Department of Computer Science and Engineering

M.Tech (Computer Science and Engineering)

Course Structure and Syllabus

Academic Regulations: 2014-2015

I Year	COURSE STRUCTURE	I Semester

+

S.No.	Subject Code	Subject Name	L	T	P	C	Marks	
							Internal	External
1	4P101	Advanced Computer Architecture	3	1	-	3	40	60
2	4P102	Advanced Data Structures and Algorithms	3	1	-	3	40	60
3	4P103	Advanced Databases	3	1	-	3	40	60
4	4SC04	Cloud Computing	3	1	-	3	40	60
5		**PROFESSIONAL ELECTIVE I**	3	1	-	3	40	60
6		**PROFESSIONAL ELECTIVE II**	3	1	-	3	40	60
7	4P171	Advanced Data Structures and Algorithms Lab	-	-	4	2	40	60
8	4P172	Technical paper writing and Seminar	-	-	3	2	50	-
		Total	**18**	**6**	**7**	**22**	**330**	**420**

PROFESSIONAL ELECTIVE I		PROFESSIONAL ELECTIVE II	
Subject Code	**Subject Name**	**Subject Code**	**Subject Name**
4P105	Natural Language Processing	4RC12	Wireless Networks and Mobile Computing
4S102	Software Process and Project Management	4SC08	Storage Area Networks
4P106	Advanced Network Programming	4S109	Ad hoc and Sensor Networks
		4S120	Network Security and Cryptography

I Year	COURSE STRUCTURE	II Semester

S.No.	Subject Code	Subject Name	L	T	P	C	Marks	
							Internal	External
1		**OPEN ELECTIVE**	3	1	-	3	40	60
2	4P207	Distributed Systems	3	1	-	3	40	60
3	4SC06	Information Retrieval Systems	3	1	-	3	40	60
4	4S213	Web Technologies & Services	3	1	-	3	40	60
5	4S214	Advanced Data Mining	3	1	-	3	40	60
6		**PROFESSIONAL ELECTIVE III**	3	1	-	3	40	60
7	4S273	Web Technologies and Services Lab	-	-	4	2	40	60
8	4P274	Technical Seminar (Independent Review Paper)	-	-	3	2	50	-
		Total	18	6	7	22	330	420

PROFESSIONAL ELECTIVE III		OPEN ELECTIVE	
Subject Code	**Subject Name**	**Subject Code**	**Subject Name**
4S211	Software Architecture and Design Patterns	4ZC03	Banking Operations, Insurance and Risk Management
4SC16	Image Processing and Pattern Recognition	4GC33	Intellectual Property Rights , Values and Ethics
4S217	Machine Learning and Artificial Intelligence	4T217	Embedded Systems
		4GC42	Fundamentals of Bio-informatics

II Year	COURSE STRUCTURE	I Semester

S.No.	Subject Code	Subject Name	L	T	P	C	Marks	
							Internal	External
1	4P375	Comprehensive Viva voice	-	-	-	2	-	50
2	4P376	Project Seminar - I	-	-	-	2	50	-
3	4P377	Project Work (PART- I) (Project Status Report) (Excellent/ Good/ Satisfactory/ Un-Satisfactory)	-	-	-	18	grading	-
		Total	**-**	**-**	**-**	**22**	**50**	**50**

II Year	COURSE STRUCTURE	II Semester

S.No.	Subject Code	Subject Name	L	T	P	C	Marks	
							Internal	External
1	4P478	Project Seminar - II	-	-	-	2	50	-
2	4P479	Project Work and Dissertation (Excellent/ Good/ Satisfactory/ Un-Satisfactory)	-	-	-	20	-	grading
		Total	**-**	**-**	**-**	**22**	**50**	**-**

L - Lectures; T = Tutorial; P = Practical; C = Credits

M. Tech. (Computer Science and Engineering)

Program Objectives:

To offer a program for systematic study of Computer Science and related Technology at the post graduate level by providing world class education in Engineering and Technology. To provide career advancement to students through a program offering contemporary know-how and proficiency in the software engineering and related areas and to have a viable option to take up academic pursuit as a means of career advancement. To contribute towards generation of quality manpower to meet the needs of the industry and related sectors that has relevance to Computer Science & Engineering. Keeping pace with the ever changing technological scenario, to help our students to gain proper direction to emerge as competent professionals fully aware of their commitment to the society and nation. To inculcate a flair for research, development and entrepreneurship in the student.

Syllabus for M.Tech I Year I Semester

Computer Science and Engineering

ADVANCED COMPUTER ARCHITECTURE

Code: 4P101

L	T	P	C
3	1	-	3

UNIT - I

Fundamentals of Computer design- Technology trends- cost-
Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes -operations in the instruction set- instructions for control flow- encoding an instruction set.-the role of compiler

UNIT - II

Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP

UNIT - III

ILP software approach- compiler techniques- static branch protection - VLIW approach - H.W support for more ILP at compile time- H.W verses S.W Solutions

UNIT - IV

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

UNIT - V

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading.

UNIT - VI

Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device- designing a I/O system.
interconnection network media – practical issues in interconnecting networks.

TEXT BOOKS

1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

REFERENCES

1. “Computer Architecture and parallel Processing” Kai Hwang and A.Briggs International Edition McGraw-Hill.
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.
3. Parallel Computer Architecture, A Hardware / Software Approach, David E. Culler, Jaswinder Pal singh with Anoop Gupta, Elsevier

Syllabus for M.Tech I Year I Semester

Computer Science and Engineering

ADVANCED DATA STRUCTURES AND ALGORITHMS

Code: 4P102

L	T	P	C
3	1	-	3

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.
- Significance of algorithms in the computer field
- Various aspects of algorithm development
- Qualities of a good solution

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, Linked List, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT III

Searching–Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable.

UNIT IV

Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT V

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, Threaded binary trees.

Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-dfs and bfs, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT VI

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees – Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util- TreeSet, Tree Map Classes, Tries(examples only),Comparison of Search trees.

Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th editon, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work,W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
ADVANCED DATABASES

Code: 4P103

L	T	P	C
3	1	-	3

Objectives:

- History and Structure of databases
- How to design a database
- How to convert the design into the appropriate tables
- Handling Keys appropriately
- Enforcing Integrity Constraints to keep the database consistent
- Normalizing the tables to eliminate redundancies
- Querying relational data
- Optimizing and processing the queries
- Storage Strategies for easy retrieval of data through index
- Triggers, Procedures and Cursors ,Transaction Management
- Distributed databases management system concepts and Implementation

UNIT I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL,DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, ER diagrams,.

