ,Extensibility. UNIT III :OBJECT ORIENTED ANALYSIS: Identifying Usecase, Business object analysis Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility UNIT IV :OBJECT ORIENTED DESIGN :Design process – Axioms – Colollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability –Databases – Object relational systems – Designing interface objects – Macro and Micro level processes –The purpose of a view <del>user interface</del> UNIT V :SOFTWARE QUALITY :Quality assurance , Testing strategies , Object orientation testing , Test cases
1241	MCA -405	Data Mining & Data Warehouse	2012	UNIT I :Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications –Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis. UNIT II :Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.Association Rule Mining- Efficient and Scalable Frequent Item set Mining Methods –41Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis– Constraint-Based Association Mining. UNIT III:Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation– Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section. UNIT IV :Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods –Partitioning Methods , Hierarchical methods , Density Based Methods , Grid Based Methods , Model
1242	MCA-501	Unix & Shell Programming	2012	UNIT I :General Overview of the System: System structure, user perspective, O/S services assumption about Hardware The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer Reading and writing disk block, Advantage and disadvantage of buffer cache. UNIT II :Internal Representation of Files: INODES, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks. System Calls for the System: Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES Mounting and unmounting files system, Link Unlink. UNIT III :Structures of Processes and process control: Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination. Theuser Id of a process, changing the size of a process. The SHELL Interprocess <del>Communication and multiprocessor system, Process tracing, custom UID, network communication, socket, problem of</del>
1243	MCA - 502	Software Project Management	2012	UNIT I : INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT :Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning –Stepwise Project Planning UNIT II :PROJECT EVALUATION :Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.. UNIT III :ACTIVITY PLANNING :Objectives – Project Schedule – Sequencing And Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity On Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control. UNIT IV :MONITORING AND CONTROL :Creating Framework – Collecting The Data – Visualizing Progress –Cost Monitoring –Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance. UNIT V :MANAGING PEOPLE AND ORGANIZING TEAMS :Introduction – Understanding Behavior <del>Organizational Behaviour, A Behavioral Solution, The Risk Power For The Job, Motivation In The Job, M.A.A.</del>

  
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1244	MCA -503	.Net Framework Technology	2012	UNIT I :Introduction to VB.NET ,Event Driven Programming ,NET as better Programming Platform NET Framework, NET Architecture, The Just-In-Time Compiler, .NET Framework class library introduction VB.NET Development Environment ,Creating Applications, Building Projects Using simple components, Running VB.NET applications, Mastering VB Language. Data, Operators, Conditionals and Loops. Procedures, Error Handling, Classes and Objects. UNIT II :Windows Applications in VB .NET. Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons. List Boxes, Combo Boxes. Picture Boxes, Scrollbars, Splitters, Timer Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars. Object Oriented Programming in VB .NET ,Class and Object, Properties, methods and events. Constructors and Destructors. UNIT III :Method overloading, Inheritance, Access modifiers: Public, Private, Protected, Friend. Overloading and Overriding. Interfaces, Polymorphism. UNIT IV :File handling ,File handling using File Stream, Stream Writer, Stream Reader, Binary Reader, Binary Writer classes, File and Directory Classes. UNIT V :Databases in VB .NET ,Database : Connections, Data adapters, and datasets, Data Reader, Connection to database with server explorer, Multiple Table Connection, Data binding with controls like Text, Page, List Memory. UNIT II :CPU, Arithmetic and Logic Unit, Instruction Sets, Instruction cycle, Addressing Modes and formats, Instruction Pipeline, Processor organization, Register organization, Control Unit Operation. UNIT III :External Devices, I/O modules, Programmed I/O, Interrupt Driven I/O, Direct Memory Access, I/O Channels and processors, Asynchronous Data Transfer. UNIT IV :Reduced Instruction Set Computers, Complex Instruction Set Computers, Super Scalars, Vector, Parallel Cluster, Distributed, Embedded and MultiCore Processors. UNIT V :Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/Output system – Programmed I/O – DMA and Interrupts –I/O Devices and Interfaces..
1245	MCA -504	Advanced Computer Architecture	2012	UNIT I : Memory, Internal Memory, External Memory, Memory Organization, Associative Memory, Virtual Memory, Cache Memory. UNIT II :CPU, Arithmetic and Logic Unit, Instruction Sets, Instruction cycle, Addressing Modes and formats, Instruction Pipeline, Processor organization, Register organization, Control Unit Operation. UNIT III :External Devices, I/O modules, Programmed I/O, Interrupt Driven I/O, Direct Memory Access, I/O Channels and processors, Asynchronous Data Transfer. UNIT IV :Reduced Instruction Set Computers, Complex Instruction Set Computers, Super Scalars, Vector, Parallel Cluster, Distributed, Embedded and MultiCore Processors. UNIT V :Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/Output system – Programmed I/O – DMA and Interrupts –I/O Devices and Interfaces..
1246	MCA -505	TCP/IP Design and Implementation	2012	UNIT I : INTRODUCTION :Internetworking concepts and architectural model– classful Internet address – CIDR– Subnetting and Supernetting –ARP– RARP– IP – IP Routing –ICMP – Ipv6. UNIT II :TCP :Services – header – connection establishment and termination– interactive data flow–bulk data flow–timeout and retransmission – persist timer – keep alive timer– futures and performance. UNIT III:IP IMPLEMENTATION :IP global software organization – routing table– routing algorithms–fragmentation and reassembly– error processing (ICMP) –Multicast Processing (IGMP). UNIT IV :TCP IMPLEMENTATION :Data structure and input processing – transmission control blocks– segment format–comparison–finite state machine implementation–Output processing– mutual exclusion–computing the TCP data length. UNIT V :TCP IMPLEMENTATION :Timers–events and messages– timer process– deleting and inserting timer event– flowcontrol and adaptive retransmission –congestion avoidance and control – urgent data processing and push function.
1247	MCA -506	Embedded System	2012	UNIT-I: COMPU EMBEDDED TING :Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming. UNIT-II:MEMORY AND OPERATING SYSTEMS :Multiple tasks and processes – Context switching – Scheduling policies – Interprocesscommunication mechanisms – Performance issues. UNIT-III: EMBEDDED SOFTWARE :Programming embedded systems in assembly and C Meeting realtimeconstraints Multi-state systems and function sequences. Embedded software development tools –Emulators and debuggers. UNIT-IV: EMBEDDED SYSTEM DEVELOPMENT :Design issues and techniques – Case studies – Completedesign of example embedded systems.UNIT-V: Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing. Interrupt handling
1248	PBN-101	NURSING FOUNDATION	2017	Unit 4: NURSING PROCESSUnit 5: QUALITY ASSURANCEUnit 6: PRIMARY HEALTH CARE CONCEPT
1249	PBN-102	NUTRITION & DIETITICS	2017	Unit 1: INTRODUCTION TO DIET THERAPYUnit 3. INFANT AND CHILD NUTRITIONUnit 4. COMMUNITY NUTRITION
1250	PBN-106	MATERNAL NURSING	2017	Unit 3: PHYSIOLOGY & MGT OF PREGNANCY, LABOUR& PUERPERIUMUnit 4: NEW BORN BABYUnit 5: MANAGEMENT OF ABNORMAL PREGNANCYUnit 6: DRUGS IN OBSTETRICS
1251	PBN-107	CHILD HEALTH NURSING	2017	Unit 1: PEDIATRIC NURSING PROCEDURES
1252	PBN-108	MEDICAL SURGICAL	2017	Unit 2: MANAGEMENT OF CLIENT WITH SPECIFIC PROBLEMUunit 3: MANAGEMENT OF CLIENT WITH NEUROLOGICAL PROBLEMUunit 4: MANAGEMENT OF CLIENT WITH CV DISORDERSUunit 5: MANAGEMENT OF CLIENT WITH RESPIRATORY DISORDERSUunit 6: MANAGEMENT OF CLIENT WITH GU PROBLEMSUunit 7: MANAGEMENT OF CLIENT WITH DIGESTIVE DISORDERSUunit 8: MANAGEMENT OF CLIENT WITH ENDOCRINE DISORDERSUunit 9: MANAGEMENT OF CLIENT MUSCULOSKELETAL PROBLEMUunit 10: MANAGEMENT OF REPRODUCTIVE TRATC DISORDERS
1253	PBN-111	COMMUNITY HEALTH	2017	Unit 2: FAMILY HEALTH SERVICESUnit 3: HEALTH TEAM CONCEPTUnit 5: NATIONAL HEALTH PROGRAMMESUnit 6: EPIDEMIOLOGYUnit 7: BIOSTATISTICS & VITAL STATISTICS
1254	PBN-112	MENTAL HEALTH	2017	Unit 3: THERAPEUTIC COMMUNICATIONUnit 4. MANAGEMENT OF MENTAL DISORDERSUnit 5: CARE OF CLIENTS WITH SUBSTANCE ABUSEUnit 6: MANAGEMENT OF MENTAL SUBNORMALITYUnit 7: PSYCHIATRIC EMERGENCIES

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1255	PBN-114	NURSING ADMINISTRATION	2017	Unit 2: NURSING UNIT MANAGEMENT Unit 3: PERSONNEL MANAGEMENT Unit 4: SUPERVISION Unit 5: MATERIAL MANAGEMENT Unit 6: FINANCIAL MANAGEMENT
1256	NUR 103	FUNDAMENTALS	2016	Unit 3: HOSPITAL ADMISSION AND DISCHARGE Unit 6: DOCUMENTATION AND REPORTING Unit 7: VITAL SIGNS Unit 8: HEALTH ASSESSMENT Unit 9: MACHINERY, EQUIPMENT & LINEN Unit 10: MEETING NEEDS OF THE PATIENT Unit 11. INFECTION CONTROL IN CLINICAL SETTINGS Unit 12. ADMINISTRATION OF MEDICATIONS Unit 13: MEETING NEEDS OF PERI-OPERATIVE PATIENTS
1257	NUR 109	MED- SURG-I	2016	Unit 3: NURSING CARE OF CLIENTS WITH RESPIRATORY SYSTEM Unit 4: NURSING CARE OF CLIENTS WITH DIGESTIVE SYSTEM Unit 5: NURSING CARE OF CLIENTS WITH BLOOD & CVS SYSTEM Unit 6: NURSING CARE OF CLIENTS WITH GU SYSTEM Unit 7: NURSING CARE OF CLIENTS WITH REPRODUCTIVE SYSTEM Unit 8: NURSING CARE OF CLIENTS WITH ENDOCRINE SYSTEM Unit 9: NURSING CARE OF CLIENTS WITH INTEGUMENTARY SYSTEM Unit 10: CARE OF CLIENTS WITH MUSCULOSKELETAL SYSTEM Unit 11. CARE OF CLIENTS WITH IMMUNOLOGICAL PROBLEMS
1258	NUR 111	COMMUNITY -I	2016	Unit 4: EPIDEMIOLOGY & MGT OF COMMUNICABLE DISEASES Unit 5: EPIDEMIOLOGY & MGT OF NON-CUMMUNICABLE DISEASES
1259	NUR 113	MED-SURG-II	2016	Unit 1: NURSING MGT OF CLIENTS WITH ENT DISORDERS Unit 2: NURSING MGT OF CLIENTS WITH EYE DISORDERS Unit 3: NURSING MGT OF CLIENTS WITH NEUROLOGICAL DISORDERS Unit 4: MGT OF CLIENTS WITH DISORDERS OF FEMALE REPRODUCTIVE SYSTEM Unit 5: NURSING MGT OF CLIENTS WITH BURNS, RECONSTRUCTIVE & COSMETIC SURGERY Unit 6: NURSING MGT OF CLIENTS WITH ONCOLOGICAL CONDITION Unit 7: DISASTER NURSING Unit 9: NURSING MGT OF CLIENTS IN CCU
1260	NUR 114	CHILD HEALTH	2016	Unit 3: NURSING CARE OF NEONATE Unit 4: IMNCI Unit 5: NURSING MGT OF COMMON CHILDHOOD ILLNESS
1261	NUR 115	MENTAL HEALTH	2016	Unit 5: TREATMENT MODALITIES & THERAPIES IN MENTAL DISORDERS Unit 6: MGT OF CLIENTS WITH SCHIZOPHRENIA, PSYCHOTIC DISORDERS Unit 7: MGT OF CLIENTS WITH MOOD DISORDERS Unit 8: MGT OF CLIENT WITH SOMATIZATION DISORDERS Unit 9: MGT OF CLIENT WITH SUBSTANCE USE DISORDERS Unit 10 : PSYCHIATRIC EMERGENCIES & CRISIS INTERVENTION
1262	NUR 117	MIDWIFERY	2016	Unit 3: ASSESSMENT & MGT OF PREGNANCY (ANTENATAL) Unit 4: ASSEMENT & MGT OF INTRANATAL PERIOD Unit 5: ASSEMENT & MGT OF POST-NATAL PERIOD Unit 1: HIGH RISK PREGNANCY- ASSEMEMNT & MANAGEMENT Unit 2: ABNORMAL LABOUR- ASSESSMENT & MANAGEMENT Unit 3: ABNORMALITIES DURING POSTNATAL PERIOD Unit 4: ASSEMENT & MGT OF HIGH RISK- NEWBORN Unit 5: PHARMACO-THERAPAEUTICS IN OBSTETRICS
1263	PGDCA 101	Fundamentals of Computers & Information Technology	2012	Computer System Concepts, Computer System Characteristics, Capabilities And Limitations, Types of Computers, Basic Components of A Computer System - Control Unit, ALU, Input/output Functions and Characteristics, Memory RAM, ROM, EPROM, PROM and other types of Memory. Use of Communication and IT, Communication Process, Communication Types Software and Its Need, Types of Software - System Software, Application Software, System Software - Operating System, Utility Program, Programming Languages, Assemblers, Compilers And Interpreter, Programming Languages- Machine, Assembly, High Level, 4GL, Their Merits And Demerits, Application Software and its Types - Word- Processing, Spreadsheet, Presentation Graphics, Data Base Management Software
1264	PGDCA 102	Introduction to Operating Systems (Dos, Windows)	2012	Physical Structure of Disk, Drive Name, FAT, File and Directory Structure and Naming Rules, Booting Process, DOS System Files. DOS Commands: Windows Structure, Desktop, Taskbar, Start Menu, My Pictures, My Music, My Documents, Working with Recycle Bin - Restoring a deleted file, Emptying the Recycle Bin. Managing Files, Folders and Disk - Navigating between Folders, Manipulating Files and Folders, Creating New Folder, Searching Files and Folders. Managing Hardware & Software - Installation of Hardware & Software, Using Scanner Web Camera, Printers. System Tools - Backup, Character Map, Clipboard Viewer, Disk Defragmenter, Drive Space, Scandisk, System Information, System Monitor, Disk Cleanup, Using Windows Update. Browsing the Web with Internet Explorer: KDE & Gnome Graphical Interfaces, Various Types of Shell Available in Linux, Multi User Features of Linux, Login and Logout from Linux System, Linux commands

