AR16

ACADEMIC REGULATIONS

COURSE STRUCTURE AND SYLLABI

FOR

M.TECH (AR-16)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Effective for the students admitted into first year from academic year 2016-2017 and onwards)

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION AFFILIATED TO JNTUK, KAKINADA)

Approved By AICTE, New Delhi, Accredited By NBA, AICTE & NAAC, UGC, New Delhi,
Listed Under 2(f) & 12(b), UGC, New Delhi, TEQIP Participated College.

K.KOTTURU, TEKKALI,- 532 201, SRIKAKULAM DIST., AP

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT (AUTONOMOUS)

Approved by AICTE, Accredited by NBA & NAAC, Recognised under 2(f)12(b) of UGC

Permanently Affiliated to JNTUK, Kakinada.

K.Kotturu, Tekkali, Srikakulam-532201, Andhra Pradesh

Vision of the Institute

To evolve into a premier engineering institute in the country by continuously enhancing the range of our competencies, expanding the gamut of our activities and extending the frontiers of our operations.

Mission of the Institute

Synergizing knowledge, technology and human resource, we impart the best quality education in Technology and Management. In the process, we make education more objective so that the efficiency for employability increases on a continued basis.

Vision of the Department

To become a pioneer in providing high quality education and research in the area of computer science and engineering.

Mission of the Department

- Enrich society and advance computer science and engineering by preparing graduates with the knowledge, ability, and skill to become innovators and leaders who are able to contribute to the aspirations of the country and society.
- Benefit humanity through research, creativity, problem solving, and application development.
- Share knowledge and expertise to benefit the country, the region, and beyond while inspiring people to engage in computing fields.

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Program Outcomes of PG in our Department (PO's)

- Strong foundation in core computer science and engineering, both theoretical and applied concepts.
- An ability to apply knowledge of computing, mathematics, science and engineering to real life problem solving.
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- An ability to design, implements, and evaluate a computer-based system, process, component, or program to meet desired needs.
- An ability to function effectively on teams to accomplish a common goal.
- Understanding the impact of computer science and engineering solutions in the societal and human context.
- Ability to explore research gaps, analyze and carry out research in the specialized/emerging areas .
- An ability to continuously update their knowledge on contemporary issues and present / express ideas in impressive and professional manner.
- Recognition of the need for and an ability to engage in continuing professional development through Life Long Learning.
- An ability to use current techniques, skills, and tools necessary for computing practice.
- An understanding of professional, ethical, legal, security and social issues and responsibilities.
- An ability to apply design and development principles of software and/or hardware systems of varying complexity.
- Ability to become entrepreneur based on societal needs.

Program Educational Objectives (PEO's)

- **PEO1:** Be employed as a practicing engineer in fields such as design, development, testing and research or undertake higher studies.
- **PEO2:** Engage in lifelong self-directed learning, a capacity that is vital for success in today's global and rapidly changing engineering environment.
- **PEO3:** Create new methods / processes to meet the society needs with their knowledge.
- **PEO4**: Conduct themselves as ethical and responsible professionals with good communication skills and demonstrate leadership skills.

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Academic Regulations for M.Tech

(Effective for the students admitted into first year from academic year 2016-2017 and onwards)

The M.Tech Degree of the Aditya Institute of Technology and Management (Autonomous), Tekkali shall be conferred on candidates who are admitted to the program and fulfill all the requirements for the award of the Degree.

1.0 ELIGIBILITY FOR ADMISSIONS

Admission to the above program shall be made subject to the eligibility, qualifications and specialization prescribed by the University from time to time. Admissions shall be made on the basis of merit rank obtained by the qualifying candidate in GATE / PGCET, subject to reservations prescribed by the Govt. of AP from time to time.

2.0 AWARD OF M. Tech DEGREE:

2.1 A student shall be declared eligible for award of the M.Tech degree, if he/she pursues a course of study and completes it successfully in not less than two academic years and not more than four academic years and registered for 80 credits and he/she musecur total 80 credits.