UNIT II

Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views –Altering Tables and Views, Relational Algebra, Basic SQL Queries, Nested Queries, Complex Integrity Constraints in SQL, Triggers

UNIT III

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT IV

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking –Transaction Support in SQL.

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking.

Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

UNIT V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM)

B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

UNIT VI

Distributed databases: Introduction to distributed databases, Distributed DBMS architectures, Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.
3. Fundamentals of Database Systems 5th edition. Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

REFERENCE BOOKS:

1. Introduction to Database Systems, C.J.Date,Pearson Education.
2. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
4. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
5. Database-Principles, Programming, andPerformance, P.O'Neil&E.O'Neil, 2nd ed., ELSEVIER
6. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.
10. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.
11. Distributed Database Systems, Chhanda Ray, Pearson.
12. Distributed Database Management Systems, S.K.Rahimi and F.S.Haug, Wiley.

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
CLOUD COMPUTING

Code: 4SC04

L	T	P	C
3	1	-	3

Objectives:
Prerequisite: Computer Networks and Operating Systems
Course Description:
Cloud computing has evolved as a very important computing model, which enables information, software, and shared resources to be provisioned over the network as services in an on-demand manner. This course provides an insight into what is cloud computing and the various services cloud is capable.

UNIT - I
Introductory Concepts & overview: Distributed Systems - Parallel Computing Architectures: Vector Processing, Symmetric Multi Processing and Massively parallel processing systems - High Performance Computing - Grid Computing - Service Oriented Architecture Overview - Virtualization.

UNIT - II
Overview of Cloud Computing : Meaning of the terms Cloud and cloud computing - cloud based service offerings - Grid Computing Vs Cloud Computing - Benefits of Cloud Model - limitations - legal issues - key characteristics of cloud computing - challenges for the cloud - the evolution of cloud computing.

UNIT - III
Web services delivered from the cloud: Infrastructure as a service - platform as a service - software as a service. Building Cloud networks: Evolution from the MSP model to cloud computing and software as a service - the cloud data center - SOA as step toward cloud computing - basic approach to a data center based SOA.

UNIT - IV
Federation Presence, Identity & Privacy in the Cloud: Federation in the cloud - presence in the cloud - privacy in the cloud - Privacy and its relation to cloud based information system. security in the cloud: cloud security challenges - software as a service security.

UNIT - V
Common Standards in cloud computing: the open cloud consortium - the distributed management task force - standards for application developers -standards for messaging - standards for security.

UNIT - VI
Mobile internet devices and the cloud: smartphone - mobile operating systems for smartphones - mobile platform virtualization - Collaboration Applications for mobile platforms - future trends.
Casestudies: Map Reduce, HDFS.

TEXT BOOKS:

1. Cloud Computing Implementation, Management and Security by John W. Rittinghouse, James F. Ransome, CRC Press, Taylor & Francis group, 2010.
2. Cloud Computing a practical approach by Anthony T. Velte, Toby J. velte Robert Elsenpeter, Tata McGrawHill edition, 2010.

REFERENCES:
1. Cloud Application Architectures by George Reese, Oreilly publishers.
2. Cloud Computing and SOA convergence in your enterprise, David S. Linthicum, Addison- Wesley.
3. George Coulouris, JeanDollimore and Tim Kindberg. Distributed Systems:Concepts and Design (Edition 3).Addison-Wesley2001 .

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
NATURAL LANGUAGE PROCESSING
(PROFESSIONAL ELECTIVE –I)

Code: 4P105

L	T	P	C
3	1	-	3

Objectives:

- To acquire basic understanding of linguistic concepts and natural language complexity, variability.
- To acquire basic understanding of machine learning techniques as applied to language.
- To implement N-grams Models.

UNIT I

Introduction and Overview What is Natural Language Processing, hands-on demonstrations. Ambiguity and uncertainty in language. The Turing test. **Regular Expressions** Chomsky hierarchy, regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools.

UNIT II

P**rogramming in Python** An introduction to programming in Python. Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) **String Edit Distance and Alignment** Key algorithmic tool: dynamic programming, a simple example, use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

UNIT III

Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions **Non-probabilistic Parsing** Efficient CFG parsing with CYK, another dynamic programming algorithms. Early parser. Designing a little grammar, and parsing with it on some test data. **Probability** Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language. **Information Theory** The "Shannon game"--motivated by language! Entropy, crossentropy, information gain. Its application to some language phenomena.

UNIT IV

Language modeling and Naive Bayes

Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models**,** Viterbi Algorithm for Finding Most Likely HMM Path Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

UNIT V

Probabilistic Context Free Grammars

Weighted context free grammars. Weighted CYK. Pruning and beam search.

Parsing with PCFGs

A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers.

Maximum Entropy Classifiers

The maximum entropy principle and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks

UNIT VI

Maximum Entropy Markov Models & Conditional Random Fields

Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.

Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's.

Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

TEXT BOOKS:

1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing"- Manning and Schutze, MIT Press
3. "Natural Language Understanding". James Allen. The Benajmins/Cummings Publishing Company

REFERENCES BOOKS:

1. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.
2. Charniak, E.: Statistical Language Learning. The MIT Press.
3. Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press.
4. Lutz and Ascher - "Learning Python", O'Reilly

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
SOFTWARE PROCESS AND PROJECT MANAGEMENT
(PROFESSIONAL ELECTIVE –I)

Code: 4S102

L	T	P	C
3	1	-	3

Objectives:
At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

UNIT I
Software Process Maturity : Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.
Process Reference Models Capability Maturity Model (CMM), CMMi, PCMM, PSP, TSP.

UNIT II
Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

UNIT III
Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT IV
Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments.
Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT V
Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation.
Project Control and process instrumentation The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT VI
CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:
1. Managing the Software Process, Watts S. Humphrey, Pearson Education.
2. Software Project Management, Walker Royce, Pearson Education.

REFERENCE BOOKS:
1. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley India, rp2011.
2. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
3. Process Improvement essentials, James R. Persse, O'Reilly, 2006
4. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
5. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
6. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
7. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon 2ed, Wiley India, 2004.

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
ADVANCED NETWORK PROGRAMMING
(PROFESSIONAL ELECTIVE –I)

Code: 4P106

L	T	P	C
3	1	-	3

Objectives:
Computer network programming involves writing computer programs that enable processes to communicate with each other across a computer network
Network programming is client–server programming
Interprocess communication, even if it is bidirectional, cannot be implemented in a perfectly symmetric way: to establish a communication channel between two processes, one process must take the initiative, while the other is waiting for it. Therefore, network programming unavoidably assumes a client–server model: The process initiating the communication is a client, and the process waiting for the communication to be initiated is a server. The client and server processes together form a distributed system. In a peer-to-peer communication, the program can act both as a client and a server.