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1265	PGDCA 103	PC Packages (MS Word, MS Excel, MS Power point)	2012	Working with MS Word, Menus & Commands, Toolbars & Buttons, Shortcut Menus, Wizards & Templates, Creating a New Document, Different Page Views and layouts, Applying various Text Enhancements Spell Check, Thesaurus, Find & Replace; Headers & Footers, Inserting – Page Numbers, Pictures, Files, Autotexts, Symbols etc., Working with Columns, Tabs & Indents, Creation & Working with Tables including conversion to and from text Working with MS Excel, Toolbars, Menus and Keyboard Shortcuts, concepts of Workbook & Worksheets, MS PowerPoint, Creating a New Presentation, Working with Presentation, Using Wizards; Slides & its different views, Inserting, <del>Deleting and Copying of Slides; Working with Notes</del>
1266	PGDCA 104	MS-Access	2012	Create a Table in MS Access - Data Types, Field Properties, Fields: names, types, properties--default values, format, caption, validation rules Data Entry, Add record delete record and edit text, Sort, find/replace, filter/ select, rearrange columns, freeze columns. Setting up Relationships- Define relationships, add a relationship, set a rule for Referential Integrity, change the join type, delete a relationship, save relationship Queries & Filter Introduction to Reports , Types of Basic Reports: Single Column, Tabular Report Groups/Total, single table report, multi table report preview report print report, Creating Reports and Labels
1267	PGDCA 105	Desk Top Publishing (Page Maker, Photoshop)	2012	Use of Desk Top Publishing in Publications, Importance of D.T.P in Publication, Advantage of D.T.P in Publication Different page format / Layouts, News paper page format, Page orientations, Columns & Gutters, Printing in reduced sizes. Master Pages and Stories, Story Editor, Menu Commands and short-cut commands, Spell check, Find & Replace, Import Export etc., Fonts, Points Sizes, Spacing etc Adobe Photoshop & Documents, Various Graphic Files and Extensions Photoshop Tools & Palettes, Use of Layers & Filters, Working with Images
1268	PGDCA 106	Internet & E-Commerce	2012	URLs, Domain names, Portals, Application. E-MAIL - Basics of Sending & Receiving, Free Email services. FTP & its usages. Telnet Concept, Web Browsers, Its functions, Concept of Search Engines, Searching the Web, HTTP, URLs, Web Servers Concepts Of Hypertext, Versions of HTML, Elements of HTML, Syntax, Head & Body Sections, Building HTML Documents. Inserting Texts, Images, Hyperlinks, Backgrounds And Color Controls Variables, Expressions, Branching & Looping statements, Functions, Arrays Objects, Events & Document Object Model, Internet & E-Business, <del>Applications. Electronic Payment Systems: Introduction, Types of Electronic Payment Systems</del>
1269	PGDCA 107(A)	Elective – 1 (A). OOPs & Programming with C++	2012	Tokens, Expressions And Control Structures, Introduction, Tokens, Keywords, Identifiers, Basic Data types, User Defined Data Types, Derived Data Types, Symbolic Constants, Type Compatibility, Declaration of Variables, Dynamic Initialisation of Variables, Reference Variables, Operators in C++ Member Functions, Arrays of Objects, Object as Function, Arguments. Constructors And Destructors Introduction, Constructors, Parameterized Constructors, Arguments, Function Overloading, Friend and Virtual Function. Operator Overloading - introduction, methods Pointers, Virtual Functions and Polymorphism Compile time Polymorphism, run time polymorphism, Pointers to Objects, This Pointer, Pointers to Derived Classes
1270	PGDCA 107 (B)	Financial Accounting with Tally	2012	Financial Statements, Financial Statement Analysis, Cost Centre, Basic concepts of Inventory Tally Configuration & INI setup, Data Directory & Folders configuration, Single & Multiple User, Tally Screen Components, Mouse / Keyboard Conventions & Key, Combinations, Switching between Screen areas, Create, Alter & Display Accounting Voucher transactions, Account Invoice transactions, Excise Invoice, Export Invoice, Transactions using Bill-wise details. Reports like balance sheet, Profit & Loss account, Ratio analysis Trial Balance. 2. Accounts books like cash / bank book, Reports like Stock summary, Inventory books like Stock item, Group summary, Stock transfers, Physical stock register, Movement analysis, Stock group & item analysis, stock category analysis <del>Ageing analysis, Sales order &amp; Purchase order book</del>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1271	1.1	Pathophysiology and Pharmacotherapeutics I	2014	<p>1. Introduction to pathophysiology and therapeutics – scope and objectives 2. Prescribing guidelines (Drug and dosage selection and dose calculation) for -</p> <ul style="list-style-type: none"> <li>a) Pediatrics</li> <li>b) Geriatrics</li> <li>c) Pregnant and breast feeding women</li> <li>d) Renally and hepatically challenged patients</li> </ul> <p>3. Elements of anatomy, etiopathogenesis, diagnostic techniques, clinical manifestations and pharmacotherapeutics of diseases associated with Cardiovascular System - 15 hrs</p> <ul style="list-style-type: none"> <li>(a) Hypertension</li> <li>(b) Ischemic Heart diseases (Angina and Myocardial Infarction)</li> <li>(c) Hyperlipidemia</li> <li>(d) Congestive Heart Failure</li> <li>(e) Arrhythmias</li> </ul> <p>4. Elements of anatomy, Etiopathogenesis, diagnostic techniques, clinical manifestations and pharmacotherapeutics of diseases associated with Respiratory System -</p> <ul style="list-style-type: none"> <li>(a) Asthma</li> <li>(b) COPD</li> <li>(c) Drug induced pulmonary diseases</li> </ul> <p>5. Elements of anatomy Etiopathogenesis, diagnostic techniques, clinical manifestations and pharmacotherapeutics of diseases associated with Endocrine System -</p> <ul style="list-style-type: none"> <li>(a) Diabetes.</li> <li>(b) Thyroid diseases</li> </ul>
1272	1.2.	Pathophysiology and Pharmacotherapeutics II	2014	<p>1. Elements of anatomy, Etiopathogenesis, diagnostic techniques, clinical manifestations and pharmacotherapeutics of diseases associated with CNS -</p> <ul style="list-style-type: none"> <li>(a) Anxiety</li> <li>(b) Depression</li> <li>(c) Schizophrenia,</li> <li>(d) Manic depressive disorders</li> <li>(e) Epilepsy,</li> <li>(f) Parkinson's disease,</li> <li>(g) Headaches</li> </ul> <p>2. Elements of anatomy, Etiopathogenesis, diagnostic techniques, clinical manifestations and pharmacotherapeutics of diseases associated with GI Disorders 10 hrs</p> <ul style="list-style-type: none"> <li>(a) Dyspepsia,</li> <li>(b) Acid Pepsin Disease,</li> <li>(c) Inflammatory Bowel Disease.</li> <li>(d) Liver disorders- Hepatitis, Gall stones, Alcoholic Liver Disease.</li> </ul> <p>3. Elements of anatomy, etiopathogenesis, clinical manifestations and pharmacotherapeutics of diseases associated with hematological System -</p> <ul style="list-style-type: none"> <li>(a) Erythropoietic system – Over view, Iron deficiency anemia, Megaloblastic anemia, Sideroblastic anemia, Hemolytic anemia, Venous Thromboembolism, Arterial Thromboembolism, Drug induced blood disorders</li> </ul>

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1273	1.3	Pharmacy Practice I	2014	<p>1. Introduction to Pharmacy Practice – Definition, patient focused approach, scope/areas of practice</p> <p>2. Introduction to Clinical Pharmacy -</p> <p>a) Definition, Scope, Objectives of Clinical Pharmacy Practice</p> <p>b) International v/s National scenario</p> <p>c) Professional responsibilities of Clinical Pharmacists.</p> <p>3. Clinical Pharmacy daily activities</p> <p>a) Definition, objectives and procedures of</p> <p>i) Ward round participation</p> <p>ii) Treatment chart review</p> <p>iii) Drug information</p> <p>iv) Patient counseling</p> <p>v) ADR monitoring and reporting</p> <p>vi) Therapeutic drug monitoring.</p> <p>vii) Home Medication Review</p> <p>b) Patient Data analysis - Patient case history, drug therapy evaluation, identification and resolving of drug related problems.</p> <p>4. Practice Management : - 08 hrs</p>

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1274	1.4.	Pharmacy Practice II	2014	<p>1. Hospital Pharmacy Stores Management - Stores Management, Drug Purchase and Procurement, Inventory Control and GPP. Management of Material and Finance.2. Drug Dispensing and Drug Distribution - 8 hours Drug distribution – various methods, individual order method, Floor Stock Method, Unit Dose Drug Distribution Method, Drug basket method, Distribution to ICCU/ICU/Emergency wards, Automated drug dispensing systems and devices , Distribution of Narcotic and Psychotropic substances , GPP associated with all these.3. Central Sterile Supply Services4. Prescription and prescription handling -</p> <p>a. Definition, Parts of prescriptions, good prescribing practices, legality of prescriptions, identification of drug related problems in prescriptions.</p> <p>b. Prescription handling, labeling of dispensed medications (Main label, Ancillary label, pictograms), Medication usage instructions.</p> <p>c. Good dispensing practices</p> <p>d. Drug Interactions (Drug-Drug, Drug-Food, Drug-Lab investigations) – types, interpretation and detection, prevention, Practice on market prescriptions, Use of drug interaction software's.</p> <p>e. PPIs – (Patient Package Insert) - Basic concept, Importance and beneficial use of PPIs. Scenario in India and other countries.5. Pharmaceutical Care - Definition, principles and procedures of pharmaceutical care6. Patient Counseling - Definition, various stages of patient counseling, barriers in counseling and strategies to overcome barriers in patient counseling. Patient information leaflets- definition, layout and design of PILs.7. Health Screening Services - Definition, scope, and uses of health screening services, procedures involved in screening blood pressure, capillary blood glucose, body mass index8. Interpretation of laboratory data</p> <p>a) Haematological, Liver function, Renal function, thyroid function tests b) Tests associated with cardiac disorders</p>
1275	1.5.	Applied Pharmaceutics	2014	<p>1. Introduction to Pharmaceutical Dosage Forms2. Basics of GMP, GLP, QA, QC.3. Study the following about all dosage forms :</p> <p>a. Need, advantage, disadvantages</p> <p>b. Brief of various ingredients used and need for these, basic properties of inactives. Basic overview of manufacturing without going into details.</p> <p>c. Storage, packaging requirements</p> <p>d. Possible stability and defects issues</p> <p>e. Proper use, special precautions while using, instructions to patients</p> <p>f. Bioavailability/biopharmaceutics aspects4. Introduction to Novel drug delivery systems, instructions to be given to patients – Transdermal, infusion pumps, genetically engineered medicines, etc.5. Introduction to Bio-Pharmaceutics6. Absorption of drugs -</p> <p>a) Introduction to absorption, structure and physiology of cell membrane</p> <p>b) Factors affecting drug absorption, Absorption of drugs from extra vascular routes.7. Distribution of Drugs -</p> <p>a) Tissue permeability of drugs, Physiological barriers to drug distribution.</p> <p>b) Factors affecting drug distribution.</p> <p>c) Volume of drug distribution, Drug protein, drug tissue binding.8. Biotransformation of drugs</p> <p>a) Drug metabolizing organs and Enzymes</p> <p>b) Phase I reactions, Phase II reactions</p> <p>c) Factors affecting biotransformation of the drugs9. Excretion of drugs - Renal excretion of drugs, Factors affecting the renal filtration, Non renal routes of drug excretion10. Prodrugs -</p> <p>a) Definition and applications of prodrugs11. Bioavailability and Bioequivalence -</p> <p>a) Definition of bioavailability and bioequivalence</p> <p>b) Factors affecting bioavailability.</p> <p>c) Importance of BA, BE, BA Classification system, NTI drugs, care to be taken in prescribing and dispensing of such drugs</p>

