R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

FIRST YEAR

SEMESTER-I

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Mathematical Foundations of Computer Science	MTCS-1001

Course Outcomes:

CO1 Knowledge gained: • Concept of group action and theorems about group actions. • Structure of permutation groups. • Polynomial rings, EDs, PIDs, & UFDs, and relations among them. • Universality of Polynomial rings

CO2 Skills gained: • Solving problems using the powerful concept of group action. • Facility in understanding the structure of a problem where the problem involves a permutation group - e.g. nature of the roots of a polynomial equation. • Ability to understand a large class of commutative rings by regarding them as quotients of polynomial rings by suitable ideals.

CO3 Knowledge gained: Topological spaces • Connectedness, compactness, separation axioms • Continuity • Metric spaces review • Fundamental groups • Covering spaces • Computations

CO4 Skills gained: Generalization of concepts like continuity • Generalizations of theorems • Distinguishing spaces up to homeomorphisms

CO5 Competency gained: • Understanding of topological spaces and having a grasp on basic results

UNIT-I

Discrete Structures -- Sets, Relations and Functions; Proof Techniques, Algebraic Structures, Morphisms, Posets, Lattices and Boolean Algebras. Logic -- Propositional calculus and Predicate Calculus , Satisfiabiliy and validity, Notions of soundness and completeness Languages.

UNIT-II

Automata Theory -- Chomsky Hierarchy of Grammars and the corresponding acceptors, Turing Machines, Recursive and Recursively Enumerable Languages; Operations on Languages, closures with respect to the operations.

UNIT-III

Computability -- Church-Turing Thesis, Decision Problems, Decidability and Undecidability, Halting Problem of Turing Machines; Problem reduction (Turing and mapping reduction).

UNIT-IV

Computational Complexity -- Time Complexity -- Measuring Complexity, The class P, The class NP, NP-Completeness, Reduction, co-NP, Polynomial Hierarchy. Space Complexity -- Savichs Theorem, The class PSPACE

UNIT-V

Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.

Text Books and References:

1. J.P. Trembley and R. Manohar-- Discrete Mathematical Structures with Applications to Computer Science, McGraw Hill Book Co.
2. Michael Sipser -- Introduction to The Theory of Computation, Thomson Course Technology
3. John E. Hopcroft and J.D.Ullman -- Inrtroduction to Automata Theory, Languages and Computation, Narosa Pub. House, N. Delhi.
4. H.R. Lewis and C.H.Papadimitrou -- Elements of the Theory of Computation, Prentice Hall, International, Inc.
5. Fuzzy Logic in Engineering by T. J. Ross
6. Fuzzy Sets Theory & its Applications by H. J. Zimmersoms

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

FIRST YEAR

SEMESTER-I

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Pattern Recognition	MTCS-1002

Course Outcomes:

CO1 Students will learn the fundamentals of pattern recognition and its relevance to classical and modern problems.

CO2 A main objective is to be able to identify where, when and how pattern recognition can be applied.

CO3 Students will learn the sufficient background necessary to read more advance texts as well as journal articles on the field.

CO4 Several applications of pattern recognition on classical computer and electrical engineering problems (e.g. word/sentence-based searches, signal analysis, speech and visual processing, engineering system design, medical diagnosis, etc.) will show the student how to use pattern recognition in real settings.

CO5 The student will also be introduced to more recent applications of pattern recognition, such as cognitive neuroscience and bioinformatics. Students will work on a selected project.

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.

Text Books and References:

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.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

FIRST YEAR

SEMESTER-I

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	High Performance Computer Architecture	MTCS-1003

Course Outcomes:

CO1 You will gain basic knowledge required to design an anlyze high performance computer systems.

CO2 You will become aware of parallel architecture in modern intel i3, i5 and ARM based computer systems.

CO3 You will know how parallelism is achieved using various pipelining techniques in ARM and Intel high performance systems.

CO4 You will learn how to evaluate and analyze cost and performance of multi processor systems.

CO5 You will learn various type of interconnection networks used to achive high performance in modern sysetms

CO6 You will learn how various type of memories are used in parallel architecture to achieve data parallelism. 8. You will acquire the background for understanding next-generation GPUs using CUDA.

CO7 You will learn how to achive parallelism using pipelining and memory organization in CUDA architecture using GPUs

CO8 You will increase your knowledge about variour parallel computing model in modern systems.

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.

Text Books and References:

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.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

FIRST YEAR

SEMESTER-I

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Advance Algorithm Design & Analysis	MTCS-1004

Course Outcomes:-

CO1 Discuss advanced algorithm design techniques

CO2 Discuss Algorithm Design Techniques, including – greedy algorithms, divide-and-conquer algorithms, Dynamic programming, Randomised Algorithms and Back-tracking.

CO3 Discuss the fundamentals of Data Compression, including Huffman coding and decoding algorithm.