2.2 A student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the year of his/her admission, shall forfeit his/her seat in M.Tech course.

2.3 The minimum instruction for each semester 95 clear instruction days.

3.0 ATTENDANCE

3.1 A candidate shall be deemed to have eligibility to write End Semester examinations if he/she has put in a minimum of 75% of attendance in aggregate of all the subjects.

3.2 Condonation of shortage of attendance up to 10% (65% and above, and below 75%) may be given by the College academic committee.

3.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representations by the candidate with supporting evidence.

3.4 Shortage of attendance below 65% shall in NO case be condoned.

3.5 A candidate shall not be promoted to the next semester unless he/she fulfills the attendance requirements of the present semester.

3.6 A stipulated fee shall be payable towards condonation of shortage of attendance.

4.0 COURSE OF STUDY:

The following specializations are offered at present for the M.Tech course of study.

1	Digital Electronics and Communication Systems
2	VLSI System Design
3	Power Electronics and Drives
4	Computer Science and Engineering
5	Structural Engineering
6	Thermal Engineering

5.0 EVALUATION

The performance of the candidate in each semester shall be evaluated subject-wise, with a Maximum of 100 marks for theory and100 marks for Laboratory, on the basis of Internal Evaluation and End Semester Examination.

5.1 For the theory subjects 60 marks shall be awarded based on the performance in the End Semester Examination. Out of 40 internal marks **30** marks are assigned for subjective exam, **5** marks for assignments and **5** marks for seminars. The internal evaluation for **30** marks shall be made based on the **average** of the marks secured in the two Mid Term-Examinations conducted, one in the middle of the Semester and the other immediately after the completion of instruction. Each midterm examination shall be conducted of duration of 120 minutes and question paper shall contain **4** questions. The student should answer all **4** questions.

5.2 For practical subjects, 60 marks shall be awardees based on the performance in the End Semester Examinations. Out of 40 internal marks 20 marks are assigned based on day to day evaluation and 20 marks are assigned based on the internal test.

5.3 There shall be a technical seminar presentation during 3rd semester. For technical 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. The Departmental Committee consists of Head of the Department, supervisor and two other senior faculty members of the department. For technical seminar there will be only internal evaluation of 100 marks. A candidate has to secure a minimum of 50% to be declared successful.

5.4 A candidate shall be deemed to have secured the academic requirement in a subjectif he/she secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal

Evaluation taken together.

5.5 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 5.4) he has to reappear for the supplementary Examination in that subject.

5.6 The viva-voce examination shall be conducted at the end of the course work after pass in all subjects.

5.7 Laboratory examination for M.Tech courses must be conducted with two Examiners, one of them being Laboratory Class Teacher and second examiner shall be external examiner.

6.0 EVALUATION OF PROJECT/DISSERTATION WORK:

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

6.1 A Project Review Committee (PRC) shall be constituted with Principal as chair person, Head of the department and two other senior faculty members of the concerned department (one will be the guide).

6.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects(theory and practical subjects).

6.3 After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work (Based on a publication in a Peer Reviewed Journal) to the Project Review Committee for its approval before the second semester end examinations. After obtaining the approval of the Committee the student can initiate the Project work after the second semester end examinations.

6.4 Every candidate shall work on projects approved by the PRC of the college.

6.5 If a candidate wishes to change his supervisor or topic of the project he can do so with approval of the PRC. However, the Project Review Committee (PRC) shall examine whether the change of topic/supervisor leads to a major change of his initial plans of project proposal. If so, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

6.6 A candidate shall submit status report in two stages at least with a gap of 3 months between them.

6.7 The work on the project shall be initiated in the beginning of the second year/III semester and the duration of the project is for two semesters. The candidate shall identify the problem, Literature survey, design/modeling part of the problem i.e. almost 35% of his dissertation/project work should complete in the III semester itself and it will be evaluated by PRC. If the candidate fails to get the satisfactory report, he has to re-register for the project/dissertation work.