UNIT – I
Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities.
Bourne again shell(bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples.

UNIT - II
Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.
Files- File Concept, File types File System Structure, Inodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lockf and fcntl functions, file permissions- chmod, fchmod, file ownership-chown, lchown , fchown, linkssoft links and hard links – symlink, link, unlink.

UNIT - III
File and Directory management – Directory contents, Scanning Directories- Directory file APIs.
Process- Process concept, Kernel support for process, process attributes, process control – process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT - IV
Signals- Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions, Introduction to message queues, semaphores and shared memory.
Message Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example.
Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT – V
Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, client/server example.
Network IPC - Introduction to Unix Sockets, IPC over a network, Client-Server model ,Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented - Communication, Socket system calls for Connectionless-Communication, Example-Client/Server Programs-Single Server-Client connection, Multiple simultaneous clients, Socket options – setsockopt, getsockopt, fcntl.

UNIT-VI

Network Programming in Java-Network basics, TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI)-Basic RMI Process, Implementation details-Client-Server Application.

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI.(Units II,III,IV)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.(Unit I)
3. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.(Unit V)
4. Unix Network Programming ,W.R. Stevens, PHI.(Units II,III,IV)
5. Java Network Programming,3rd edition, E.R. Harold, SPD, O'Reilly.(Unit V)

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
4. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
5. Unix Network Programming The Sockets Networking API, Vol.-I,W.R.Stevens, Bill Fenner, A.M.Rudoff, Pearson Education.
6. Unix Internals, U.Vahalia, Pearson Education.
7. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.
8. C Programming Language, Kernighan and Ritchie, PHI

Syllabus for M.Tech I Year I Semester

Computer Science and Engineering

WIRELESS NETWORKS AND MOBILE COMPUTING

(PROFESSIONAL ELECTIVE –II)

Code: 4RC12

L	T	P	C
3	1	-	3

UNIT I :

INTRODUCTION TO MOBILE & WIRELESS COMMUNICATION: Mobile communication, Mobile computing, Architecture, Mobile Devices, Mobile System Networks, Components of Wireless Environment, Overview & Challenges of Wireless Networks, Categories of Wireless Networks Wireless LAN : Infra red Vs radio transmission, Infrastructure and Ad-hoc Network

UNIT II

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM): GSM Architecture, GSM Entities, Call Routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security

GENERAL PACKET RADIO SERVICE (GPRS): Introduction, GPRS and packet data network, GPRS network architecture, GPRS network operations, Data services in GPRS, Applications and limitations of GPRS, Billing and charging in GPRS

UNIT III:

MOBILE NETWORK LAYER: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP), Mobile Ad-hoc networks : Routing, destination Sequence Distance Vector, Dynamic Source Routing.

UNIT IV:

MOBILE TRANSPORT LAYER: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT V:

DATABASES: Database Hoarding Techniques, Data Caching, Client-server computing Adaptation, Transaction models, Query and Data recovery process**, DATA DISSEMINATION AND BROADCASTING SYSTEMS:** Communication Asymmetry, Classification of data delivery mechanisms, Broadcast models, Selective tunning and indexing techniques, Digital audio and video broadcasting

UNIT VI:

PROTOCOLS AND TOOLS: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

TEXT BOOKS:

1. Raj Kamal, "Mobile Computing", Oxford Univ. Press.
2. Asoke K Talukder, et al, "Mobile Computing", Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. Jochen Schiller, "Mobile Communications", Pearson Education, Second Edition, 2008.
2. William Stallings, " Wireless Communications & Networks", Person, 2nd Edition, 2007.
3. Ivan Stojmenovic , "Handbook of Wireless Networks and Mobile Computing", Wiley, 2007.
4. Dr. Sunilkumar, et al "Wireless and Mobile Networks: Concepts and Protocols", Wiley India
5. Kumkum Garg, "Mobile Computing", Pearson.

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
STORAGE AREA NETWORKS
(PROFESSIONAL ELECTIVE –II)

Code: 4SC08

L	T	P	C
3	1	-	3

Course objectives:
Storage area networks are playing a vital role in handling data in a segregated manner. The basis for storage area networks can be associated with the library information handled in educational institutions. This course helps in understanding the importance of data and the way data should be stored over a network. Such that, data is easily indexed which may finally help in searching data in an efficient manner. This course also explains how proper storage of data can be associated with replication and how fault tolerance gets enhanced so that data base crashes can be managed.

UNIT I
Introduction to Storage Technology
Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data centre infrastructure, role of each element in supporting business activities

UNIT II
Storage Systems Architecture
Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components , Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

UNIT III
Introduction to Networked Storage
Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN , Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfils the need , Understand the appropriateness of the different networked storage options for different application environments

UNIT IV
Information Availability & Monitoring & Managing Data centre
List reasons for planned/unplanned outages and the impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures , Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities.

UNIT V
Identify key areas to monitor in a data centre, Industry standards for data centre monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data centre

UNIT VI
Securing Storage and Storage Virtualization
Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes

Case Studies
The technologies described in the course are reinforced with EMC examples of actual solutions.
Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

TEXT BOOKS

1. EMC Corporation, Information Storage and Management, G.Somasundaram, A.Shrivastava, Wiley Publishing.
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
3. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
4. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
ADHOC AND SENSOR NETWORKS
(PROFESSIONAL ELECTIVE –II)

Code: 4S109

L	T	P	C
3	1	-	3

Course objectives:
Ad Hoc and Sensor Networks is playing a vital role in handling sensor nods in Wireless Sensor Networks. The main goal of the subject is under standing, what is the MANETs how the concepts are comparable with sensor nodes. The information retrieval is a key mechanism in the cloud computing, how the data can be retrieved from sensor network and security issues in sensor networks can be learn in this subject.

UNIT I
Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and challenges of MANETs - **Routing in MANETs:** Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms, other routing algorithms.

UNIT II
Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting - **TCP over Ad Hoc:** TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT III
Basics of Wireless, Sensors and Applications: Design issues, Clustering of sensors**,** Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT IV
Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT V
Security: Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT VI
Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms - **Operating System:** TinyOS - **Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS
1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P.Aggarwal*, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
NETWORK SECURITY AND CRYPTOGRAPHY
(PROFESSIONAL ELECTIVE –II)

Code: 4S120

L	T	P	C
3	1	-	3

Course Objective:
The students should learn all cryptographic algorithms, attacks on information passing through the network. After completion of this course, they are in a position to implement several authentication and encryption algorithm. They understand the security protocols in different layers.