### 1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development during the last five years (10)

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1276	1.6	Social Pharmacy – I	2014	<p>1. Introduction to Social Pharmacy –</p> <p>a) Definition and Scope - Introduction to Social Pharmacy as a discipline and its various concepts. Sociological Understanding of Health and Illness, Role of Pharmacist in Public Health -</p> <p>b) WHO Definition of health – various dimensions of health -</p> <p>c) Introduction and broad overview of health systems, infrastructure, and functioning in India and other countries – both in Public and private sector. National health programmes in India – brief study of these and the role of pharmacist in each of these.2. Drugs, Industry &amp; Policies -</p> <p>a. Drugs and developed countries, developing countries, GATT, patents, Patents Act.</p> <p>b. Pharmaceutical Industry and its activities, Classification systems of drugs, Social marketing – brief study of organizations and functioning like Medicines Sans Frontiers</p> <p>c. Concept of RUM, WHO Essential Medicines, Irrational medicine use and its associated problems, etc., Evidence based medicine, STGs (Standard Treatment Guidelines)</p> <p>d. National Drug Policy, National Health Policy, Pharmacy &amp; Drug Ethics –harmoeconomics – Definition, types of pharmoeconomic models, consumption of drugs, pharmaceutical pricing and reimbursement, Health Insurance4. Pharmacoepidemiology – Definition, scope, advantages and disadvantages5. Health Promotion and Health education -</p> <p>a) Epidemiology of Communicable Diseases : Causative agents and Clinical presentations and Role of Pharmacist in prevention of communicable diseases :</p> <p>(i) Respiratory infections – chickenpox, measles, rubella, mumps, influenza (including Avian-Flu, H1N1), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis</p> <p>(ii) Intestinal infections – poliomyelitis, viral hepatitis, cholera, acute diarrhoeal diseases, typhoid, food poisoning, amebic worm infestation</p>
1277	2.1	Pathophysiology and Pharmacotherapeutics III	2014	<p>1. Infectious diseases: -</p> <p>(a) Guidelines for the rational use of antibiotics and surgical Prophylaxis.</p> <p>(b) Pathophysiology and Pharmacotherapeutics of Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infection- Malaria, HIV &amp; Opportunistic infections, Fungal infections, Viral infections, Gonorrhoea and Syphilis2 Musculoskeletal disorders -</p> <p>(a) Basics of Anatomy and physiology of musculoskeletal system.</p> <p>(b) Pathophysiology and Pharmacotherapeutics of Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic Lupus Erythematosus3 Renal system -</p> <p>a) Basics of anatomy and physiology of Renal system</p> <p>b) Pathophysiology and pharmacotherapeutics of Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders</p>

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1278	2.2.	Pathophysiology and Pharmacotherapeutics IV	2014	<p>1. Oncology: Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy induced nausea and emesis</p> <p>2. Dermatology: - (a) Pathophysiology and Pharmacotherapeutics of Psoriasis, Scabies, Eczema, Impetigo</p> <p>3. Women's Health - (a) Physiology of Menstrual Cycle (b) Contraception - Physical Methods, Chemical Methods, IUDs, and Permanent methods. (c) Disorders related to Menstrual Cycle - Polycystic ovary Syndrome, Dysmenorrhea, Premenstrual Syndrome. (d) Obstetric Drug Therapy - Trimesters of Pregnancy, Common complaints of Pregnancy and their management - nausea, vomiting, reflux esophagitis, Diabetes mellitus, Hypertension and Preeclampsia, FDA Categorisation of drugs in Pregnancy (e) Menopause - signs and symptoms and Management</p> <p>4. Elements of anatomy and Physiology of Vision Etiopathogenesis, diagnostic techniques, clinical manifestations and pharmacotherapeutics of diseases associated with Eye such as (a) Glaucoma (b) Infectious ophthalmic diseases</p>
1279	2.3.	Pharmacy Practice III	2014	<p>1. Drugs and Poison Information - (a) Introduction to drug information resources available (b) Systematic approach in answering DI queries (c) Critical evaluation of drug information and literature (d) Preparation of written and verbal reports (e) Establishing a Drug Information Centre (f) Poisons information- organization &amp; information resources (g) Drug Information Bulletin</p> <p>2. Pharmacovigilance - (a) Scope, definition and aims of Pharmacovigilance (b) Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used] (c) Reporting, evaluation, monitoring, preventing &amp; management of ADRs (d) Role of pharmacist in management of ADR</p> <p>3. Medication Errors - classification, consequences, prevention, and role of Pharmacist. Dispensing errors, and ways to minimize them.</p> <p>4. Medication adherence - Consequences on non-adherence, role of pharmacist methods to improve adherence, compliance aids</p> <p>5. Communication skills - verbal, written, Body language</p> <p>7. Responding to symptoms/minor ailments - Relevant pathophysiology, common non-pharmacological and OTC drug therapy, and referral to doctor - in :Pain, GI disturbances (Nausea, Vomiting, Dyspepsia, diarrhea, constipation), Worm infestations, Pyrexia, Ophthalmic symptoms, URT infections, skin disorders, oral and dental disorders</p> <p>8. Hospital supplies - - a. Surgical items/supplies - catheters, syringes &amp; needles, I.v. sets, Ryle's tubes, Study of Wound management, stoma and incontinence products, Surgical dressing like cotton, gauze, bandages and adhesive tapes,</p>

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1280	2.4.	Pharmacy Practice IV	2014	<p>1. Health Accessories - -</p> <p>Study and handling of various common health accessories handled in hospital and community pharmacy. Student should have working knowledge, uses and cautions in using these. (Wheel Chairs, Canes, Crutches, and other orthopedic aids, Bed Pans, Vaporizers, Syringes and Needles, Hot water Bottles, Clinical Thermometers, Trusses, First Aid Supplies, Family Medicine Cabinet, etc.2. Medical gases – different gases and their use, coding and care of cylinders, delivery of gases to various parts of hospital, domiciliary oxygen services, and role of pharmacist3. I.V admixture services and role of Pharmacist4. Total Parenteral Nutrition – Definition, composition and clinical use of TPN5. Clinical Research - Introduction to Clinical trials Various phases of clinical trial. Methods of post marketing surveillance Abbreviated New Drug Application submission Good Clinical Practice – ICH, GCP, - Central drug standard control organisation (CDSCO) guidelines, Schedule Y -Composition, responsibilities, procedures of IRB / IEC Role and responsibilities of clinical trial personnel as per ICH GC</p> <p>a. Sponsor b. Investigators c. Clinical research associate d. Auditors e. Contract research coordinators f. Regulatory authority</p> <p>Designing of clinical study documents (protocol, CRF, ICF, PIC with assignment) Informed consent Process6. Introduction to Biostatistics7. Research in pharmacy practice areas.8. Continuing education for pharmacists9. <i>Compounding of Pharmaceuticals in the hospital/ community pharmacy. Weights and measures calculations involving</i></p>
1281	2.5.	Pharmaceutical Jurisprudence	2014	<p>A brief review of Pharmaceutical legislations. - A Study of various pharmaceutical and related legislations with more emphasis on aspects relevant to community &amp; hospital pharmacy practice in India. Study the aspects only from practical angle, with examples, case studies, etc2. Drugs and Cosmetics Act-1940 and Rules 1945 -</p> <ul style="list-style-type: none"> <li>• Duties &amp; Responsibilities of Drug Inspectors, other officers, and obligations of the pharmacy to them</li> <li>• Brief about DTAB, DCC, Drug testing laboratories</li> <li>• Various drug licences for retail pharmacy, requirements to start a pharmacy/medical store, application forms, issue of licence, display of licences, duration of licences, laws related to stocking, handling and sale of drugs and devices</li> <li>• Various schedules under the Act &amp; Rule – study in brief –those relevant to pharmacy practice</li> <li>• Labelling requirements of drugs – various aspects</li> <li>• Spurious, misbranded, adulterated, counterfeit drugs – various aspects related to this, how to recognize, role of the pharmacist</li> <li>• Import of drugs for personal use</li> <li>• Various documents to be maintained under the Act &amp; Rules by a pharmacy</li> <li>• Storage requirements, handling expired goods</li> <li>• Various punishments under the Act</li> <li>• Practical study of Prescription and non-prescription drugs, market samples, examine for labeling, etc.</li> </ul> <p>• Laws relating to various traditional systems/ medicines approved in India • Banning of drugsPharmacy Act – 1948Medicinal and Toilet Preparation Act-1955Narcotic Drugs and Psychotropic Substances Act – 19856. Drugs and Magic Remedies (Objectionable Advertisements) Act and Rules, 19547. Essential Commodities Act8. Drugs Price Control Order9. Prevention of Cruelty to Animals Act, 196010. Consumer Protection</p>



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1282	2.6.	Social Pharmacy II	2014	<p>A. Preventive care:</p> <ol style="list-style-type: none"> <li>1. Vaccines, and immunizations – and Role of Pharmacist &amp;</li> <li>2. Role of Pharmacist in Demography &amp; Family Planning -</li> <li>3. Mother and child health, importance of breastfeeding, ill effects of formula foods and bottle feeding, and role of Pharmacist -</li> <li>4. Geriatrics and role of Pharmacist -</li> <li>5. Effect of Environment on Health &amp; Role of Pharmacist – Water pollution, safe supply of water,</li> <li>6. Occupational diseases/illnesses and Role of Pharmacist -</li> <li>7. Mental Health and role of Pharmacist -</li> <li>8. Psychosocial Pharmacy : Drugs of misuse and abuse – psychotropic and narcotics, and other pharmaceuticals and chemicals, tobacco and tobacco products, alcohol. Social &amp; psychosocial impact of these, role of pharmacist in reducing, preventing the menace.</li> <li>Tobacco cessation and role of pharmacist -</li> <li>9. Palliative/terminal care and role of pharmacist in handling psychosocial issues -</li> <li>10. Care for disabled and role of pharmacist in handling psychosocial issues</li> <li>11. Early intervention in hereditary diaseses, screening tests</li> </ol> <p>B. Nutrition and health :</p> <ol style="list-style-type: none"> <li>1. Basics of nutrition – Macronutrients and Micronutrients, fibre – importance, sources (Plant and animal origin),</li> <li>2. Calorific and nutritive values of various foods</li> <li>3. Daily/recommended dietary allowance and functions of each. Balanced diets – for various individual groups. Nutrition deficiency diseases</li> <li>4. Food as a medicine. Brief study of various concepts of Naturopathy.</li> <li>5. Nutrition as per Ayurveda – Ayurvedic outlook to diets – as per prakruti, seasons, seasonal availability of foods, etc. Prakruti study in brief.</li> <li>6. Wrong/improper foods and food habits, causes of various disease conditions, ill effects of wrong foods/fast foods,</li> </ol>
1283	IT -3021	Data Structure & Algorithms	2018	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation Understand basic data structures such as arrays, linked lists, stacks and queues. Solve problem involving graphs, trees and heaps.
1284	IT-3031	Computer Organization and Architecture	2018	Explain the organization of basic computer, its design and the design of control unit. Understand basic data structures such as arrays, linked lists, stacks and queues Describe the operations and language of the register transfer, micro operations and input-output organization
1285	IT-3041	Operating System	2018	Understand the basics of operating systems like kernel, shell, types and views of operating systems . Understand basic data structures such as arrays, linked lists, stacks and queu Describe the various CPU scheduling algorithms and remove deadlocks. Explain various memory management techniques and concept of thrashing.
1286	IT -4021	Database Management System	2018	Understand database concepts and structures and query language. Understand the E R model and relational model. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS. Understand Functional Dependency and Functional Decomposition.
1287	IT-4031	Software Engineering	2018	Students will be able to decompose the given project in various phases of a lifecycle. Students will be able to choose appropriate process model depending on the user requirements. Students will be able perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance

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1288	IT -4041	Analog and Digital Communication	2018	Application of the Sampling theorem to analog-to-digital conversion and understand the limitations of practical sampling, quantization and encoding. Apply signal and system analytical tools in both the time and frequency domains; including Fourier transforms, frequency response functions, time duration versus bandwidth, and convolution. Understand amplitude, phase and frequency modulation and demodulation and how they compare
1289	IT -4051	Computer Network	2018	Understand and describe the layered protocol model. Understand and explain Data Communications System and its components. Identify the different types of network topologies and protocols.
1290	IT -5011	Digital Circuit and System	2018	Develop a digital logic and apply it to solve real life problems. Analyze, design and implement combinational logic circuits. Classify different semiconductor memories. Analyze, design and implement sequential logic circuits
1291	IT -5021	Object Oriented Analysis and Design	2018	Specify, analyze and design the use case driven requirements for a particular system. Model the event driven state of object and transform them into implementation specific layouts. Identify, Analyze the subsystems, various components and collaborate them interchangeably.
1292	IT -5031(A)	Theory of Computation	2018	Students will demonstrate knowledge of basic mathematical models of computation and describe how they relate to formal languages. Students will understand that there are limitations on what computers can do, and learn examples of <u>unsolvable problems</u> .
1293	IT -5031(B)	Microprocessor & Interfacing	2018	Write Assembly language program in 8086. Interface peripherals for 8086. Design elementary aspect of <u>microprocessor based system</u> .
1294	IT -5041(A)	Internet & Web Technology	2018	Create web pages using PHP. Identify the difference between the HTML PHP and XML documents. Identify the <u>engineering structural design of XML and parse tree. Understand the concept of JAVA SCRIPTS</u>
1295	IT -5041(B)	E-Commerce and Governance	2018	the processes of developing and implementing information Systems. Be aware of the ethical, social, and security issues of information systems. the role of information systems in organizations, the strategic management processes, and the implications for the management. how various information systems work together to accomplish the information <u>objectives of an organization</u>
1296	IT -5051	Lab(Linux)	2018	Understand the basic set of commands and editors in Linux operating system. Discuss shell programming in Linux <u>operating system. Explain the fundamental concepts of open-source operating system Linux</u>
1297	IT -6011	Wireless and Mobile Computing	2018	Demonstrate the different wireless technologies such as CDMA, GSM, GPRS etc. Explain the design considerations for deploying the wireless network infrastructure. Differentiate and support the security measures, standards. Services and <u>layer wise security considerations</u>
1298	IT -6021	Compiler Design	2018	Apply different parsing algorithms to develop the parsers for a given grammar. Understand syntax-directed translation and run-time environment. Learn to implement code optimization techniques and a simple code generator.
1299	IT -6031(B)	Artificial Intelligence	2018	Acquire the knowledge of searching strategies of AI. Acquire the knowledge of game playing techniques and planning of AI. To understand the concept of statistical methods for reasoning and logic. To acquire the knowledge of expert <u>systems and other learning methods of AI</u>
1300	IT -6031(A)	Computer Graphics & Multimedia	2018	Render projected objects to naturalize the scene in 2D view and use of illumination models for this. To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping. To define the fundamentals of animation, virtual reality and its related technologies. To design an application with the principles of <u>virtual reality</u>
1301	IT -6041(A)	Pattern Recognition	2018	Have knowledge of some existing applications of wireless sensor actuator networks. Learn the various hardware, software platforms that exist for sensor networks. Have knowledge of the various protocols for sensor networks. Analyze modeling and simulation of sensor networks. Understand what research problems sensor networks pose in disciplines such as signal processing, wireless communications and even control systems
1302	IT -6041(B)	Internet Of Things	2018	Understand the vision of IoT from a global context. Understand the application of IoT. Determine the Market perspective of IoT. Use of Devices, Gateways and Data Management in IoT. Building state of the art architecture in IoT.
1303	IT -6051	Data Analytics Lab	2018	Understand the basics of software as a product. List the components of Hadoop and Hadoop Eco-System. Access and <u>Process Data on Distributed File System . Manage Job Execution in Hadoop Environment</u>

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1304	IT -7011	Soft Computing	2018	Neural Network: Concept, biological neural network, comparison of ANN with biological NN, evolution of artificial neural network. Supervised Learning: Perceptron learning, Single layer/multilayer. Unsupervised learning: Introduction, Fixed weight competitive nets, Kohonen SOM, Counter Propagation networks. Simple Genetic Algorithm, <u>terminology and operators of GA</u>
1305	IT -7021(A)	Simulation & Modelling	2018	Define, describe and apply basic concepts related to modeling, identification and simulation. Classify various simulation models and give practical examples for each category. Demonstrate the ability to apply knowledge of probability and statistics for simulation & modeling. Construct a model for a given set of data and motivate its validity.
1306	IT -7021(B)	Deep and Reinforcement Learning	2018	Compare and contrast different learning algorithms with parameters. Examine the nature of a problem at hand and find the appropriate learning algorithms and it's parameters that can solve it efficiently enough. Design and implement <u>of deep and reinforcement learning approaches for solving real-life problems.</u>
1307	IT -7021(C)	Data Science	2018	Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications. Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration. Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies. Ability to recognize and implement various ways of selecting <u>suitable model parameters for different machine learning techniques..</u>
1308	IT -7031(A)	Cyber Laws and Forensics	2018	Become aware of various cyber crimes and cyber laws. Underline the need of digital forensic and role of digital evidences. Understand different types of digital evidences that can be presented to support investigations. List the <u>methods to generate legal evidence and supporting investigation reports</u>
1309	IT -7031(B)	Digital Image Processing	2018	The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems. nsform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering. Image Restoration A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degradations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations. Image Compression: Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards
1310	IT -8011	Information Security	2018	Acquire knowledge to secure computer systems, protect personal data, and secure computer networks in an organization. Design operational and strategic information security strategies and policies. Understand key terms and concepts in information security and Cryptography and evaluate the cyber security needs of an organization.
1311	IT -8021(A)	Engineering Economics & Management	2018	To impart knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions. To help the students to understand the fundamental concepts and principles of management; the basic roles, skills, functions of management, various <u>organizational structures and basic knowledge of marketing.</u>
1312	IT -8021(B)	Machine Learning	2018	Recognize the characteristics of machine learning strategies. Apply various supervised learning methods to appropriate problems. Identify and integrate more than one technique to enhance the performance of learning. Create <u>probabilistic and unsupervised learning models for handling unknown pattern.</u>
1313	IT -8021(C)	Robotics	2018	Perform kinematic and dynamic analyses with simulation. Design control laws for a robot. Integrate mechanical and <u>electrical hardware for a real prototype of robotic device</u>
1314	IT -8031(A) 4	Parallel Computing	2018	To develop an understanding of various basic concepts associated with parallel computing environments. Understand, appreciate and apply parallel and distributed algorithms in problem solving . Acquire skills to measure the performance of parallel and distributed programs. Design parallel programs to enhance machine performance in parallel hardware environment. Design and implement parallel programs in modern environments such as CUDA, <u>OpenMP, etc</u>

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1315	IT -8031(B)	Game Theory with Engineering Applications	2018	formulate mathematically multi-agent decision-making problems arising in engineering applications as games analyze using mathematical theory the equilibria of the games and compute them using optimization theory, analyze mathematically the outcome of the game. CO3 Understand selected models and concepts of game theory CO4 Produce simple economic models with basic game theory
1316	ME- 4021	KINEMATICS AND THEORY OF MACHINES	2018	Unit 1 : Introduction:-Links-types, Kinematics pairs-classification, Constraints-types, Degrees of freedom of planar mechanism, Grubler's equation, linkage mechanisms, inversions of four bar chain, slider crank chain and double slider crank chain Velocity in Mechanisms Velocity of point in mechanism, relative velocity method, Velocities in four bar mechanism, slider crank mechanism and quick return motion mechanism, Rubbing velocity at a pin joint, Instantaneous center method, Types & location of instantaneous centers, Kennedy's theorem, Velocities in four bar mechanism & slider crank mechanism Unit 2 : Acceleration in Mechanisms:-Acceleration of a point on a link, Acceleration diagram, Coriolis component of acceleration, Crank and slotted lever mechanism, Klein's construction for Slider Crank mechanism Mechanisms with Lower Pairs Pantograph, Exact straight line motion mechanisms-Peaucellier's, Hart and Scott Russell mechanisms, Approximate straight line motion mechanisms-Grass-Hopper, Watt and Tchebicheff mechanisms, Analysis of Hooke's joint, Davis and Ackermann steering gear mechanisms. Unit 3 : Friction:-Laws of friction, Friction on inclined plane, Efficiency on inclined plane, Friction in journal bearing-friction circle, Pivots and collar friction uniform pressure and uniform wear, Belt and pulley drive, Length of open and cross belt drive, Ratio of driving tensions for flat belt drive, centrifugal tension, condition for maximum power transmission, V belt drive Brakes & Dynamometers Shoe brake, Band brake, Band and Block brake, Absorption and transmission type dynamometers Unit 4: Cams and Followers: - Classification & terminology, Cam profile by graphical

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1317	ME-4031	POWER PLANT ENGINEERING	2018	<p>Unit 1 : Introduction Power and energy, sources of energy, review of thermodynamic cycles related to power plants, fuels and combustion calculations. Load estimation, load curves, various terms and factors involved in power plant calculations. Effect of variable load on power plant operation, Selection of power plant</p> <p>Power plant economics and selection:-Effect of plant type on costs, rates, fixed elements, energy elements, customer elements and investor's profit; depreciation and replacement, theory of rates. Economics of plant selection, other considerations in plants selection. Unit 2 : Steam power plant:-General layout of steam power plant, Power plant boilers including critical and super critical boilers. Fluidized bed boilers, boilers mountings and accessories, Different systems such as coal handling system, pulverizes and coal burners, combustion system, draft, ash handling system, Dust collection system, Feed water treatment and condenser and cooling towers and cooling ponds, Turbine auxiliary systems such as governing, feed heating, reheating , flange heating and gland leakage. Operation and maintenance of steam power plant, heat balance and efficiency, Site selection of steam power plant. Unit 3 : Diesel power plant:-General layout, Components of Diesel power plant, Performance of diesel power plant, fuel system, lubrication system, air intake and admission system, supercharging system, exhaust system, diesel plant operation and efficiency, heat balance, Site selection of diesel power plant, Comparative study of diesel power plant with steam power plant.</p> <p>Gas turbine power plant:-Layout of gas turbine power plant, Elements of gas turbine power plants, Gas turbine fuels, cogeneration, auxiliary systems such as fuel, controls and lubrication, operation and maintenance, Combined cycle power plants, Site selection of gas turbine power plant. Unit 4 : Nuclear power plant:-Principles of nuclear energy, Lay out of nuclear power plant, Basic components of nuclear reactions, nuclear power station, Nuclear waste disposal, Site selection of nuclear power plants. Hydro electric station Hydrology, Principles of working, applications, site selection, classification and arrangements, hydro-electric</p>

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1318	ME-4041	MATERIAL SCIENCE & METTALURGY	2018	<p>Unit 1 : Engineering Materials:-Classification of plain carbon steels; composition, properties &amp; applications of low, medium &amp; high carbon steels. Alloy steels: Free cutting steels; structural steel, spring steel, tool steel, high speed steels stainless steels. Effects of alloy element on properties of steels. Type of Cast irons: composition, properties &amp; applications of each. Properties of aluminum; alloy of aluminum, (wrought &amp; cast alloys), properties of copper, copper alloys (Brasses &amp; Bronzes); Introduction and application to nano materials. Powder metallurgy- property and application. Unit 2 : Plastic Deformation of Metals:-The tensile stress strain curve, Deformation by slip &amp; by twinning, Dislocation theory, Theory of work hardening its effect on properties of metals, Recovery, Recrystallisation and grain growth; Hot and cold working of metals and their effect on mechanical properties, annealing, Introduction to creep, fracture and fatigue behavior of metals. Unit 3 : Crystal Structure:-Mechanism of crystallization; unit cells, space lattice and lattice constants; Crystal systems, and Bravais Lattices; Body centered cubic, Face centered cubic and Hexagonal closed packed structure; Miller indices for planes and directions; Crystal imperfections; point defects, line defects and surface defects. Manufacturing and properties of refractory (acid, basic and natural). Unit 4 : Heat Treatment of Steels:-Definition, principle, and purpose of heat treatment. Description of heat treatment methods: Hardening, Annealing, Normalizing, Tempering and case hardening with microstructure changes. Martempering &amp; Austempering, Hardenability and its determination. Precipitation Hardening. Isothermal Transformation of steel, Transformation on continuous cooling, Critical cooling rate, Heat treatment furnace. Unit 5 : Phase Diagrams:-Definition of phase, Equilibrium cooling of pure metals and binary alloys. Hume Rothery rule for solid solubility, Types of solid solution, Eutectic, Eutectoid and Peritectic reactions, Allotropy of iron, Iron-Iron carbon equilibrium diagram, relationship equilibrium diagram and properties of alloy.</p>
1319	ME -4051	MACHINE DRAWING	2018	<p>Unit 1 : Introduction:- Principles of Drawing, Requirements of production drawing, Sectioning and conventional representation, Dimensioning, symbols of standard tolerances, Machining Symbols such as external and internal threads, slotted heads, square ends, and flat radial ribs, slotted shaft, splined shafts, bearings, springs, gears. Introduction to Computer Aided Drafting software for 2D and 3D Modeling. Unit 2 : Fasteners:- Various types of screw threads, types of nuts and bolts, screwed fasteners, welding joints and riveted joints. Unit 3 : Assembly Machine Drawing:- Basic concept, plotting technique, assembly and blow up of parts, bill of materials, product data; Cotter and Knuckle joints, pedestal and footstep bearings, crosshead, stuffing box, IC engines parts - piston and connecting rods; lath machine parts. Unit 4 : Pipe and Pipe Fittings:- flanged joints, spigot and socket joint, union joint, hydraulic expansion joint. Couplings: Solid or Rigid Coupling, Protected Type Flange coupling, muff coupling, Oldham, universal coupling, cone friction clutch, free hand sketch of single plate friction clutch.</p>
1320	ME-3011	ENVIRONMENTAL ENGINEERING	2018	<p>Unit 1: Ecosystem –Principles of ecology, ecosystem concept: Biotic and abiotic components of ecosystem, Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Biodiversity: Threats and conservation, Food Chain. Unit 2: Energy General idea about Natural Resources, current status and types of resources Non Renewable Sources of energy, coal, oil, Gas, Hydrogen, nuclear sources. Unit 3: Air Pollution &amp; Sound Pollution - Air Pollution: Air pollutants, classification, (Primary &amp; secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution Environmental problems, (Global warming, ozone depletion and acid rain) General idea about forest ecosystem, grassland ecosystem, wetland ecosystems and aquatic Biogeochemical Cycling: Oxygen cycle, Carbon cycle, Nitrogen cycle, Sculpture cycle and water cycle. Unit 4: Water Pollution- Pollutants in water, adverse effects. Treatment of Domestic &amp; Industrial water effluent. Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures. Unit 5: Society &amp; Ethics – Impact of waste on society. Solid waste management (Nuclear Thermal Plastic medical Agriculture domestic and e-</p>