6.8 A candidate shall be allowed to submit the project report only after fulfilling the attendance requirements of all the semesters with approval of PRC and 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 Principal (through Head of the Department) and shall make an oral presentation before the PRC.

6.9 The Candidate may be permitted to submit the Project Report If only the work is Published/Accepted to be Published in a Journal / International conference of repute and relevance.

6.10 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/ School/ Institute.

6.11 The thesis shall be adjudicated by external examiner from outside the college.

6.12 The viva-voce examination shall be conducted by a board consisting of the supervisor, Head of the Department and the examiner outside the college who adjudicated the Thesis.

6.13 The student has to clear all the subjects of M.Tech course before submission of the project thesis/ dissertation

The Board shall jointly report candidates work as :

A. Excellent
B. Good
C. Satisfactory
D. Unsatisfactory

Head of the Department shall coordinate and make arrangements for the conduct of viva-voce examination. If the report of the viva-voce is unsatisfactory, the candidate will retake the viva-voce examination after three months. If he fails to get a satisfactory report at the second viva-voce examination, the candidate may be asked to submit a new project proposal to PRC starting with 6.5

7. Method of Awarding Letter Grades and Grade Points for a Course

A letter grade and grade points will be awarded to a student in each course based on his/her performance as per the grading system given below.

Table: Grading System for M.Tech. Programme

Percentage	Grade Points	Letter Grade
95-100%	10	O
85-<95%	9	A+
75-<85%	8	A
65-<75%	7	B_+
55-<65%	6	B
50-<55%	5	P
< 50%	0	F (Fail)

7.1 Calculation of Semester Grade Points Average (SGPA)* for semester

The performance of each student at the end of the each semester is indicated in terms of SGPA. The SGPA is calculated as below:

$$\text{SGPA} = \frac{\Sigma(CR \times GP)}{\Sigma CR} \quad \text{(for all courses passed in semester)}$$

Where CR = Credits of a Course

GP = Grade points awarded for a course

*SGPA is calculated for the candidates who passed all the courses in that semester.

7.2 Calculation of Cumulative Grade Points Average (CGPA*) and Award of Division for Entire Programme.

The CGPA is calculated as below:

$$\text{CGPA} = \frac{\Sigma(\text{CR} \times \text{GP})}{\Sigma\text{CR}} \quad \text{(for entire programme)}$$

Where CR = Credits of a course

GP = Grade points awarded for a course

*CGPA is calculated for the candidates who passed all the courses till that semester.

Table: Award of Divisions

CGPA	DIVISION
≥ 7.5	First Class with distinction
≥ 6.5 and < 7.5	First Class
≥ 5.5 and 6.5	Second Class
≥ 5.0 and <5.5	Pass Class
< 5.0	Fail

After a student has satisfied the requirements prescribed for the completion of the programme and is eligible for receiving the award of M.Tech. Degree, he shall be placed in one of the above divisions.

8.0 WITH-HOLDING OF RESULTS:

If the candidate has not paid any dues to the college or if any case of indiscipline is pending against him / her, the result of the candidate will be withheld and he/she will not be allowed into the next higher semester. The issue of the degree is liable to be with held in such cases.

9.0 TRASITORY REGULATIONS:

Candidate who have discontinued or have been detained for want of attendance or who have failed after having undergone the course are eligible for admission to the same or equivalent subjects as and when subjects are offered, subject to 5.5 and 2.0

10.0 GENERAL:

10.1 The academic regulations should be read as a whole for purpose of any Interpretation.

10.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

10.3 The Institute may change or amend the academic regulations and syllabus at any time and the changes and amendments made shall be applicable to all the students with effect from the date notified by the college.