UNIT - I
Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

UNIT - II
Conventional Encryption Principles, Conventional encryption algorithms: DES, TDES, AES, cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions: SHA1 and HMAC.
Public key cryptography principles, public key cryptography algorithms: RSA, DIFFIE HELL MAN, digital signatures, digital Certificates, Certificate Authority and key management
Kerberos, X.509 Directory Authentication Service.

UNIT - III
Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT - IV
IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT – V
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).
Intruders, Viruses and related threats.

UNIT - VI
Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

TEXT BOOKS :
1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech

REFERENCES :
1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.

Syllabus for M.Tech I Year I Semester

Computer Science and Engineering

ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

Code: 4P171

L	T	P	C
-	-	4	2

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.

Sample Problems on Data structures:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods: a) Linear search b) Binary search
2. Write Java programs to implement the following using arrays and linked lists a) List ADT
3. Write Java programs to implement the following using an array. a) Stack ADT b) Queue ADT
4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5. Write a Java program to implement circular queue ADT using an array.
6. Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.
7. Write Java programs to implement the following using a singly linked list.a) Stack ADT b) Queue ADT
8. Write Java programs to implement the deque (double ended queue) ADT using
   a) Array b) Singly linked list c) Doubly linked list.
9. Write a Java program to implement priority queue ADT.
10. Write a Java program to perform the following operations:
    a) Construct a binary search tree of elements.
    b) Search for a key element in the above binary search tree.
    c) Delete an element from the above binary search tree.
11. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
12. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.
13. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in
    a) Preorder b) Inorder c) Postorder.
14. Write Java programs for the implementation of bfs and dfs for a given graph.
15. Write Java programs for implementing the following sorting methods:
    a) Bubble sort d) Merge sort g) Binary tree sort
    b) Insertion sort e) Heap sort
    c) Quick sort f) Radix sort
16. Write a Java program to perform the following operations:
    a) Insertion into a B-tree b) Searching in a B-tree
17. Write a Java program that implements Kruskal's algorithm to generate minimum cost spanning tree.
18. Write a Java program that implements KMP algorithm for pattern matching.

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.
2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.
3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
6. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
7. Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill.
8. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
9. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel , 8th edition, PHI.
10. Java Programming, D.S.Malik,Cengage Learning.
11. A Practical Guide to Data Structures and Algorithms using Java, S.Goldman & K.Goldman, Chapman & Hall/CRC, Taylor & Francis Group.

(Note: Use packages like java.io, java.util, etc)

Syllabus for M.Tech I Year I Semester

Computer Science and Engineering

TECHNICAL PAPER WRITING AND SEMINAR

Code: 4P172

L	T	P	C
-	-	3	2

Max. Marks: 50

There shall be two seminar presentations during I year I semester and I year II Semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Departmental Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% to be declared successful

In the First semester the report must be in the form of the review paper with a format used by IEEE /ASME Etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high Quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 10 marks
- Final Report : 10 marks
- Presentation : 30 marks

A Student has to concentrate on the following sections while writing technical paper or presenting seminar.

Contents:

- Identification of specific topic
- Analysis
- Organization of modules
- Naming Conventions
- Writing style
- Figures
- Feedback
- Writing style
- Rejection
- Miscellaneous

REFERENCES:

Teach Technical Writing in Two Hours per Week by Norman Ramsey

For Technical Seminar the student must learn few tips from sample seminars and correcting himself, which is continues learning process

REFERENCE LINKS:

1. http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm
2. http://www.cse.psu.edu/~yuanxie/advice.htm
3. http://www.eng.unt.edu/ian/guides/postscript/speaker.pdf

NOTE: A student can use any references for this process, but must be shared in classroom.

Syllabus for M.Tech I Year II Semester

Computer Science and Engineering

BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT (OPEN ELECTIVE)

Code: 4ZC03

L	T	P	C
3	1	-	3

Course Objective: The objective of the course is to provide to students an understanding of Banking Operations, Insurance Market, and Risk Management Principles and techniques to control the risk & the major Institutions involved and the Services offered within this framework.

UNIT I

INTRODUCTION TO BANKING BUSINESS: Introduction to Banking sectors-History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank New Dimensions and products- E-Banking, Mobile-Banking, Net Banking, CRM, cheque system and KYC system.

UNIT II

BANKING REFORMS AND REGULATIONS: Banking regulation Act-1949, Reserve Bank of India Act-1934, Establishment of RBI, Functions and credit control system; Role of commercial banks and its functions. Banking sector reforms in India and deficiencies in Indian banking including problems accounts and Non-Performing Assets.

UNIT III

INTRODUCTION TO INSURANCE: Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance; life insurance and its products: Role of Agents and brokers.

UNIT IV:

INSURANCE BUSINESS ENVIRONMENT: Regulatory and legal frame work governing the insurance sector, history of IRDA and its functions: Business and economics of insurance, need for changing mindset and latest trends.

UNIT V

INTRODUCTION TO RISK MANAGEMENT: Introduction to Risk, meaning and types of risk in business and individual, Risk management process, methods: Risk identification and measurement, Risk management techniques; Non insurance methods

UNIT VI

FINANCIAL RISK MANAGEMENT: Introduction to Financial markets. Financial risk management techniques –Derivatives, Hedging and Portfolio management techniques: Derivatives and types of Derivatives-Futures, options and swaps: Shares, Commodity and Currency trading in India.

TEXT BOOKS:

1. Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
2. General Principles of Insurance Harding and Evantly
3. Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.

REFERENCES:

1. Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
2. Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
3. G. Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008.
4. Gulati: Principles of Insurance Management, Excel, 2009.
5. James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Mgt. & Insurance, Cengage, 2009.
6. Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
7. P.K. Gupta: Insurance and Risk Management, Himalaya, 2009.
8. Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009.
9. Jyotsna Sethi & Nishwan Bhatia : Elements of Banking and Insurance, 2/e,PHI, 2012.

Syllabus for M.Tech I Year II Semester

Computer Science and Engineering

INTELLECTUAL PROPERTY RIGHTS, VALUES AND ETHICS (OPEN ELECTIVE)

Code: 4GC33

L	T	P	C
3	1	-	3

UNIT –I: INTELLECTUAL PROPERTY RIGHTS - I

Invention and Creativity, Basic Types of Property, Need for Protection of IPR, Patents, Criteria for Patentability, Overview of Patent search, drafting and filing,

UNIT II: INTELLECTUAL PROPERTY RIGHTS - II

Trade Marks, Trade Secrets, Industrial Designs, Integrated Circuits, Geographical Indications, Copyrights.