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1321	ME-3021	STRENGTH OF MATERIALS	2018	Unit1: STRESS AND STRAIN: Definition, Stress- strain, tensile & compressive stresses, shear stress- Elastic limit, Hooke's Law Poission' Ratio, modulus of elasticity, modulus of rigidity, bulk modulus, yield stress, ultimate stress, factor of safety, state of simple shear, relation between elastic constants, Volumetric Strain, Volumetric strain for tri-axial loading, Deformation of tapering members, Deformation due to self weight, bars of varying sections, composite sections, temperature. Stress Mechanical properties of materials: Ductility, malleability, hardness, toughness, fatigue, creep; behavior of materials under tension, compression,bending,shear;ductileandbrittle materials, failure of MSandClintensionandtorsionUnit2: COMPOUND STRESSES: introduction, 3.2 Stress components on inclined planes, 3.3 General two- dimensional stress system, 3.4 Principal planes and stresses, 3.5 Mohr's circle of stresses. 3.6 Thin cylinders subjected to pressure, change in length, diameter and volume, 3.7 Thick cylinders - Lamé's equations (excluding compoundcylinders).Unit3: STRESSES IN BEAMS: Theory of pure Bending Assumptions Flexural formula for straight beams moment of resistance bending
1322	ME-3031	MANUFACTURING PROCESSES	2018	Unit1: Patterns and Pattern making Introduction to Foundry - Steps involved in casting, advantages, limitations and applications of casting process. Pattern types, allowances for pattern, pattern materials, color coding and storing of patterns Moulding methods and processes-materials, equipment, Moulding sand ingredients, essential requirements, sand preparation and control, testing, cores and core making. Design considerations in casting, gating and Riser - directional solidification in castings, Metallurgical aspects ofCastingUnit2: Casting Processes Sand castings, pressure die casting, permanent mould casting, centrifugal casting, precision investment casting, shell Moulding, CO2Moulding, continuous casting-squeeze casting, electro slag casting, Fettling and finishing, defects in Castings, Casting of non-ferrous materials Melting, Pouring and Testing. Melting furnaces crucibles oil fired furnaces-electric furnaces-cupola, selection of furnace, calculation of cupola charges-Degasification, inoculation, pouring techniques casting defects and Inspection of castings.Unit3: Basic Joining Processes Types of welding-gas welding, -arc welding,-shielded metal arc welding, GTAW, GMAW, SAW, ESW-Resistance welding (spot, seam, projection, percussion, flash types)-atomic hydrogen arc welding-thermit welding Flame cutting - Use of Oxacetylene modern cutting processes arc
1323	ME-3041	THERMODYNAMICS	2018	Unit1: Basic concepts of Thermodynamics:- Property, Equilibrium, State, Process, Cycle, Zeroth law of thermodynamics, statement and significance, concept of an Ideal gas, Gas laws, Avogadro's hypothesis, Heat and work transfer. First law of thermodynamics- Statement of first law of thermodynamics, first law applied to closed system, first law applied to a closed system undergoing a cycle, processes analysis of closed system, flow process, flow energy, steady flow process, Relations for flow processes, limitations of first law ofthermodynamics.Unit2: Second law of thermodynamics:- Heat engine, heat reservoir, Refrigerator, heat pump, COP, EPR, Available energy, Carnot's theorem, Carnot's cycle, efficiency of Carnot's cycle, statement of second law Reversible and irreversible processes, consequence of second law, Entropy, Entropy change for ideal gas, T-S diagrams, Availability and Irreversibility. Gibbs and HelmholtzfunctionsUnit3: Real gas:- Deviation with ideal gas, Vander-wall's equation, evaluation of its constants, limitations of the equation. The law of corresponding states Compressibility factor, Generalized compressibility chart, P-V-surface of a Real gas Thermodynamicrelations MaxwellrelationsandtheirapplicationsUnit4: Pure Substance:- Phase-Phase-
1324	ME-5011	DYNAMICS OF MACHINERY	2018	UNIT - I Force analysis: - Rigid body dynamics in general plane equation-Equations of motion-Dynamic force analysis-Inertia force and inertia torque-D'Alemberts principle-The principle of superposition-Dynamic analysis in reciprocating engines-Gas forces-Equivalent masses-Bearing loads-Crank shaft torque- Turning moment diagrams-Fly wheels-Engine shaking forces-Cam dynamics-Unbalance, Spring, Surgeand Windup.UNIT - IIMechanisms For Control:- Governors-Types-Centrifugal governors-Gravity controlled and spring controlled centrifugal governors-Characteristics-Effects of friction-Controlling force-Other governor mechanisms. Gyroscopes:- Gyroscopic forces and torques-Gyroscopic stabilization-Gyroscopic effects in automobiles, ships and airplanes.UNIT - IIIBalancing:- Static and dynamic balancing-Balancing of rotating masses-Balancing a single cylinder engine- Balancing multi- cylinder engines-Partial balancing in locomotive engines- Balancing linkages- Balancing machines.UNIT - IVFriction:- Frictional torque in pivots and collars by uniform pressure and uniform wear rate criteria.Boundary and fluid film lubrication, friction in journal and thrust bearings. concept of friction circle and axis. rolling friction.Clutches: Single plate and multi plate

  
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1325	ME- 5021	FLUID MECHANICS	2018	UNIT – I Basic Concepts and Properties of Fluid:- definition, distinction between solid and fluid - Units and dimensions - Properties of fluids - density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapour pressure, capillary and surface tension - Fluid statics: concept of fluid static pressure, absolute and gauge pressures - pressure measurements by manometers and pressure gauges. UNIT – II Fluid Kinematics And Fluid Dynamics:- Fluid Kinematics - Flow visualization - lines of flow - types of flow - velocity field and acceleration - continuity equation (one and three dimensional differential forms)- Equation of streamline - stream function - velocity potential function - circulation - flow net – fluid dynamics - equations of motion - Euler's equation along a streamline - Bernoulli's equation – applications - Venturi meter, Orifice meter, Pitot tube - dimensional analysis - Buckingham's ? Theorem- applications - similarity laws and models. UNIT – III Incompressible Fluid Flow:- Viscous flow - Navier - Stoke's equation (Statement only) - Shear stress, pressure gradient relationship - laminar flow between parallel plates - Laminar flow through circular tubes (Hagenoiseulle's) - Hydraulic and energy gradient - flow through pipes - Darcy -
1326	ME- 5031(A)	ARTIFICIAL INTELLIGENCE & NEURAL NETWORK	2018	Unit-1 Introduction:- Artificial Intelligence Main components and characteristics of AI (Feature Engineering, ANN, Deep Learning), Applications of AI, Advantages and disadvantages of AI, Goals of AI, Comparison of Programming of a System with AI and without AI, Challenges in AI, Programming languages preferably used in AI, Techniques/Algorithms used in AI, AI Software platforms, Future of AI. Unit-2 Various types of production systems and search techniques:- Types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies. Unit-3 Knowledge Representation and Probabilistic Reasoning:- Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning. Probabilistic reasoning, Bayes' theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning. Unit-4 Game playing techniques:- Minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing. Unit-5 Introduction to Neural Network (NN):- Introduction, benefits of neural network, models of Neural Network. Learning Processes: Various techniques used in learning, introduction to Artificial neural networks, common sense, reasoning, Convolution Neural Network, Feedforward Neural Network, Recurrent Neural Network, Multilayer perceptron, Architecture / Three Layers in Artificial Neural Networks, Implementation of ANN, Applications of ANN in images, signals and language some example of expert systems.
1327	ME- 5041(A)	MECHATRONICS ENGINEERING	2018	Unit-1 Introduction:- Introduction to mechatronics, Examples of mechatronics systems, definition of Mechatronics, Multi-disciplinary scenario, origins. Evaluation of Mechatronics, An over view of mechatronics, Design of mechatronics system. Measurements system and function of main elements of measurement systems. Need for mechatronics in industries. Objectives, advantages and disadvantages of mechatronics. Microprocessor based controllers. Principle of working of engine management system, automatic washing machine. Unit-2 Transducers and Sensors:- Definition and classification of transducers. Definition and classification of sensors. Principle of working and applications of light sensors, proximity sensors and Hall effect sensors. Microprocessor:- Microprocessor based digital control. Digital member system, binary and hexadecimal number system, Logic functions, Karnaugh Map, Data word representation basic Elements of control systems. Unit-3 Microprocessor Architecture:- 8085A processor architecture Terminology- such as, CPU, memory and address, ALU, assembler, data, registers, Fetch cycle, write cycle, state, bus interrupts. Micro controllers implementation in micro controllers. Classification of micro controllers. Unit-4 Electrical Actuators:- Actuator and actuator system. Classifications of actuator system with examples. Mechanical switches. Concept of



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1328	ME - 6011	INTERNAL COMBUSTION ENGINE	2018	UNIT – I Internal Combustion Engine:- S.I. and C.I. engines of two and four stroke cycles, determination of engine dimensions, speed, fuel consumption, output, mean effective pressure, efficiency, factors effecting volumetric efficiency, heat balance, cylinder arrangement, firing order, power balance for multi-cylinder engines, valve timing. Thermodynamic properties of fuel-air mixture before and after combustion, deviations of actual cycle from Ideal conditions.Branch Subject Title Subject Code Contact HoursUNIT – II Combustion in S.I. Engines:- The Process of combustion, Effects of engine variables on ignition lag and flame propagation, abnormal combustion, knocking, effects and control of knock, Knock theory, effects of engine variable on knock, S.I. Engine fuel properties, Knock rating of fuel, octane number, additives, requirements of combustion chamber, Design Principles, Types of combustion chambers, merits. Combustion in C.I. Engines:- Combustion Process, Stages, diesel knock, effects of operating parameters on knock, knock Control, rating of C.I. engine fuels, Cetane number, types and requirements of the combustion chambers. Emission and Control:- SI and CI engine emissions, effects of pollutants on human health and biological sphere. Control of emissions from SI and CI Engines. Introduction to Noise Pollution & its Control UNIT –
1329	ME - 6021	MACHINE COMPONENT design DESIGN	2018	UNIT - I Introduction:- Basic design concepts, design process, stages/phases in design, flowchart, problem formulation, design considerations (strength, manufacturing, maintenance, environment, economics and safety); design for recycle and reuse, Design and safety factors for steady and variable loads, impact and fatigue considerations, reliability and optimization, standardization in design. UNIT - II Power Transmissions Systems, Pulleys:- Transmission of power by Belt and Rope drives, Transmission efficiencies, Belts – Flat and V types – Ropes - pulleys for belt and rope drives, Materials, Chain drives. Spur & Helical & Bevel Gear Drives :- Spur gears- Helical gears – Load concentration factor – Dynamic load factor. Surface compressive strength – Bending strength – Design analysis of spur gears – Estimation of centre distance, module and face width, check for plastic deformation. Check for dynamic and wear considerations. Design bevel gear and its application. UNIT - III Springs:- Design of helical compression and tension springs, leaf springs and torsion springs; fatigue loading of springs, surge in spring Shafts:- Design of shaft under combined bending, twisting and axial loading: shock and fatigue factors design for
1330	ME – 6031(A)	GAS DYNAMICS	2018	UNIT - II Introduction to gas dynamics:- control volume and system approaches acoustic waves and sonic velocity - Mach number - classification of fluid flow based on mach number - mach cone compressibility factor - General features of one dimensional flow of a compressible fluid - continuity and momentum equations for a control volume. UNIT - III Isentropic flow of an ideal gas:- basic equation - stagnation enthalpy, temperature, pressure and density- stagnation, acoustic speed - critical speed of sound dimensionless velocity-governing equations for isentropic flow of a perfect gas - critical flow area - stream thrust and impulse function. Steady one dimensional isentropic flow with area change-effect of area change on flow parameters chocking- convergent nozzle. UNIT - III Simple frictional flow:- adiabatic flow with friction in a constant area duct governing equations fanno line limiting conditions - effect of wall friction on flow properties in an Isothermal flow with friction in a constant area duct governing equations - limiting conditions. Steady one dimensional flow with heat transfer in constant area ducts- governing equations - Rayleigh line entropy change caused by heat transfer UNIT - IV Effect of heat transfer on flow parameters:- Intersection of Fanno and Rayleigh lines
1331	ME – 6041(A)	MECHANICAL MEASUREMENT & CONTROL	2018	UNIT - I Mechanical Measurements Introduction:- Introduction to measurement and measuring instruments, Generalized measuring system and functional elements, units of measurement, static and dynamic statistical analysis of errors. 4 Sensors and Transducers: Types of sensors, types of transducers and their characteristics 2 Signal transmission and processing: Devices and systems. 2 Signal Display & Recording Devices. UNIT - II Statistics:- Least square regression analysis and data outlier detection; Normal distribution and concept of standard deviation of the mean in finite data set, Uncertainty Analysis: Measurement errors; error sources: calibration, data acquisition, data reduction; Design stage uncertainty analysis; combining elemental errors; Bias & Precision errors; Error propagation, Higher order uncertainty analysis. UNIT - III Metrology:- Metrology and Inspection: Standards of linear measurement, line and end standards. Limit fits and tolerances. Interchange ability and standardization. Linear and angular measurements devices and systems Comparators: Sigma, Johansson's Microkrator. Limit gauges classification, Taylor's Principle of Gauge Design.