CO4 Discuss string and pattern matching techniques – brute-force method, Knuth-Morris-Pratt method

CO5 Discuss dynamic programming algorithms such as

CO6 **Understand the fundementals of data structures**

CO7 Describe advanced data structures such as binomial heaps, fibonacci heaps

CO8 Study advanced graph problems such as all-pairs shortest paths, min-flow max-flow problem, graph partitioning

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 method, dynamic programming.

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.

Text Books and References:

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 & C++”,Prentice Hall of India, 2002

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

FIRST YEAR

SEMESTER-I

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Distributed Systems	MTCS-1005

Course Outcomes:-

CO1 Upon Completion of the course, the students will be able toList the principles of distributed systems and describe the problems and challenges associated with these principles.

CO2 Understand Distributed Computing techniques, Synchronous and Processes. Apply Shared Data access and Files concepts.

CO3 Design a distributed system that fulfills requirements with regards to key distributed systems properties

CO4 Understand Distributed File Systems and Distributed Shared Memory.

CO5 Apply Distributed web-based system.Understand the importance of security in distributed systems

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 DFS-Design process of DFS.

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.

Text Books and References:

1. Andrew S Tanenbaum, "Distributed Operating Systems ", Pearson Education India, 2001
2. Mukesh Singhal , Niranjan 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 Jo˜ao 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 Transcations on Parallel and Distributed Systems,March 2008.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-II

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	**Advanced Computer Networking**	**MTCS-2001**

Course Outcomes:-

CO1 Recognize the technological trends of Computer Networking.

CO2 Discuss the key technological components of the Network.

CO3 Evaluate the challenges in building networks and solutions to those

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.

Text Books and References:

1. J. Walrand and P. Varaya, High Performance Communication Networks, Harcourt Asia (Morgan Kaufmann), 2000.
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.
3. J. F. Kurose and K. W. Ross, Computer Networking:A Top Down Approach Featuring the Internet, Pearson Education, 2001.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-II

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Real Time Systems	MTCS-2002

Course Outcomes:

CO1 Explain the fundamentals of interaction of OS with a computer and User computation

CO2 Explain the fundamental concepts of how process are created and controlled with OS

CO3 Describe the programming logic of modeling Process based on range of OS features.

CO4 Develop the target system by porting RTOS

CO5 Compare types and Functionalities in commercial OS.

CO6 Application development using RTOS

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 Distributed systems

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 protocols.

UNIT-V

Real-Time Databases, Architecture and software engineering issues, Case studies

Text Books and References:

1. Rajib Mall, "Real-Time Systems: Theory and Practice," Pearson, 2008.
2. Jane W. Liu, "Real-Time Systems" Pearson Education, 2001.
3. Krishna and Shin, "Real-TIme Systems," Tata McGraw Hill. 1999.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-II

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Advance Soft Computing	MTCS-2003

Course Outcomes:-

CO1 Apply soft computing techniques to solve engineering problems.

CO2 Handle multi-objective optimization problems.

CO3 Apply advanced AI techniques of swarm intelligence , particle swarm optimization, ant-Colony optimization and patients.

CO4 Apply rough set theory and granular computing to solve process control applications

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.

Text Books and References:

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).
2. M. T. Hagan, Howard B. Demuth, Mark H. Beale, Neural Network Design; (ISBN: 0-9717321-0 8); Thomson 2002
3. Jang, Sun and Mizutani, Neuro-Fuzzy and Soft-Computing – A computational approach to learning and machine intelligence; Prentice Hall of India; ISBN-81-203-2243-6

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-II

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	**Distributed And Parallel Databases**	**MTCS-2004**

Course Outcomes:-

CO1 The need for parallelism in data processing.

CO2 The different types of parallelism

CO3 The different parallel processing architecture.

CO4 How to measure the performance of parallel processing.

CO5 Basic parallel query processing.

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.

Text Books and References:

1. Raghu Ramakrishnan, Johannes Gerhke, “Database Management Systems” McGraw Hill.
2. Decision support & database system –Efrem G. Mallach.
3. Datawarehousing fundamental – Paulraj Ponniah Wiley.
4. Introduction to data mining with case studies – G.K. Gupta.
5. Elmasri and Navathe, “Fundamentals of Database Systems”, Person Education.
6. Korth, Silberchatz, Sudarshan, “Database System Concepts” Mc Graw Hill.
7. Peter Rob and Coronel, “Database Systems, Design, Implementation and Management”, Thomson Learning.

8. Data Warehousing (OLAP) S. Nagabhushana New Age.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-II

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Advance Network Security	MTCS-2005

Course Outcomes:-

CO1 At the end of the program, graduates will be able to get insights into various fields of information security with a deep understanding of theoretical aspects of security and related analysis.

CO2 Graduates should also get a broader understanding of various security systems, protocols, complexities, standards, practical applicability, and their limitations.

CO3 During the course, students should enhance their inquisitiveness to ever-evolving domain of information security and apply their knowledge to solve problems.