UNIT-III: CONVENTIONS AND TREATIES:

WTO, GATT & TRIPS, WIPO Mission and Activities, Patent Cooperation Treaty, Case Studies on IP

UNIT-IV: CULTURE & VALUES:

A Introduction to Indian Culture Values and Ethics, The Indian Concept of Human Life, Indian Civilization, Sanskrit and Indian Languages, Festivals, Sculpture, Music, Dance, Drama, Ayurveda. Family and its Importance, Indian Marriage System, Status of Women in Indian Society, Education, Purpose, Ancient System, Value Education, Human Value System, Interfaith Understanding, Happiness, Modernism and its Effect on Lifestyle, Mind and its Operation, Control of Mind, Yoga, Control of Sense organs, Exemplary Life Sketches-Albert Einstein, M K Gandhi, Abdul Kalam

UNIT-V: ETHICS:

Ethics in Ancient India, Ethics, Morals, Ethics and Human Life, Core Areas for Ethics, Values, Morality, Integrity, Honesty, Character, Loyalty, Trustworthiness, Courage and Confidence, Confidentiality, Secrecy and Transparence, Justification, Contracts and Spirit Promises and Schedules, Quarrels, Selfishness, Obstacles, Supporting Measures, Reputation and its sale, Decision Making in Ethics, Exemplary Life Sketches-Vishveshwaraiah, , Jagadeesh Chandra Bose, Meghanad Saha

UNIT- VI: PROFESSIONAL ETHICS:

Occupation, Profession, Professional, Professional Organization, Obligations of a Professional, Temptations, Aptitude, Importance of Professional Ethics for Engineers, Code of Ethics, Need for a Code, Impact of Ethical Behaviour, The Code of Ethics for Engineers, Fundamental Principles and Cannons, Commerce and Ethics, Marketing Ethics, Finance and Ethics, Science, Religion and Ethics, Medical Ethics, Genetics and Ethics, Politics and Ethics, Genders and Ethics, Media and Ethics, Computer Ethics Exemplary Life Sketches- Narayan Murthy, Homi Jahangir Bhabha

REFERENCES:

1. Anitha Rao R & Bhanoji Rao “Intellectual Property Rights – A Primer”, Eastern Book Co, 2008.
2. The ABCs of Ethics by Michael. L. Buckner, Universe. Inc, New York Lincoln, Shangahai
3. Science, Faith and Ethics by Denis Alexander and Robert.S.White, Hendrickson Publishers, Massachusetts, USA, March 2006
4. Vedic Science Primer by PSR Murthy, BS Publications, Hyderabad
5. Medical Ethics-Global View Points, Edited by Diane Andrews, Hennig Feld, Green Haven Press
6. Divine Stories, Human Value Stories, Volume I and II, Sri Satya Sai Books and Publications

Syllabus for M.Tech I Year II Semester
Computer Science and Engineering
EMBEDDED SYSTEMS
(OPEN ELECTIVE)

Code: 4T217

L	T	P	C
3	1	-	3

UNIT I
Embedded Computing: Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples. (Chapter I from Text Book 1, Wolf).

UNIT II
The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. (Chapter 3 from Text Book 2, Ayala).
Basic Assembly Language Programming Concepts: The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions.
(Chapters 4, 5 and 6 from Text Book 2, Ayala).

UNIT III
Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts. (Chapter 7and 8 from Text Book 2, Ayala)

UNIT IV
Applications: Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

UNIT V
Introduction to Real – Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management,
Interrupt Routines in an RTOS Environment. (Chapter 6 and 7 from Text Book 3, Simon).
Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

UNIT VI
Introduction to advanced architectures: ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller. (Chapter 8 from Text Book 1, Wolf).

TEXT BOOKS
1. Computers as Components-principles of embedded computer system design, Wayne Wolf, Elsevier.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.

REFERENCES
1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

Syllabus for M.Tech I Year II Semester

Computer Science and Engineering

FUNDAMENTALS OF BIO-INFORMATICS

(OPEN ELECTIVE)

Code: 4GC42

L	T	P	C
3	1	-	3

UNIT I : SCOPE OF BIOINFORMATICS and BIOLOGICAL DATABASES

History, definition, importance and applications of bioinformatics, Introduction to biological data, Organization and management of databases, Nucleotide databases (Genbank,), Protein Databases(SWISS PROT)

UNIT II: SEQUENCE ALIGNMENT

Basic concepts of sequence homology Dynamic Programming, Dot Matrix analysis, Smith-Waterman Algorithm , Neddleman-Wunsch Algorithm ,Scoring matrices: PAM and BLOSUM matrices

UNIT III: **SEQUENCE-BASED DATABASE SEARCHES**

BLAST and FASTA algorithms, various versions of basic BLAST and FASTA, Use of these methods for sequence analysis including the on-line use of the tools and interpretation of results.

UNIT IV : MULTIPLE SEQUENCE ALIGNMENT

Basic concepts of various approaches for MSA (e,g. progressive, hierarchical etc.). Algorithm of CLUSTALW and its application

UNIT V : PHYLOGENETIC ANALYSIS

Definition and description of phylogenetic trees. Distance based and character based methods of phylogenetic analysis .

UNIT VI : PROTEIN STRUCTURE PREDICTION

Secondary structure prediction methods, Algorithms of Chou Fasman, GOR methods. Protein homology modeling.

TEXT BOOKS:

1. Bioinformatics. David Mount, 2000. CSH Publications

REFERENCES:

1. Bioinformatics: A Machine Learning Approach P. Baldi. S. Brunak, MIT Press 1988.
2. Genomics and Proteomics-Functional and Computational aspects. Springer Publications. Editior-Sandor Suhai.
3. Bioinformatics- Methods and Protocols-Human Press. Stephen Misener, Stephen A. Krawetz.
4. Bioinformatics – A Practical guide to the Analysis of Genes and Proteins – Andreas D.Baxevanis, B.F. Francis Ouellette.

Syllabus for M.Tech I Year II Semester
Computer Science and Engineering
DISTRIBUTED SYSTEMS

Code: 4P207

L	T	P	C
3	1	-	3

Objectives:

- To explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
- To list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
- To recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
- To design a distributed system that fulfills requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible, and explain why;
- To build distributed system software using basic OS mechanisms as well as higher-level middleware and languages.

UNIT I
Characterization of Distributed Systems- Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models- Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication.

UNIT II
Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.
Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems.

UNIT III
Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.
Peer to Peer Systems-Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore.