10.4 Wherever the word he, him or his occur, it will also include she, her and hers.

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

M.TECH COURSE STRUCTURE (AR-16 REGULATIONS)

I YEAR I SEMESTER

S.No.	CODE	COURSE	L	P	Credits
1	16MCS1001	Data Structures and Algorithms	4	-	4
2	16MCS1002	Database Management Systems	4	-	4
3	16MCS1003	Computer Networks	4	-	4
4	16MCS1004	Operating Systems	4	-	4
5	16MCS1005	Object Oriented Programming	4	-	4
6		**Elective – I**	4	-	4
	16MCS1006	Advanced Computer Architecture			
	16MCS1007	Compiler Design			
	16MCS1008	Artificial Intelligence			
	16MCS1009	Bio-Informatics			
7	16MCS1101	Systems Lab	-	4	2
		Total	**24**	**4**	**26**

I YEAR II SEMESTER

S.No.	CODE	COURSE	L	P	Credits
1	16MCS1010	Data Mining and Knowledge Discovery	4	-	4
2	16MCS1011	Software Engineering	4	-	4
3	16MCS1012	Object Oriented Analysis & Design	4	-	4
4	16MCS1013	Web Technologies	4	-	4
5		**Elective – II**	4	-	4
	16MCS1014	Mobile Computing			
	16MCS1015	Cryptography & Network Security			
	16MCS1016	Machine Learning			
	16MCS1017	Cloud Computing			
6		**Elective – III**	4	-	4
	16MCS1018	Soft Computing			
	16MCS1019	Simulation & Modeling			
	16MCS1020	Parallel Computing & Algorithms			
	16MCS1021	Digital Image Processing			
7	16MCS1102	Object Oriented Analysis & Design Lab	-	4	2
8	16MCS1103	Web Technologies Lab	-	4	2
		Total	**24**	**8**	**28**

II YEAR I SEMESTER

S.No.	CODE	COURSE	L	P	Credits
1	16MCS2201	Technical Seminar	-	-	2
2	16MCS2202	Project Work Phase-1	-	-	10
		Total	**-**	**-**	**12**

II YEAR II SEMESTER

S.No.	CODE	COURSE	L	P	Credits
1	16MCS2203	Project Work Phase-2	-	-	14
		Total	-	-	**14**

L-Lecture hours/Week; P-Practical Hours/Week; C-Credits;

DATA STRUCTURES AND ALGORITHMS

Credits:4 **External Marks: 60**
CourseCode:16MCS1001 **Internal Marks: 40**
I Year I Semester

COURSE OBJECTIVES:

The objective of this course is to make the student:

- Understand the properties of various data structures.
- Implement the main data structures: Lists, stacks, queues, trees, graphs and hash tables; and use them to solve computational problems.
- Analyze and use the main search, sorting and traversal algorithms in data structures.
- Design and implement data structures to efficiently solve problems.
- Practice methods of data structures and algorithm design.

COURSE OUTCOMES:
Upon completion of the COURSE, students will be able to:

- Analyse the efficiency of the designed algorithms, and apply abstractions.
- Identify the strengths and weaknesses of different search and sorting algorithms;
- Design and employ appropriate data structures and algorithms for implementing dictionaries;
- Develop algorithms for non-linear data structures.
- Analyze and Design algorithms using Greedy and Divide and Conquer strategies to solve problems.
- Solving searching problems by designing efficient algorithms using Dynamic Programming, Branch and Bound Method and Back tracking strategies;

Unit I:

Introduction to data structures, Algorithm Analysis – performance analysis – time complexity and space complexity. Singly linked lists, doubly linked lists, circular list – Algorithms.
Stacks and queues: algorithms implementation using linked list. The list ADT, Stack ADT, Queue ADT.

Unit II:

Searching – Linear and binary search methods
Internal Sorting: Shell Sort, Heap Sort, Merge Sort, Quick Sort, Radix Sort.
External Sorting: Multi-way Merge, Poly-phase Merge.
Sorting Methods: Order Statistics: Lower Bound on Complexity for Sorting Methods: Lower Bound on Worst Case Complexity, Lower Bound on Average Case Complexity, Heap Sort, Quick Sort, Radix Sorting, Merge Sort.

Unit III:

Dictionaries: Sets, Dictionaries.
Hashing: Hash Function, Separate Chaining, Open Addressing, Rehashing. Analysis of Closed Hashing Result (Unsuccessful Search, Insertion, Successful Search, Deletion). Skip Lists, Analysis of Skip Lists.