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1332	ME- 7011	HEAT AND MASS TRANSFER	2018	<p>UNIT-I Introduction to Heat Transfer:- Concepts of the mechanisms of heat flows; Conduction, convection and radiation; Effect of temperature on thermal conductivity of materials; Introduction to combined heat transfer mechanism. 2 Conduction: One-dimensional general differential heat conduction equation in the rectangular, cylindrical and spherical coordinate systems; Initial and boundary conditions. Steady State one-dimensional Heat conduction : Composite Systems in rectangular, cylindrical and spherical ordinates with and without energy generation; Thermal resistance concept; Analogy between heat and electricity flow; Thermal contact resistance; Critical thickness of insulation.UNIT-II</p> <p>Fins:- Heat transfer from extended surfaces, Fins of uniform cross-sectional area Errors of measurement of temperature in thermometer wells. Transient Conduction: Transient heat conduction; Lumped capacitance method; Time constant; Unsteady state heat conduction in one dimension only, Heisler charts</p> <p>UNIT-III</p> <p>Forced Convection:- Basic concepts; Hydrodynamic boundary layer; Thermal boundary layer; Approximate integral boundary layer analysis; Analogy between momentum and heat transfer in turbulent flow over a flat surface; Mixed boundary layer; Flow over a flat plate; Flow across a single cylinder and a sphere; Flow inside ducts; Empirical heat transfer relations; Relation between fluid friction and heat transfer; Liquid metal heat transfer. Natural Convection : Physical mechanism of natural convection; Buoyant force; Empirical heat transfer relations for natural convection over vertical planes and cylinders, horizontal plates and cylinders, and sphere ; Combined free and forced convection.UNIT-IV</p> <p>Thermal Radiation:- Basic radiation concepts; Radiation properties of surfaces; Black body radiation Planck's law, Wein's displacement law, Stefan Boltzmann law, Kirchhoff's law; ; Gray body; Shape factor; Black-body radiation; Radiation exchange between diffuse non black bodies in an enclosure; Radiation shields; Radiation combined with conduction and convection; Absorption and emission in gaseous medium; Solar radiation; Green house effect.UNIT-V</p> <p>Heat Exchanger:- Types of heat exchangers; Fouling factors; Overall heat transfer coefficient; Logarithmic mean temperature difference (LMTD) method; Effectiveness-NTU method; Compact heat exchangers. Condensation And Boiling : Introduction to condensation phenomena; Heat transfer relations for laminar film condensation on vertical surfaces and on outside &amp; inside of a horizontal tube; Effect of non-condensable gases; Drop wise condensation; Heat pipes; Boiling modes, pool boiling;</p>
1333	ME – 7021(A)	AUTOMOBILE ENGINEERING	2018	<p>UNIT - I</p> <p>Vehicle Structure and Engines: - Types of automobiles, vehicle construction and different layouts, chassis, frame and body, resistances to vehicle motion and need for a gearbox, components of engine their forms, functions and materials</p> <p>UNIT - II</p> <p>Engine Auxiliary Systems:- Electronically controlled gasoline injection system for SI engines., Electronically controlled diesel injection system, Unit injector system, Rotary distributor type and common rail direct injection system), Electronic ignition system, Turbo chargers, Engine emission control by three way catalytic converter system.UNIT - III</p> <p>Transmission Systems:- Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, over drive, transfer box, fluid flywheel –torque converter, propeller shaft, slip joints, universal joints, Differential, and rear axle, Hotchkiss Drive and Torque Tube Drive.UNIT - IV</p> <p>Steering, Brakes And Suspension Systems:- Steering geometry and types of steering gear box-Power Steering, Types of Front Axle, Types of Suspension Systems, Pneumatic and Hydraulic Braking Systems, Antilock Braking System and Traction Control</p> <p>UNIT-V</p> <p>Electrical And Control Systems:- Storage battery, construction and operation of lead acid battery, testing of battery, principle of operation of starting mechanism, different drive systems, starter relay switch, regulator electric fuel gauge, fuel pump, horn, wiper, Lighting system, head light dazzling, signaling devices, battery operated vehicles, choppers. Importance of maintenance, scheduled and unscheduled maintenance, wheel alignment, trouble Shooting probable causes &amp; remedies of various systems, microprocessor based control system for automobile, intelligent automobile control systems</p>

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1334	ME – 7021(B)	MECHANICAL SYSTEM DESIGN	2018	<p>Unit I Design of Belt, Rope and Chain Drives:-Methods of power transmission, selection and design of flat belt and pulley; Selection of V-belts and sheave design; Design of chain drives, roller chain and its selection; Rope drives, design of rope drives, hoist ropes.UnitII Spur and Helical Gears:-Force analysis of gear tooth, modes of failure, beam strength, Lewis equation, form factor, formative gear and virtual number of teeth; Gear materials; Surface strength and wear of teeth; strength against wear; Design of straight tooth spur and Helical Gears. Bevel Gears: Application of bevel, formative gear and virtual number of teeth; Force analysis; Lewis equation for bevel gears; Strength against wear; Design of bevel gear.Unit III Design of I.C. Engine Components:-General design considerations in I C engines; design of cylinder; design of piston and piston-rings; design of connecting rod; design of crankshaft.Unit IV Design of Miscellaneous Components:-design of Flanged coupling; Rigid coupling, Design of Pressure vessels subjects to internal pressure, external pressure, design of penetration, design of flanges, cone cylinder junctions ,Materials, Fabrication.Unit V Optimization:- Basic concept of optimization, classification of optimization, optimization Techniques, engineering applications of optimization. Classical optimization techniques: unconstrained optimization single-variable optimization, multivariable optimization, solution by direct search method, solution by Lagrange multipliers method.</p>
1335	ME – 7021 (C)	MATERIAL HANDLING EQUIPMENT	2018	<p>UNIT – I Introduction:-Types of interplant transporting facility, principal groups of material handling equipments, choice of material handling equipment, hoisting equipment, screw type, hydraulic and pneumatic conveyors, general characteristics of hoisting machines, surface and overhead equipments, general characteristics of surface and overhead equipments and their applications.UNIT – II Material Handling Equipment:- To control of hoisting equipments, Flexible hoisting appliances like ropes and chains, welded load chains, roller chains, selection of chains hemp rope and steel wire rope, selection of ropes, fastening of chains and ropes , different types of load suspension appliances, fixed and movable pulleys, different types of pulley systems, multiple pulley systems . Chain and rope sheaves and sprockets.UNIT – III Load handling attachments:- Standard forged hook, hook weights, hook bearings, cross piece and casing of hook, crane grab for unit and piece loads, carrier beams and clamps, load platforms and side dump buckets, electric lifting magnets, grabbing attachments for loose materials, crane attachments for handling liquid materials.UNIT – IV Gear:-Arresting gear, ratchet type arresting gear, roller ratchet, shoe brakes and its different types like electromagnetic, double shoe type, thruster operated, controller brakes, shoe brakes, thermal calculations of shoe brakes and life of linings, safety handles, load operated constant force and variable force brakes general theory of band brakes, its types and construction.UNIT – V Cranes:-Cranes with rotary pillar, cranes with a fixed post, jib cranes with trolley, cranes with luffing boom cantilever cranes, cage elevators safety devices of elevators belt and chain conveyors and their power calculations, vibrating and oscillating conveyors pneumatic and hydraulic conveyors, screw conveyors hoppers, gates and feeders. Introduction to AGV s as new material handling device, use of robot for material handling.</p>

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1336	ME – 7031(A)	RELIABILITY ENGINEERING	2018	<p>Unit -I Reliability: Definition Probability Concept; Addition of Probabilities; Complimentary Events; Calculation of Reliability, Reliability analysis. Unit -II Failure Data Analysis:- Introduction, Mean Failure Rate, Mean Time to Failure (MTTF), Mean Time between Failures (MTBF), Graphical Plots, MTTF in terms of Failure Density, MTTF in Integral Form. Unit - III Conditional Probability:- Introduction, Hazard Rate as conditional probability, Principles of CBM, Pillars of condition monitoring, CBM implementation and benefits, visual monitoring, vibration monitoring, wear debris monitoring, corrosion monitoring, performance monitoring. Unit - IV General Maintenance &amp; Management function:- Breakdown, emergency, corrective, predictive, Objectives and evolution of TPM, Effects and Criticality analysis (FMECA), applications and benefits, risk evaluation, risk priority. Unit - V Maintainability and Availability:- Introduction, Maintenance Planning &amp; scheduling, Maintenance organization, Tools for better maintenance –preventive, shutdown and Scheduled maintenance.</p>
1337	ME – 7031(B)	TRIBOLOGY	2018	<p>UNIT - I Tribological Aspects of Rolling Motion:-Introduction to tribological systems and their characteristic features; analysis and assessment of surface; topography; deterministic and stochastic tribo-models for asperity contacts; techniques of surface examination; technological properties of surfaces. Quantitative laws of sliding friction, causes of friction, adhesion theory, laws of rolling friction, measurement of friction. UNIT - II Wear:-Introduction, mechanism of wear, types of wear, quantitative laws of wear, measurement of wear, wears resistance materials. UNIT - III Lubricants:-Introduction, dry friction, boundary lubrication, hydrodynamic, hydrostatic and elastohydrodynamic lubrication, functions of lubricants, types and properties, lubricant additives. Principles, application to rolling contact bearings, cams, Gears. UNIT - IV Bearing Design Consideration &amp; Characteristics:-Geometry and pressure equation of journal bearing, hydrostatic bearings, thrust bearings, porous bearings and hydrodynamic gas bearings. Journal bearings with specialized applications. General requirements and different types of bearing materials. UNIT - V Surface Interactions:- Elastic &amp; Plastic deformation of surfaces. Contact of Solids, Contact of Ideally Smooth Surfaces. Distribution of Pressure over elastic contact of two curvilinear bodies. Formulae for calculation of contact area. Physico-Mechanical properties of surface layers, Characteristics of Surface Geometry. Classes of surface roughness. Contact of rough surfaces. Interaction of surface peaks. Real and contour area of contact.</p>

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1338	ME - 7031©	MECHANICAL VIBRATION	2018	<p>UNIT - I Basic Concepts of Vibration:-Vibration and oscillation, causes and effects of vibrations, Vibration parameters – spring, mass, damper, Damper models, Motion – periodic, non periodic, harmonic, nonharmonic, Degree of freedom, static equilibrium position, Vibration classification, Steps involved in vibration analysis. Free Undammed Single Degree of Freedom Vibration System : Longitudinal, transverse, tensioned system, Methods for formulation of differential equations by Newton, Energy, Lagrangian (Rayleigh's Method), Effect of springs mass and shaft inertia on natural frequency, Effect of flexible bearing on natural frequency.UNIT - II Free Damped Single Degree of Freedom Vibration System:-Viscous damped system – under damped, critically damped, over damped; Logarithmic decrement; Coulomb's damping; Combined viscous and coulomb's damping. Equivalent Single Degree of Freedom Vibration System: Conversion of multi- springs, multi masses, multi – dampers into a single spring and damper with linear or rotational coordinate systemUNIT - III Free Undammed Multi Degree of Freedom Vibration System:-Eigen values and Eigen vectors for linear system and tensional two degree of freedom; Holzer method for linear and tensional unbranched system; Two rotors, Three rotors and geared system; Drunkenly and Rayleigh method for transverse vibratory system Forced Single Degree of Freedom Vibratory System: Analysis of linear and tensional systems subjected to harmonic force excitation and harmonic motion excitation (excluding elastic damper)UNIT- IV Vibration Measuring Instruments:-Principle of seismic instruments, vibrometer, accelerometerundamped, damped. Vibration Isolation: Force isolation, motion isolation, isolators. . Rotor Dynamics: Critical speed of single rotor, undamped and damped CAM Dynamics: Cam Dynamics: Mathematical Model, Differential Equation, Response Follower Jump Phenomenon</p>
1339	ME-8011	REFRIGERATION AND AIR CONDITIONING	2018	<p>Unit 1:Introduction: Principles and methods of refrigeration, freezing; mixture cooling by gas reversible expansion, throttling, evaporation, Joule Thomson effect and reverse Carnot cycle; unit of refrigeration, coefficient of performance, vortex tube &amp; thermoelectric refrigeration, adiabatic demagnetization; air refrigeration cycles- Joule's cycle Boot-strap cycle, reduced ambient cycle and regenerative cooling cyclesUnit 2:Vapour compression system: Vapor compression cycle, p-h and t-s diagrams, deviations from theoretical cycle, sub-cooling and super heating, effects of condenser and evaporator pressure on cop; multi-pressure system: removal of flash gas, multiple expansion &amp; compression with flash inter cooling; low temperature refrigeration: production of low temperatures, cascade system, dry ice, production of dry ice, air liquefaction system,Unit 3: (a) Vapor absorption system: Theoretical and practical systems such as aqua-ammonia, electrolux &amp; other systems; (b) Steam jet refrigeration: Principles and working, simple cycle of operation, description andworking of simple system, (c) refrigerants: nomenclature &amp; classification, desirable properties, common refrigeration, comparative study, leak detection methods, environment friendly refrigerants and refrigerant mixtures, brine and its propertiesUnit 4: Psychometric: Calculation of psychometric properties of air by table and charts; psychrometric processes: sensible heating and cooling, evaporative cooling, cooling and dehumidification, heating and humidification, mixing of air stream, sensible heat factor; principle of air conditioning, requirements of comfort air</p>