UNIT IV
Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.
Coordination and Agreement - Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT V
Transactions and Concurrency control - Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency controls. Distributed Transactions - Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication- Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT VI
Security - Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 WiFi. Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, other consistency models, CORBA case study- Introduction, CORBA RMI, CORBA Services.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
4. Reliable Distributed Systems, K.P.Birman, Springer.
5. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
6. Distributed Operating Systems and Algorithm Analysis, R.Chow, T.Johnson, Pearson.
7. Distributed Operating Systems, A.S.Tanenbaum, Pearson education.
8. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani & Mukesh Singhal, Cambrigde, rp 2010

Syllabus for M.Tech I Year II semester
Computer Science and Engineering
INFORMATION RETRIEVAL SYSTEMS

Code: 4SC06

L	T	P	C
3	1	-	3

Objectives:
On completion of this course you should have gained a good understanding of the foundation concepts of information retrieval techniques and be able to apply these concepts into practice.
Specifically, you should be able to:

- To use different information retrieval techniques in various application areas
- To apply IR principles to locate relevant information large collections of data
- To analyse performance of retrieval systems when dealing with unmanaged data sources
- To implement retrieval systems for web search tasks.

UNIT I
Boolean retrieval. The term vocabulary and postings lists. Dictionaries and tolerant retrieval. Index construction. Index compression.

UNIT II
Scoring, term weighting and the vector space model. Computing scores in a complete search system. Evaluation in information retrieval. Relevance feedback and query expansion.

UNIT III
XML retrieval. Probabilistic information retrieval. Language models for information retrieval. Text classification.

UNIT IV
Vector space classification. Support vector machines and machine learning on documents

UNIT V
Flat clustering, Hierarchical clustering, Matrix decompositions and latent semantic indexing.

UNIT VI
Web search basics, Web crawling and indexes, Link analysis.

TEXT BOOKS:
1. Introduction to Information Retrieval , Christopher D. Manning and Prabhakar
2. Raghavan and Hinrich Schütze, Cambridge University Press, 2008.

REFERENCE BOOKS:
1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval, Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.
4. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza- Yates, Pearson Education, 1992.
5. Information Storage & Retrieval, Robert Korfhage , John Wiley & Sons.

Syllabus for M.Tech I Year II Semester
Computer Science and Engineering
WEB TECHNOLOGIES & SERVICES

Code: 4S213

L	T	P	C
3	1	-	3

Objectives:

The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. She / He should have good understanding of different technologies on client and server side components as Follows:

Client Side: HTML5, CSS, Javascript, Ajax, and JSON
Server Side: PHP
Web services fundamentals, Axis framework for WS

UNIT I
HTML5: Introduction**,** Editing HTML5, First HTML5 Example, W3C HTML5 Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, Internal Linking, meta Elements, New HTML5 Form input Types, input and datalist Elements and autocomplete Attribute, Page-Structure Elements
Cascading Style Sheets: Introduction, Inline Styles, Embedded Style Sheets, Conflicting Styles, Linking External Style Sheets, Positioning Elements, Backgrounds, Element, Box Model and Text Flow, Media Types and Media Queries, Drop-Down Menus, Text Shadows , Rounded Corners, Color, Box Shadows, Linear Gradients; Introducing Vendor Prefixes, Radial Gradients, Multiple Background Images, Image Borders, Animation; Selectors, Transitions and Transformations, Layouts.

UNIT II:
JavaScript: Introduction to Scripting, Control Statements, Functions, Arrays, Objects

UNIT III
XML : Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs) W3C XML Schema Documents, XML Vocabularies, Extensible Stylesheet Language and XSL Transformations, Document Object Model (DOM)
Ajax-Enabled Rich Internet Applications with XML and JSON: Introduction, Rich Internet Applications (RIAs) with Ajax, History of Ajax,"Raw" Ajax Example Using the XMLHttpRequest Object, Using XML and the DOM, Creating a Full-Scale Ajax-Enabled Application.

UNIT IV
PHP Introduction, Simple PHP Program, Converting Between Data Types, Arithmetic Operators, Initializing and Manipulating Arrays, String Comparisons, String Processing with Regular Expressions, Form Processing and Business Logic, Reading from a Database, Using Cookies, Dynamic Content.

UNIT V: Web Services I
Web Services and Service-Oriented Architecture, History of Web Services, What Is REST?, Review of HTTP Requests and Responses, HTTP as an API, A First RESTful Example, Why Use Servlets for RESTful Web Services? **RESTful Web Services:** The Service Side, The Client Side

UNIT VI: Web Services II
SOAP-Based Web Services, SOAP Handlers and Faults, Web Services Security, Web Services and Java Application Servers

TEXT BOOKS:
1. Internet & World Wide Web How to Program, 5/e Paul J. Deitel, Harvey M. Deitel, Abbey Deitel
2. Java Web Services: Up and Running, 2nd Edition, Martin Kalin, O'Reilly Media

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Web Programming, building internet applications, Chris Bates 3 edition, WILEY Dreamtech .
3. The complete Reference Java 7 Edition , Herbert Schildt., TMH.
4. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp –2008.
5. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition –2009
6. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009
7. Beginning Web Programming-Jon Duckett ,WROX.
8. Java Script,D.Flanagan,O'Reilly,SPD.
9. Building Web Services with Java, 2 Edition, S. Graham and others, Pearson Edn., 2008.
10. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
11. McGovern, et al., Java Web Services Architecture, Morgan Kaufmann Publishers,2005.

Syllabus for M.Tech I Year II Semester
Computer Science and Engineering
ADVANCED DATA MINING

Code: 4S214

L	T	P	C
3	1	-	3

Objectives:

- To develop the abilities of critical analysis to data mining systems and applications.
- To implement practical and theoretical understanding of the technologies for data mining
- To understand the strengths and limitations of various data mining models;

UNIT-I
Data mining Overview
Data mining tasks – mining frequent patterns, associations and correlations, classification and regression for predictive analysis, cluster analysis , outlier analysis.

UNIT-II :Advanced Pattern Mining
Advanced pattern mining in Multilevel, multidimensional space – mining multilevel associations, mining multidimensional Associations, mining quantitative association rules, mining rare patterns and negative patterns.

UNIT-III : Advance Classification
Classification by back propagation, support vector machines, classification using frequent patterns, other classification methods – genetic algorithms, roughest approach, fuzz>set approach;

UNIT-IV:Advance Clustering
Density - based methods –DBSCAN, OPTICS, DENCLUE; Grid-Based methods – STING, CLIQUE;
Exception – maximization algorithm; clustering High- Dimensional Data; Clustering Graph and Network Data.