Unit IV:
Trees – Binary trees, properties, representation and traversals, expression tree.
Search Trees: Binary Search Trees. AVL Trees: Insertions and Deletions, B- Trees
Graphs – basic concepts, Operations, storage structures and traversals.
Graph Algorithms: Minimum-Cost Spanning Trees – Prim's Algorithm, Kruskal's Algorithm.
Shortest Path Algorithms: Dijkstra's Algorithm.
All Pairs Shortest Paths Problem: Floyd's Algorithm, Warshall's Algorithm.

Unit V:
Algorithms Design Techniques: **Divide and Conquer Technique:** General Method,Strassen's Matrix Multiplication. **Greedy Method**: General Method, Knapsack Problem, Jobsequencing with deadlines, Minimum cost spanning trees-Kruskal's algorithm, Single sourceshortest paths- Dijkstras Algorithm.

Unit VI:

Dynamic Programming Method - General method, All pairs shortest path problem, OptimalBinary Search Trees, 0/1 Knapsack problem, Traveling salesman problem,
Back trackingMethod - General Method, 8-Queens Problem, Sum of subsets, Graph coloring, Hamiltoniancycle,
Branch and Bound Method - General Method, 0/1 Knapsack problem, Travelingsalesperson.

Text Books :
1. Richard F Gilberg, Behrouz A Forouzan, Data Structures, A Pseudo CODE Approach, Cengage.
2. Horowitz , Sahani, Anderson-freed, Fundamentals of DATA STRUCTURES in C: 2nded, , Universities Press.
3. Mark Allen Weiss, Data structures and Algorithm Analysis in C, 2nd edition, Pearson
4. Mark Allen Weiss: "Data Structures and Algorithm Analysis in C", 2nd edition, Addison Wesley.
5. Ellis Horowitz, SartajSahni, S. Rajasekaran "Fundamentals of Computer Algorithms", Second editon, University Press.

Reference Books:
1.Michel J Folk, Greg Riccardi, Bill Zoellick, File Structures :An Object oriented approach with C++, 3rd ed.
2. NB Venkateswarlu& EV Prasad, 2010,C and Data Structures: A Snap Shot oriented Treatise with Live examples from Science and Engineering,S Chand.
3. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, 2001, "Introduction to Algorithms", PHI Pvt. Ltd.
4. AnanyLevitin, 2003"Introduction to the Design and Analysis of Algorithm", Pearson Education Asia.

M.Tech(Computer Science &Engineering)

DATABASE MANAGEMENT SYSTEMS

Credits : 4 **External Marks : 60**
CourseCode: 16MCS1002 **Internal Marks : 40**
I Year I Semester

COURSE OBJECTIVES:

- To introduce basic RDBMS Concepts,SQL, Database Design and Query processing. And also to introduce Transaction processing, issues and techniques relating to concurrency and recovery in multi-user Database Environments, Security and various Data Structures for External data storage and efficient retrieval

COURSE OUTCOMES:

Students will be able to:

- Differentiate Database Systems from File Systems and Define the Terminology, Features, Classifications, Characteristics embodied in Database Systems.
- Interpret, Design and Implement an E-R Model.
- Create /Modify the Structure and write optimized SQLQueries to extract and modify Information from Tables or Views.
- Apply proper Techniques such as Normalization and analyze the applicability of a Specific Normal form in designing a Database.
- Compare various Indexing, Hashing and File Organization Techniques.
- Explain broad range of Database Management issues including Data integrity, Concurrency And Recovery, security

UNIT I :

Database System Applications;Database Systems versus file Systems; View of Data : Data Abstraction, Instances and Schemas ;Data Models :The ER Model ,Relational Model, Other Data Models ;Database Languages: DDL , DML ,Database Access from Application Programs; Data base Users and Administrators; Transaction Management ;Database System Structure: Storage Manager, the Query Processor.(Korth)

UNIT II :