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1340	ME-8021	IE&OR	2018	Unit1: Linear system and distribution models: Mathematical formulation of linear systems by LP, solution of LP for two variables only, special cases of transportation and assignment and its solution, Vogel's forward looking penalty method, cell evaluation degeneracy, use of SW Lindo, Tora, Excell.Unit2: Supply chain (SCM): Definition, importance, expenditure and opportunities in SCM; integration of inbound, outbound logistics and manufacturing to SCM, flow of material money and information, difficulties in SCM due to local v/s system wide (global) optimization and uncertainties in demand and transportation; Bull-whip effect; customer value; IT, info-sharing and strategic partnerships; plant and warehouse-network configuration; supply contracts and revenue sharing; outsourcing; transportation, cross docking and distribution, forecasting models in SCM; coordination and leadership issues; change of purchasing role and vendor rating, variability from multiple suppliers.Unit3: Inventory models: Necessity of inventory in process and safety stock, problem of excess inventory and cycle time (=WIP/ Throughput), JIT/ lean mfg; basic EOQ/ EPQ models for constant review Q system (S,s); periodic review, base stock P-system; service level, lead time variance and safety stock;; ABC, VED and other analysis based on shelf life, movement, size, MRP technique and calculations, lot sizing in MRP, linking MRP with JIT; evolution of MRP to ERP to SCM and e-business.Unit4: (a) Waiting Line Models Introduction, Input process, service mechanism, Queue discipline, single server (M/M/1) average length and times by Little's formula, optimum service rate, basic multiple server models (M/M/c)
1341	ME-8031(C)	RAPID PRODUCT DEVELOPMENT	2018	UNIT 1 Introduction: Influence of Innovations on Product Development, Impact on economy, export competitiveness, design as a strategy to win international market and Innovation process.Unit 2: Virtual Prototyping and Testing: Geometric modeling, Types of Geometric models and Solid Models Virtual augmented reality, Requirement of devices and technologies and applications Computer Aided Engineering. UNIT 3 Physical Prototyping and Rapid Manufacturing Computer Numerical Control: Comparison between NC and conventional machines features of CNC Machine Tool and programming. UNIT 4 Rapid Tooling: Indirect rapid tooling process.
1342	MTPIE-1001	Advanced Mathematics	2014	UNIT 1 Linear Algebra: Linear transformation, vector spaces, hash function, Hermite polynomial, Heaviside's unit function and error function. Elementary concepts of Modular mathematics UNIT 2 Solution of Partial Differential Equation (PDE) by separation of variable method, numerical v FT, DFT, WFT, Wavelet transform, Haar transform. UNIT 3 Probability, compound probability and discrete random variable, Binomial, Normal and Poisson's distributions, Sampling distribution, relations. elementary concept of estimation and theory of hypothesis, recurred UNIT 4 Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/Infinity/ FC FS), (M/M/S: Infinity/ UNIT 5 FEM: Variational functionals, Euler Lagrange's equation, Variational forms, Ritz method, Galerkin's method, discretization, finite elements method for one dimensional problems.
1343	MTPIE-1002	Advance Production Technology	2014	Unit I Metrology: Standards of Measurements, Linear and angular instruments; slip gauges, comparators, sine bar, angle gauges, clinometers, tape limit gauging, Gauge design; fits and tolerance. Rolling: General description of machines and process; Rolling of structural sections and sheets; construction of halls; hot and cold rolling techniques plates gauge, screw thread measurements Unit II Metal cutting : Principles of metal cutting, tool geometry, Tool life plots, Machinability, Tool wear, Cutting force analysis, Cutting tool metal machining, materials & Cutting fluids, Economics of Unit III Pattern Making: Pattern and pattern making, pattern allowances; pattern design considerations, core, core boxes, types of patterns. Foundry: molding and core sands and their properties molding machines, centrifugal casting, dye casting shell molding; cupola description and operation. Lost wax molding; continuous casting. Unit IV Forging: Theory and application of forging processes description; principle of toleration of drop and horizontal forging machines; General principle of designs. Press working: Description and operation of processes, process of shearing, punching, piercing blanking trimming perfecting notching lancing embossing coining bending forging and drawing press tool

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1344	MTPIE-1003	Production Planning & Inventory Control	2014	Unit 1SALES OPERATION PLANNING - Nature of sales operation planning, relevant costs, Sales & operation planning Methods.Unit 2MASTER PRODUCTION SCHEDULE - NATURE OF MASTER Production Schedule, Master production Scheduling Techniques, Time Fencing and Master Production Schedule stability, Final assembly Schedule, Managing master production Schedule.Unit 3MATERIAL RESOURCE PLANNING - Nature of Material Resource planning, Using MRP and MRP-II system; order control and flow control; routing, scheduling and priority , Buffering Concepts.Unit 4PRODUCTION ACTIVITY CONTROL - Shop floor control concepts, Techniques,performance measurement, Gantt Chart, Finite Loading systems, concept of JIT manufacturing system; logistics, distribution, and supply chain management technology-Process planning layout designs, manufacturing Planning & Control. ;Unit 5Inventory – functions, costs, classifications, deterministic and probabilistic inventory models, quantity discount; perpetual and periodic inventory control systems.
1345	MTPIE-1004	Theory of Metal Cutting and Tool forming	2014	Unit 1Lathe: Classification of machine tools and their basic components; lathe- specification,components & accessories, various operations on lathes, capstan & turret lathes, tool layout,methods of thread production, machining time, single point cutting tools, tool signature and nomenclature Grinding: Types of grinding machines, surface, cylindrical and internal grinding, grinding wheels, specifications, wheel turning and dressing without eccentricity, centre-less grinding.Unit 2Milling: Vertical, horizontal and universal type machines, specifications and classifications of milling machines, universal dividing head plain and different indexing, gear cutting,milling cutters.Drilling & Broaching: Fixed spindle, radial and universal drilling machines, drilling time broaching principle, broaches and broaching machines,Unit 3Shapers: Classification and specifications, principle parts, quick return mechanism, shaper operations, speed feed, depth of cut, machining time. Surface qualities, equipment used for rating surfaces, rms. CLA value, causes for surface irregularities.Gear Cutting: Die casting, methods of forming gears, generating process, Gear shaping,gear shaving, gear grinding gear testing
1346	MTPIE-1005	Operation Research	2014	Unit 1Linear Programming: Introduction, history and development of OR, model building,process of OR, linear programming– formulation, graphical method, simplex method, big-M-method, two-phase method, degeneracy in LPP, unrestricted variables, duality in LP,convex sets, revised simplex, sensitivity analysis, parametric linear programming,introduction to integer programming, branch and bound algorithm, cutting plane algorithm,single and multiple goal programming algorithms.Unit 2Allocations in LPP- assignment model- hungarian method, unbalanced, traveling sales man and miscellaneous problem; transportation- optimality test, degeneracy unbalanced problems, transshipmentUnit 3Decision and Game theory: Decision tree, decision making models under certainty, risk and uncertainty; rectangular, two persons zero sum games, maximin and minimax principles, saddle point, dominance, graphical and algebraic methods of solution, solution by transforming into linear programming problem
1347	MTPIE-2001	Reliability and Quality Management	2014	Unit 1INTRODUCTION: Reliability function - MTBF - MTTF - mortality curve -Availability - Maintainability.FAILURE DATA ANALYSIS: Repair time distributions - exponential, normal, log normal. Gamma and Weibull- reliability data requirements - Graphical evaluation.Unit 2RELIABILITY PREDICTION: Failure rate estimates - Effect of environr:l:1ent and stress - Series and Parallel systems - RDB analysis - Standby Systems – Complex Systems.Unit 3RELIABILITY MANAGEMENT: Reliability demonstration testing – Reliability growth testing - Duane curve -Risk assessment - FMEA, Fault tree.Unit 4TOTAL PRODUCTIVE MAINTENANCE: Causes of Machine Failures - Downtime-Maintenance policies - Restorability predictions - Replacement models - Spares provisioning - Maintenance management - Cleanliness and House Keeping.
1348	MTPIE-2002	Simulation Modeling Process	2014	Unit 1Introduction to modeling and simulation: Modeling and simulation methodology, system modeling, concept of simulation; gaming; static, continuous and discrete event simulation.Unit 2Basic concept of probability, generation and characteristics of random variables,continuous and discrete variables and their distributions; mapping uniform random variables to other variable distributions; linear, nonlinear and stochastic modelsUnit 3Introduction to Queuing Theory: Characteristics of queuing system, Poisson's formula,birth death system, equilibrium of queuing system, analysis of M/M/1 queues. Introduction to multiple server Queue models M/M/c Application of queuing theory in manufacturing and computer systemUnit 4System Dynamics modeling: Identification of problem situation, preparation of causal loop diagrams and flow diagrams, equation writing, level and rate relationship, Simulation of system dynamics models.



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1349	MTPIE-2003	Metrology and Measurement	2014	Unit 1General concepts of measurement: definition-standards of measurement, errors in measurement, limit-gauging, various systems of limits, fits and tolerance, interchangeability, ISI and ISO system. basic principles and design of standards of measuring gauges, types of gauges and their design,accuracy and precision, calibration of instruments, principles of light interference, interferometer,measurement and calibration.Unit 2Linear and angular measurements: Slip gauges, micrometers, verniers, dial gauges, surface plates,comparators- mechanical, electrical, pneumatic and optical comparator, angular measuring instruments- sine bar, angle gauges, spirit level, autocollimators, clinometers; measurement of straightness, flatness and squareness.Unit 3Measurement of surface finish and measuring machines: surface finish- definitions, types of surface texture,surface roughness measurement methods, comparison, profile-meters, pneumatic and replica, measurement of run out and concentricity, length bar measuring machine, optical projection, comparator, tool makers microscope.Unit 4Metrology of screw threads and gears: internal/external screw thread terminology measurement of various elements of threads thread micrometer method two wire and three wire
1350	MTPIE-2004	Method Study& Engineering Economy	2014	Unit 1METHOD STUDY - Definition and concept , scope of method study ,indicators of method study Elements of method design , Process charts , procedures of method study.Unit 2WORK MEASUREMENT - Definition & objectives of work measurement, Procedure for time study time estimates & production standard, level of performance, Allowances, Recording techniques in time study. stop watch.MICROMOTION STUDY Introduction, objectives of micro motion study. SIMO charts ; ;Unit 3JOB EVALUATION – Definition and concept Need for job evaluation , Methods of job evaluation Essentials for success of job evaluation programmeUnit 4Economy and Costing: Elementary cost accounting and methods of depreciation; break-even analysis, techniques for evaluation of capital investments, financial statements.
1351	MTPIE-2005	Machines of Dynamics	2014	Unit -1Dynamics of Engine Mechanisms: Displacement, velocity and acceleration of piston; turning moment on crankshaft, turning moment diagram; fluctuation of crankshaft speed, analysis of flywheel.Unit- 2Governor Mechanisms: Types of governors, characteristics of centrifugal governors, gravity and spring controlled centrifugal governors, hunting of centrifugal governors, inertia governors.Unit -3Balancing of Inertia Forces and Moments in Machines: Balancing of rotating masses, two planebalancing, determination of balancing masses (graphical and analytical methods), balancing of rotors,balancing of internal combustion engines (single cylinder engines, in-line engines, V-twin engines,radial engines, Lanchester technique of engine balancing.Unit -4Friction: Frictional torque in pivots and collars by uniform pressure and uniform wear rate criteria.Boundary and fluid film lubrication, friction in journal and thrust bearings, concept of friction circle and axis, rolling friction.Clutches: Single plate and multi plate clutches, Cone clutches.
1352	MTPIE-3001(A)	ELECTIVE-I,Computer Integrated Manufacturing	2014	Computer Integrated manufacturing System Definition, CIM wheel concept, Evolution of ('1M, CIM and system view of manufacturing, and CIM IT & Concurrent Engineering, Elements of CIM system, CIM hardware and software.Unit2Computer Aided Design Historical background, Development of CAD, CAD system hardware, Software, Graphics standards,Basic definitions, Modes of graphic operation, User interface, Software modules, Modeling and viewing.Unit32D - Representation and Transformation of Points - -transformation of Lines -Rotation. Reflection.Scaling and combined transformations - 3Dsealing - shearing - Rotation - Reflection - Translation -Projections parametric representation of Ellipse, Parabola, Hyperbola.Unit 4CNC Machine Tool and Programming Development of CNC Technology, Principles, Fatures, NC, CNC, ONC concepts,Classification of CNC Machine Tools, CNC Controller, CNC Programming for various. Controllers -SI numeric, Fanuc Program, G&M codes, Part Programming of Prismatic and revolved components, APT part programming using CAD, CAM S/w.