UNIT-V:Web and Text Mining
Introduction, web mining, web content mining, web structure mining, web usage mining, Text mining – unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

UNIT-VI:Temporal and Spatial Data Mining
Introduction; Temporal Data Mining – Temporal Association Rules, Sequence Mining, GSP algorithm, SPADE, SPIRIT Episode Discovery, Time Series Analysis, Spatial Mining – Spatial Mining Tasks, Spatial Clustering. Data Mining Applications.

TEXT BOOKS:
1. Data Mining Concepts and Techniques, Jiawei Hang Micheline Kamber, Jian pei, Morgan Kaufmannn.
2. Introduction to Data Mining – Pang-Ning Tan, Vipin kumar, Michael Steinbach, Pearson.

REFERENCE BOOKS:
1. Data Mining Techniques – Arun K pujari, Universities Press.
2. Data Mining Principles & Applications – T.V Sveresh Kumar, B.Esware Reddy, Jagadish S Kalimani, Elsevier.

Syllabus for M.Tech I Year II Semester

Computer Science and Engineering

SOFTWARE ARCHITECTURE AND DESIGN PATTERN
(PROFESSIONAL ELECTIVE –III)

Code: 4S211

L	T	P	C
3	1	-	3

Course Objective:

The main purpose of the course is to understanding of the concept of software architecture and how this phase in the development between requirement specification and detailed design plays a central role for the success of a software system. The students will get knowledge of some well-known architecture patterns, and be able to design, construct and evaluate architectures for software systems. The Student understands what a design pattern is, how to describe the design patterns, how design pattern solve design problems, and student be able to identify appropriate patterns for design problems.

UNIT I

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture, Architectural styles and patterns.

UNIT II

Creating an Architecture

Quality Attributes, Moving from quality to Architecture, UNIT Operations, Achieving qualities, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture, shared information systems

UNIT III

Analyzing Software Architecture

Analyzing development qualities at the architectural level, SAAM, ATAM, CBAM, Architecture Reviews

Moving from Architecture to Systems

Software Product Lines, Building systems from off the shelf components, Reuse of Architectural assets within an organization.

UNIT IV

Patterns

what is pattern? Pattern categories, Pattern Description, Patterns and Software Architecture, Pattern Systems, Classification, Selection, Creational Patterns.

UNIT V

Design Patterns Catalogue, Structural Pattern, Behavioural Patterns, Pattern Community, Designing a document editor

Tools for Architectural design, Unicon, A4 - Exploiting style in architectural design, Architectural Interconnection.

UNIT VI

Case Studies:

Key word in Context, The World Wide Web - a case study in interoperability, Instrumentation software, cruise control, three vignettes in mixed styles, CORBA - a case study on Industry Standard computing infrastructure, Flight Simulation – a case study in architecture for integration, Celsius Tech – a case study in product line development.

TEXT BOOKS

1 Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, published by Pearson Edition

2. Design Patterns, by Erich Gamma, Pearson Education

*3.*Mary Shaw David Garlan, “Software Architectural Perspectives on an emerging discipline ", EEE, PHI 1996

Syllabus for M.Tech I Year II Semester

Computer Science and Engineering

IMAGE PROCESSING AND PATTERN RECOGNITION

(PROFESSIONAL ELECTIVE –III)

Code: 4SC16

L	T	P	C
3	1	-	3

Course Objectives

- Covers the basic theory and algorithms that are widely used in digital image processing
- Expose students to current technologies and issues that are specific to image processing systems
- Develop applications using image processing techniques
- Develop critical thinking about shortcomings of the state of the art in image processing
- Understand fundamental methods of pattern recognition related to Image Processing applications

UNIT I

The digitized image and its properties: Applications of image processing, image function, image representation, sampling, quantization, colour images, metrics and topological properties of digital images, histograms, image quality, noise image. Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform– Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms, DWT.

UNIT II

Image pre-processing: Pixel brightness transformation, position dependent brightness correction, grey scale transformation; geometric transformation, Histogram equalization ,local pre-processing- image smoothening, Sharpening filters – Homomorphic filtering, edge detectors, zero-crossing, scale in image processing, canny edge detection, parametric edge models, edges in multi spectral images, local pre-processing and adaptive neighbourhood pre processing; image restoration

UNIT III

Image Segmentation-Threshold detection methods, optimal thresholding, multispectral thresholding, thresholding in hierarchical data structures; edge based image segmentation- edge image thresholding, edge relaxation, border tracing, border detection.

UNIT IV

Mathematical Morphology—Basic morphological concepts, four morphological principles, binary dilation, erosion, Hit or miss transformation, opening and closing; thinning and skeleton algorithms; Morphological segmentation -particles segmentation and watersheds, particles segmentation.

UNIT V

Image textures-statistical texture description, methods based on spatial frequencies, co-occurrence matrices, edge frequency, and texture recognition method applications

Image representation and description-representation, boundary descriptors, regional descriptors

UNIT VI

Pattern recognition fundamentals: Basic concepts of pattern recognition, fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

TEXT BOOKS

1. Image Processing Analysis and Machine Vision by Millan sonka,Vaclav Hiavac,Roger Boyle,Vikas publishing House, Brooks/Cole.
2. Digital Image Processing Second Edition by Rafel C. Gonzalez Richard E. Woods. Pearson Education
3. Pattern Recognition principles by Julus T. Tou and Rafel C. Gonzalez, Addision –Wesley publishing company.
4. Pattern Recognition and Image Analysis by Earl Gose, Richard Johnsonbaugh, Prentice Hall of India private limited, 1999.
5. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.

Syllabus for M.Tech I Year II Semester

Computer Science and Engineering

MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

(PROFESSIONAL ELECTIVE –III)

Code: 4S217

L	T	P	C
3	1	-	3

Course Objectives:

- This course will cover several advanced topics in Artificial Intelligence.
- This is a course of studying common state-of-the-art algorithms for both data compression and error-correcting codes which use the same tools and techniques as machine learning.
- By the end of this course, students should possess a firm grounding in the existing techniques and component areas of Artificial Intelligence and be able to apply this knowledge to the development of Intelligent Systems or to the exploration of research problems.

Unit I

Introduction: Designing a learning system, perspectives and issues in machine learning, a concept learning task, concept learning as search, finding a maximally specific hypotheses, version spaces and the Candidate-Elimination algorithm

Unit II

Decision tree learning: Introduction, representation, appropriate problems for decision tree learning, the basic decision tree learning algorithms, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning

Unit III

Introduction to information theory, probability, entropy and inference, Data compression: The source coding theorem (without proof), limits of compressibility- Huffman coding, hash codes

Unit IV

Probabilities and inference: An example inference task: Clustering, exact inference by complete enumeration, maximum likelihood and clustering, Model comparison and Occam's razor, Monte Carlo methods, efficient Monte Carlo methods

Unit V

Neural networks: Introduction to neural networks, the single neuron as a classifier, capacity of a single neuron, learning as inference

Unit VI

Hopfield networks, boltzmann machines, supervised learning in multilayer networks

Text Books:

1. Machine Learning, Tom M. Mitchell, McGraw Hill, first edition, 1997.
2. Information Theory, Inference, and Learning Algorithms, David J.C. MacKay, first edition, 2005.