Database Design and ER diagrams :Beyond ER Design;Entities,Attributes and Entity sets; Relationships and Relationship sets; Additional features of ER Model ;Conceptual Design with the ER Model ;Introduction to the Relational Model; Integrity Constraint Over relations ; Enforcing Integrity constraints; Querying relational data ; Logical database Design :ER to Relational. Introduction to Views:Destroying/Altering tables and Views.(Ramakrishnan)

UNIT III:

SQL: Queries,Constraints,Triggers:Over view ;The Form of a Basic SQL Query ; Nested Queries:Introduction to Nested Queries, Correlated Nested Queries, Set-Comparison Operators;

Aggregative Operators ; NULL values : Comparison using Null values; Logical connectives AND, OR, and NOT, Impact on SQL Constructs, Outer Joins ,Disallowing NULL values; Complex Integrity Constraints in SQL; Triggers and Active Data bases.(Ramakrishnan)

UNIT IV:

Schema refinement and Normal forms: Problems Caused by Redundancy, Decompositions, Problem related to Decomposition; Functional Dependencies; Reasoning about FDS ; FIRST, SECOND, THIRD Normal Forms ,BCNF,Multivalued Dependencies ,Fourth Normal form, Join Dependencies ,Fifth Normal Form; Properties of Decompositions: Lossless join Decomposition, Dependency Preserving Decomposition ; Schema refinement in Database Design.(Ramakrishnan)

UNIT V:

Transaction Concept; Transaction State; Implementation of Atomicity and Durability; Concurrent Executions ;Serializability; Recoverability; Lock –Based Protocols :Locks, Granting of locks,2PL,implementation of locking ; Timestamp Based Protocols. Validation based Protocols, Multiple Granularity .Recovery System :Failure classification; Log – Based Recovery;Shadow Paging; Recovery with Concurrent Transactions ; Buffer Management; Failure with loss of nonvolatile storage;(Korth)

UNIT VI:

Data on External Storage; File Organization and Indexing: Cluster Indexes, Primary and Secondary Indexes; Index Data Structures: Hash Based Indexing, Tree based Indexing; Comparison of File Organizations ;B+ Trees :A Dynamic Index Structure; Introduction to Database Security, Access Control, Discretionary Access Control, Mandatory Access Control, (Ramakrishnan)

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, Database Management Systems 3/e ,TATA McGrawHill.
2. Silberschatz, Korth,Database System Concepts,5/e McGraw hill.

REFERENCES BOOKS:

1. https://www.coursera.org/course/db
2. Peter Rob & Carlos Coronel, Data base Systems design, Implementation, and Management, 7th Edition.
3. ElmasriNavrate, Fundamentals of Database Systems, Pearson Education
4. C.J.Date,Introduction to Database Systems,Pearson Education

M.Tech(Computer Science & Engineering)

COMPUTER NETWORKS

Credits:4 **External Marks: 60**
CourseCode: 16MCS1003 **Internal Marks: 40**
I Year I Semester

COURSE OBJECTIVES:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

COURSE OUTCOMES:

Upon completion of the Course, students will be able to:

- Understand the hierarchical, layered structure of typical network architecture.
- Describe the node-to-node data transfer and list the multiple access protocols.
- Explain end-to-end routing of packets and splits long messages into smaller units
- Express the enhancements made to IPv4 by IPV6.
- Explain end-to-end data transfer and integrity across the network and techniques to improve QoS
- Outline the features and operations of the various end user application programs.