CO4 With a focused one year research leading to a thesis, students should be able to understand the "art" and "science" of research and should be capable enough to apply this training to newer/other fields and problems.

CO5 Students should also be able to solve security issues with understanding of system security and cryptographic attributes with a relevance to standards

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 CryptographyPrinciples 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-l), RIPEMD, HMAC), Digital Signatures and Authentication Protocols and Web Security.

Text Books and References:

1. W. Stalling, Cryptography and Network Security: Principles and Practices, 4th Ed, 2005
2. B. A. Forouzan, Cryptography and Network Security, McGraw Hill, 2nd Ed, 2004.
3. J. Hershey, Cryptography Demystified, McGraw Hill, 2003
4. R E Smith, Internet Cryptography, Addison Wesley
5. J. Knudsen, Java Cryptography, O'Reilly, 1998.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-III

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	**Fault Tolerant Computing Systems**	**MTCS-3001**

Course Outcomes:-

CO1 Evaluate reliability of systems with permanent and temporary faults

CO2 Carry out assessment of the relationship between software testing, residual defects and security vulnerabilities.

CO3 Understand cost-dependability trade-offs and the limits of computer system dependability.

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.

Text Books and References:

1. Israel & Krishnan, "Fault Tolerant Systems" Elsevier Publications, 2007.
2. D. K. Pradhan, "Fault Tolerant computing - Theory and Techniques "Prentice Hall.Inc.1986.
3. Levi & Agrawala, "Fault Tolerant Systems Design, McGraw hill, 1994.
4. MA. Breuer and A.D.Friedman, "Diagnosis and Reliable design of Digital Systems", Computer Sci. Press, 1976.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-III

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	**Statistical Data Mining**	**MTCS-3002**

Course Outcomes:-

On completion of this course, the students will be able to:

CO1 Describe and discuss the key terminology, concepts tools and techniques used in business statistical analysis

CO2 Critically evaluate the underlying assumptions of analysis tools

CO3 Understand and critically discuss the issues surrounding sampling and significance

CO4 Discuss critically the uses and limitations of statistical analysis

CO5 Solve a range of problems using the techniques covered

CO6 Conduct basic statistical analysis of data.

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.

Text Books and References:

1. J. Han & M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Ed,2006.
2. M. J. A. Berry and G. Linoff, Mastering Data Mining: The Art and Science of Customer Relationship Management, Wiley Computer Publishing, 2000.
3. P. Adriaans & D. Zantinge, Data Mining, Addison Wesley, 1996.

4. R. Mattison, Data Warehousing: Strategies, Tools and Techniques, Mc Graw Hill, 1996.
5. P. Ponniah, Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals,Wiley, 2001.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

Semester – III

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	**Dissertation Part- I (Literature Review/Problem Formulation/ Synopsis**	**MTCS-3003**

Course Outcomes: After studying this course, students will be able to,

CO1- To define and limit of the research.

CO2- To place your study in an historical perspective.

CO3- To avoid unnecessary duplication.

CO4- To evaluate promising research methods.

Course Content

The objective of Dissertation Part-I is to promote a systematic understanding of the knowledge, critical awareness of current problems, originality in the application of knowledge and the quality of work. The ideal work may be characterized by a new result in design, development and implementation. It should have the potential of industrial/scientific acceptance. The first part of the Dissertation should be to determine the interest of students and broadly identify the area of work, finalize the research problem based on literature survey. Also, by now the students should have familiarity with the concepts, tools, techniques required to carry out the Dissertation work. Student is expected to start the research work. Outcome of Dissertation Part-I should be to conclude the work on the identified problem its importance, its justification, literature survey, field work, research work etc. Minor variation may be accepted depending upon nature of title.

R.K.D.F. UNIVERSITY, BHOPAL

M-Tech. **(Computer Science & Engineering)**

SECOND YEAR

SEMESTER-IV

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	**Dissertation Part- II**	**MTCS-4001**

Course Outcomes: After studying this course, students will be able to,

CO1- The programme of instruction will consist of advanced subjects of the respective specialization. The complete programme is distributed over four semesters with two semesters per academic year. Course work is offered in the first two semesters (except for PG programme in Mechanical engineering where it is extended up to third semester) and the dissertation work will be carried out during third and fourth semesters. Every branch of M.E/ M. Tech programme will have a curriculum and syllabi for the courses recommended by the board of studies and approved by the academic council. The academic programmes of the Institute follow the credit system.

CO2- Every candidate shall be required to submit the record of dissertation work at the end of fourth semester.

Course Content

The objective of Dissertation Part-I is to promote a systematic understanding of the knowledge, critical awareness of current problems, originality in the application of knowledge and the quality of work. The ideal work may be characterized by a new result in design, development and implementation. It should have the potential of industrial/scientific acceptance. Dissertation Part-II should be seen in continuation with Dissertation Part-I. The researcher should continue the research work in the two parts.