Reference Book:

1. Pattern Classification, Richard O. Duda, Peter E. Hart, David E Strok, second edition

Syllabus for M.Tech I Year II Semester
Computer Science and Engineering
WEB TECHNOLOGIES AND SERVICES LAB

Code: 4S273

L	T	P	C
-	-	4	2

Objectives:

1. Write syntactically correct HTTP messages and describe the semantics of common HTTP methods and header fields
2. Discuss differences between URIs, URNs, and URLs, and demonstrate a detailed understanding of http-scheme URLs, both relative and absolute
3. Describe the actions, including those related to the cache, performed by a browser in the process of visiting a Web address
4. Install a web server and perform basic administrative procedures, such as tuning communication parameters, denying access to certain domains, and interpreting an access log
5. Write a valid standards-conformant HTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms
6. Use CSS to implement a variety of presentation effects in HTML and XML documents, including explicit positioning of elements
7. Demonstrate techniques for improving the accessibility of an HTML document

LIST OF EXERCISES:

1) Create a simple webpage using HTML5.

2) Use frames to Include Images and Videos.

3) Add a Cascading Style sheet for designing the web page.

4) Design a dynamic web page with validation using JavaScript.

5) Design a catalogue in PHP with AJAX.

6) Simple application to demonstrate Web Service.

7) Design a simple online test web page in PHP.

Syllabus for M.Tech I Year II Semester
Computer Science and Engineering
TECHNICAL SEMINAR
(Independent Review Paper)

Code: 4P274

L	T	P	C
-	-	3	2

Max. Marks: 50

There shall be two seminar presentations during I year I semester and I year II Semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Departmental Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester the report must be in the form of the review paper with a format used by IEEE / ASME etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 10 marks
- Final Report : 10 marks
- Presentation : 30 marks

Syllabus for M.Tech II Year I Semester
Computer Science and Engineering
COMPREHENSIVE VIVA-VOCE

Code: 4P375

L	T	P	C
-	-	-	2

Max. Marks: 50

There shall be a Comprehensive Viva-Voce in II year I Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the M.Tech course of study. The Comprehensive Viva-Voce is valued for 50 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce. A candidate has to secure a minimum of 50% to be declared successful.

Syllabus for M.Tech II Year I Semester
Computer Science and Engineering
PROJECT SEMINAR - I

Code: 4P376

L	T	P	C
-	-	-	2

Max. Marks: 50

In II year I semester, a project seminar shall be conducted for 50 marks and for 2 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 20 marks and the end semester seminar evaluation shall carry 30 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 10 marks and the remaining marks shall be for presentation and discussion. A candidate shall secure a minimum of 50% to be declared successful.

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Syllabus for M.Tech II Year I Semester
Computer Science and Engineering
PROJECT WORK (PART I)
PROJECT STATUS REPORT

Code: 4P377

L	T	P	C
-	-	-	**18**

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the Project Review Committee.

A Project Review Committee (PRC) shall be constituted comprising of Heads of all the Departments which are offering the M.Tech programs and three other senior faculty members concerned with the M.Tech. Programme.

Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the previous semesters and after obtaining the approval of the PRC.

After satisfying attendance requirement, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the PRC for its approval. Only after obtaining the approval of PRC the student can initiate the Project work. This process is to be completed within four weeks of commencement of II year I semester.

The student shall submit a project report at the end of II year I semester, and the same shall be evaluated at the end of that semester by the PRC as Excellent/Good/Satisfactory/Unsatisfactory. In the case of unsatisfactory declaration, the student shall re-submit the Project report after carrying out the necessary modifications / additions in the Project work, within the specified time as suggested by the PRC.

Syllabus for M.Tech II Year II Semester
Computer Science and Engineering
PROJECT SEMINAR - II

Code: 4P478

L	T	P	C
-	-	-	2

Max. Marks: 50

A project seminar shall be conducted for 50 marks and for 2 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 20 marks and the end semester seminar evaluation shall carry 30 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 10 marks and the remaining marks shall be for presentation and discussion. A candidate shall secure a minimum of 50% to be declared successful.

Syllabus for M.Tech II Year II Semester
Computer Science and Engineering
PROJECT WORK AND DISSERTATION

Code: 4P479

L	T	P	C
-	-	-	**20**

A candidate is permitted to submit Project Dissertation only after successful completion of PG subjects (theory and practical), seminars, Comprehensive viva-voce, PG Project Part–I, and after the approval of PRC, not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Head of the Department and shall make an oral presentation before the PRC. Along with the draft thesis the candidate shall submit draft copy of a paper in standard format fit for publication in Journal / Conference, based on the project thesis, to the Head of the Department with due recommendation of the supervisor.

- Four copies of the Project Dissertation certified by the Supervisor and Head of the Department shall be submitted to the College.

- The dissertation shall be adjudicated by one examiner selected by the College. For this, Head of Department shall submit a panel of 3 examiners, who are eminent in that field, with the help of the PRC. The Chief Superintendent of the college in consultation with the college academic committee shall nominate the examiner.

- If the report of the examiner is not favourable, the candidate shall revise and resubmit the Dissertation, in the time frame as prescribed by PRC. If the report of the examiner is unfavourable again, the thesis shall be summarily rejected. The candidate can re-register only once for conduct of project and evaluation of Dissertation, and will go through the entire process as mentioned above. The total duration for the M.Tech program is limited to four years.

- If the report of the examiner is favourable, viva-voce examination shall be conducted by a Board consisting of the Head of the Department, Supervisor and the Examiner who adjudicated the Dissertation. The Board shall jointly report the student's performance in the project work as – (a) Excellent, or (b) Good, or (c) Satisfactory, or (d) Unsatisfactory, as the case may be. In case, the student fails in the viva-voce examination, or gets the Unsatisfactory grade, he can re-appear only once for the viva-voce examination, as per the recommendations of the Board. If he fails at the second viva-voce examination, the candidate can re-register only once for conduct of project and evaluation of Dissertation, and will go through the entire process as mentioned above. The total duration for the M.Tech program is limited to four years.