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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1353	MEPE-1001	Advanced Mathematics	2013	UNIT I Separation of variable method, numerical Solution of PDE (Laplace, Poisson's, Parabola) using finite difference methods, Elementary Properties of FT, DFT, WFT, Wavelet transform, Haar transform. Probability, compound probability and discrete random variable. Binomial, Normal, Poisson's distribution. Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations. UNIT III Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS) UNIT IV Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB Introduction, programming in MATLAB scripts, functions and their application.
1354	MEPE-1002	Advanced Control System	2013	Review of Linear Control System: Modeling through differential equations and difference equation, state space method of description and its solution, discretization of continuous time state space model, Laplace and z-domain analyses of control systems, Controllability, operability & Stability, Dode & Nyquist analysis, Root Loci, Effect of load disturbance upon control actions. UNIT - II Development of feedback control laws through state space technique modal control, pole placement problem. UNIT - III Variable Structure control and its applications. Examples on variable structure control. UNIT - IV Control of nonlinear dynamics: Lyapunov based control function, Phase plane technique, Liapunov stability analysis. UNIT - V Optimal control: Calculus of variation, Euler-Lagrange equations, Boundary conditions, Transversal condition Bolza problem, Pontryagin's maximum principle.
1355	MEPE-1003	Forced Commutation Circuits	2013	Inverter principles, Commutation techniques. Different types of single phase and three phase inverters, voltage control techniques. UNIT - II Current sourced and voltage sourced inverters, Waveform synthesis, voltage Frequency and phase sequence control, voltage and current relations, Harmonics study. UNIT - III Principles and classification of chopper circuits, analysis of practical choppers for single two and four quadrant operation, Device selection, Control circuits, Switch mode power supplies, Square wave switching, Resonant mode operation of power supplies, Ferroresonant, Linears and the switchers. UNIT - IV Induction heating, induction welding and Melting. Application to Dielectric heating. Medium frequency supplies for induction heating, high frequency sources for fluorescent lamps. R.F. generators, Laser power supply. UNIT - V Power supplies for SRM drive, power supplies for AC and DC drives, Device ratings, Device Data sheets. Safe operating areas. Control circuits.
1356	MEPE-1004	Power Electronics Devices and Phase controlled circuits	2013	UNIT - I Review of power switching devices i.e. Thyristor, MOSFET, GTO, IGBT, BJT, MCT's. Trigger techniques optical isolator, protection circuit, isolation transformer Natural and forced commutation of SCR. UNIT - II Phase controlled rectifier configuration. Control of output voltage by sequence and sector control. Reduction on harmonics using multiple pulse control, design of rectifier circuit. Comparative aspects of design using converter transformer forced sell turnoff devices. Design of Chopper circuit, reduction of harmonic circuit, multiphase choppers. Analysis of rectifier and chopper circuit. UNIT - III Single phase and three phase controllers. Triggering techniques. Concept of dual converters. Circulating and non circulating current. Mode of operation. Regenerative braking. UNIT - IV Concepts of three phase to single phase and three phase to three phase cycloconverter. Symmetrical and asymmetrical control. Harmonic analysis of output v
1357	MEPE-1005	Electric Drives	2013	UNIT - I Introduction: concept of electric drives, types of drives, speed torque characteristics of various electric drives. Starting methods for DC shunt and series motor and three phase induction and synchronous motors, expressions for starting current and starting torque. Electric braking of electric drives, types of braking, speed torque characteristics of electric drives under braking conditions. Reversal of electric drives. UNIT - II Speed control: fundamental parameters of speed control of dc motors. Field control and armature control characteristic constant torque and constant HP Characteristics a.c. motors variable frequency pole changing variable resistance in stator and rotor circuit, voltage injection in the rotor circuit characteristics. UNIT - III Transient condition basic concept regarding transients in drives analysis of transient condition during starting braking reversal and sudden loading of dc drives energy involved in transient process analysis of transient behavior of the phase induction drive while starting and braking. UNIT - IV Solid state control advantage of using solid state control drives in industrial field principle of working block diagram and characteristics obtained in dc shunt, series and compound motors. Three phase induction and synchronous motor for

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1358	MEPE-2001	Power Electronics App. To Power System	2013	UNIT I Power System components models formation of bus admittance matrix, algorithm for formation of bus impedance matrix. Reactive power capability of an alternator, transmission line model & load ability, Reactive power transmission & associated difficulties, Regulated shunt compensation, Models of OLTC & Phase shifting transformer, load flow study. UNIT II Sensitivity analysis: Generation shift distribution factors, line outage distribution factors, Compensated shift factors. Power systems security levels, contingency selection & evaluation, security constrained economic dispatch. Pre-contingency corrective rescheduling. UNIT III Voltage stability: Proximity indicators e.g. slope of PV curve, Minimum Eigen value of reduced load flow Jacobian participation factors based on modal analysis and application. UNIT IV Flexible ac transmission system, reactive power control, brief description and definition of FACTS controllers, shunt compensators, configuration and operating characteristics of TCR, FC-TCR, TSC, Comparisons of SVCs.
1359	MEPE-2002	Solid State controllers of Drives	2013	UNIT – 1 Microprocessor based control of converters such as rectifiers. Chopper. UNIT-II Microprocessor based control of Inverters cyclo-converters. Use of PLL. UNIT-III Field oriented control (Vector control) and programmable controllers for three phase drives. Steady state and transient analysis of phase controlled converter fed and chopper fed DC drives torque speed curves. UNIT-IV Steady state and transient analysis of three phase induction motor drives (i) Variable stator voltage control (ii) Variable frequency controls (iii) V/F control
1360	MEPE-2003	Modeling and Simulation of Drives	2013	UNIT-I Mathematical modeling of electrical machines, Reference frame theory, Transformation of variables between reference frames, analysis of AC and DC machine Linearised equations of AC and DC machine. UNIT-II Stability analysis Four Quadrant operation of Drive, Motor characteristics thermal effects in electrical machines, Rating, Selection of motor and its size. UNIT – III Open loop and closed loop control of converter and chopper fed DC motors. UNIT-IV Analysis of CSI and VSI fed AC drive, Generalized operation of induction motor with impressed voltage
1361	MEPE-2004	Advanced Microprocessor and Application	2013	Review of basic microprocessor and microcomputer concepts and the architecture and instruction set of a typical 8 bit microprocessor. UNIT-II ADVANCED PROCESSORS :- Over view of 16-bit/32-bit/64 bit Intel based microprocessors. Arithmetic and I/O co-processor architecture. Register details, operation-addressing modes & instruction set of a typical 16-bit microprocessor assembly language programming for the processor introduction to multiprocessing. UNIT-III PROGRAMMABLE SUPPORT CHIPS :- Programmable parallel interface chip (e.g. 8255) functional schematic. Pin function operating mode interface with microprocessor chip programming serial communication interface chip (e.g. 8251) functional schematic pin function.
1362	MEPE-2005	Power Quality and Conditioning	2013	UNIT I Understanding Power quality, types of power quality disturbances, power quality indices, Causes and effects of power quality disturbances. UNIT II Causes and effects of harmonics, converter configuration and their contribution to supply harmonics, other sources of harmonics. UNIT III Radio interference, supply standards, elimination/suppression of harmonics, classical solutions & their drawbacks, passive input filters, design of harmonic filters, Improved power quality converter topologies, (single and three phase), transformer connections, Elimination/suppression of harmonics using active power filters – topologies, and their control methods, PWM converter as a voltage source active filter, current source active filter,
1363	MEPE-3001 (1)	Micro Controllers and Control	2013	UNIT-I Introduction: Overview of microcontroller 8031, 80196 and latest microcontroller developments architecture of 8051 instructions set. Assembly language programming to 8051 Inside the 8051 introduction to 8051 assembly programming assembling and running of 8051 program data types and directives flag bits and PSW register. Register bank and stack jump loop and call instructions addressing modes. UNIT-II Program development Program development using arithmetic instruction logical instruction single bit instruction I/O programming interrupts programming timer counter programming. UNIT-III Microcontroller interfacing Interfacing to LCD ADC DAC chip stepper motor key board. UNIT-IV Introduction overview of DSP and its latest development, architecture, instruction set and application
1364	MEPE-3001 (2)	Power Electronics Supply System and design	2013	UNIT - I Review of basic power electronics principles. Introduction to various power electronics supplies. Performance parameters for power electronics supplies and their measurements. UNIT - II DC to DC converters: Analysis and design of buck, boost, buck-boost and cuk converters, two quadrant and full bridge converters. Isolated converters i.e. flyback, forward and bridge topology. Design of d.c.

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1365	MEPE-3001 (3)	Non Conventional Energy Sources and Energy converters	2013	Renewable Energy Systems: Energy Sources, Comparison of Conventional and non-conventional, renewable and non-renewable sources, statistics of world resources and data on different sources globally and in Indian context, significance of renewable sources and their exploitation energy planning, Energy efficiency and management. Unit - II Wind Energy System Wind Energy, Wind Mills, Grid connected systems, system configuration, working principles, limitations, effects of wind speed and grid conditions. Grid independent systems - wind-battery, wind-diesel, wind-hydro biomass etc. wind operated pumps, controller for energy balance. Small hydro system grid connected system, system configurations, working principles and limitations, effect of hydro potential and grid conditions, synchronous versus induction generators for stand alone systems, use of electronic load controllers and self excited induction generators. Wave Energy Systems: System configuration, grid connected and hybrid systems. Unit - III Solar Radiation Extraterrestrial solar radiation, terrestrial solar radiation, solar thermal conversion, solar photo tonic systems. Solar cell material and efficiency. Characteristic of PV panels under varying insulation. PV operated lighting and water
1366	MEPE-3002 (1)	Computer Aided Power Electronics Analysis & Design	2013	UNIT- I Introduction to power electronics simulation, methods of analysis and formulation of system equations. UNIT- II Modeling of power electronics system elements, computer formulation of power electronics system equations, review of graph theory. UNIT- III Introduction to Spice, Auto sec, Simulink for power electronics converter analysis. Introduction to digital optimization, Sequential methods of simulation. UNIT- IV Advance techniques for efficient computation. Creation of data files for power semi-conductors, magnetic and capacitors. UNIT- V Modeling of stray inductance, Capacitances and connections, Thermal Modeling and heat flow design. Analysis under abnormal fault conditions and design of protection circuits.
1367	MEPE-3002 (2)	EHV AC and DC Transmission	2013	UNIT-I Constitution of EHV a.c. and d.c. links, Kind of d.c. links, Limitations and Advantages of a.c. and d.c. transmission, Principal application of a.c. and d.c. transmission, Trends in EHV a.c. and d.c. transmission, Power handling capacity. Converter analysis and circuit, Firing angle control, Overlapping. UNIT-II Extra long distance lines, Voltage profile of loaded and unloaded line along the line, Compensation of lines, Series and shunt compensation, Shunt reactors, Tuned power lines. Problems of Extra long compensated lines, FACT concept and application. UNIT-III Travelling waves on transmission systems, Their shape, Attenuation and distortion, effect of junction and termination on propagation of traveling waves. Overvoltages in transmission system. Lightning, switching and temporary over voltages: Control of lightning and switching over voltages.
1368	BHOM 101	Anatomy	2016	Human Structure, Osteology, Histology, Dissection, Embryology, Genetics - Activities, Skill Development.
1369	BHOM 102	Physiology	2016	general & applied physiological function, biochemistry of body, study of different function of human system, special senses - skill development
1370	BHOM 103	Homoeopathic pharmacy	2016	preparation of different homoeopathic drugs, pharmacopoeia, doctrine and posology with dispensing of medicine- skill development and employability.
1371	BHOM 201	Pathology	2017	study of different aspect of diseases, diagnostic study, laboratory procedures, bacteriology, virology, mycology, paracytology- activity, skill, employability
1372	BHOM 202	Forensic Medicine & Toxicology	2017	study of medical forensic science in relation with law & administration of justice, medico legal aspect, law procedures and toxicology- skill development
1373	BHOM 203	Homoeopathic Materia Medica	2016	knowledge of different medicines with its application in disease aspect, source of different drugs, relationship between remedies, action of remedy- skill & employability development
1374	BHOM 204	Organon of Medicine	2016	study of philosophy & principle of homoeopathy, law of practising homoeopathy, different observation of disease and medicine, relation of homoeopathy with different pathys- skill development
1375	BHOM 301	Surgery	2018	concern with treatment of injuries & diseases by manual & instrumental intervention, management of different diseased cases
1376	BHOM 302	Obstetrics/Gynaecology	2018	there treatment, prenatal, natal, post natal care, treatment and management of female complaints.- skill development
1377	BHOM 303	Materia Medica	2016	knowledge of different medicines with its application in disease aspect, source of different drugs, relationship between remedies, action of remedy- skill & employability development
1378	BHOM 304	Organon of Homoeopathic Medicines	2016	study of philosophy & principle of homoeopathy, law of practising homoeopathy, different observation of disease and medicine, relation of homoeopathy with different pathys- skill development

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SN	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1379	BHOM 401	Practice of Medicine	2019	study of disease prognosis, diagnosis and their medical management with homoeopathic therapeutics, prevention and treatment- skill and employability
1380	BHOM 402	Materia medica	2019	knowledge of different medicines with its application in disease aspect,source of different drugs,relationship between remedies,action of remedy- skill & employability development
1381	BHOM 403	Organon of Medicine	2019	study of philosophy & principle of homoeopathy, law of practising homoeopathy,different observation of disease and medicine, relation of homoeopathy with different pathys- skill development
1382	BHOM 404	Repertory	2019	case taking,repertorization with different repertory,different rubrics and symptoms accessibility ,computer repertorization, symptomatology,analysis of evaluation of cases,final selection of remedy and potency- skill & employability
1383	BHOM 405	Community Medicine	2019	study of different communicable & infectious diseases,different health problems in society,their planning,impliment & evaluate the effectiveness of health care system,awareness programes , medical camps, immunization- activity,skill development

Only Unique courses are mentioned. No multiple entries.

#### 1.1.3.1 Number of courses having focus on employability/ entrepreneurship/ skill development year-wise during the last five years

2021-22	2020-21	2019-20	2018-19	2017-18
<b>1383</b>	<b>1377</b>	<b>1355</b>	<b>1345</b>	<b>986</b>

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