UNIT I:

Introduction:Data Communications: components, data representation, data flow; **Networks**: distributed processing, network criteria, physical structures, network models, categories of network, interconnection of networks; **The Internet:** A brief history**,** The internet today; **Protocols & Standards:** Protocols, Standards, Standards organizations, Internet standards;**Layered Tasks:** sender, receiver, and carrier, Hierarchy;**The OSI model:** Layered architecture, peer to peer processes, encapsulation; **Layers in OSI model**: Physical layer, Data link layer, Network layer, Transport layer, Session layer, Presentation layer, Application layer; **TCP/IP protocol suite**: Physical and Data link layers, Network layer, Transport layer, Application layer, **Addressing**: Physical address, Logical address, Port address, Specific address.**(Text Book-1)**

UNIT II:

Data Link Layer: **Design Issues:** Services Provided to the Network Layer, Framing, Error Control and Flow Control;**Error Detection and Correction:** Error Correcting CODEs, Error Detecting CODEs;**Elementary Data Link Protocols:** An Unrestricted Simplex Protocol, A Simplex Stop-and-Wait Protocol, A Simplex Protocol for a Noisy Channel; **Sliding Window Protocols:** A one- bit sliding window protocol, A Protocol Using Go Backn, A Protocol Using Selective Repeat;

The Medium Access Sublayer: Multiple Access Protocols: ALOHA, Carrier Sense Multiple Access Protocols, Collision-Free Protocols, Limited–contention Protocols,**Bridges**: Transparent Bridges, Source Routing Bridges, Remote Bridges.**(Text Book-2)**

UNIT III:

Network Layer:Design issues: Store and forward packet switching, Services providedto the transport layer, Implementation of connectionless service, Implementation of connection oriented service andComparison of virtual circuit anddatagram subnets.

Routing algorithm: Shortest path routing algorithm, flooding, distance vector routing, link state routing, hierarchical routing, broadcast routing, multicast routing, routing for mobile hosts, routing in ad-hoc networks.**(Text Book-2)**

UNIT IV:

IPV4 Address: Address space, Notations, ClassfulAddressing, Classless Addressing, Network Address Translation(NAT).**IPV6 addresses:**Structure,Address Space;**Internetworking:**Need for network layer, Internetasadatagram network, internet as a connectionless network; **IPV4**:Datagram, Fragmentation, Checksum, Options; **IPV6**:Advantages, Packet format, Extensionheaders, Translation from IPV4 to IPV6.**(Text Book-1)**

UNIT V:

Process to Process delivery: Client/Server paradigm, Multiplexing and De-multiplexing, connectionless versus connection-oriented services, Reliable versus unreliable; **UDP:**Well known ports for UDP, User datagram, checksum, UDP operation, Uses of UDP; **TCP:** TCP services, TCP features, segment, A TCP connection, Flow control, Error control, Congestion control; **SCTP:** SCTP services, SCTP features, Packet format, An SCTP Association, Flow control, Error control.

Congestion control: Open-loop congestion control, Closed-loop congestion control, Congestion control in TCP, Congestion control in frame relay; **Quality of Service:** flow characteristics, flow classes; **Techniques to improve QoS:**Scheduling, Traffic shaping, Resource reservation, Admission control.**(Text Book-1)**

UNIT VI:

Domain Name System: the name space, resource records, name servers;**E-mail:**Architecture andservices, The user agent, Message formats, Message transfer, Final delivery; **WWW:**Architecture overview, Static web documents, Dynamic web documents, Hypertext transfer protocol, Performanceelements, The wireless web; **Multimedia:**Introduction to audio, Audio compression, Streaming audio, Internet radio, Voice over IP, Introduction to video, Video compression, Video ondemand, The MBone-the multicast backbone.**(Text Book-2)**

TEXTBOOKS:

1. Behrouz A Fourzan,Data Communications and Networking, 4th Edition, TMH.
2. Andrew S Tannenbaum, Computer Networks, 4th Edition, Perarson.

REFERENCE BOOKS:

1. Mayank Dave ,Computer Networks, Cengage Learning.
2. Larry L Peterson and Bruce S Davie, Elsevier, Computer networks: A systems approach, 5th Edition, Elsevier,
3. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/Ne_index1.html
4. http://nptel.iitm.ac.in/video.php?subjectId=106105081
5. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php

M.Tech (Computer Science & Engineering)

OPERATING SYSTEMS

Credits : 4 **External Marks : 60**
CourseCode: 16MCS1004 **Internal Marks: 40**
I Year I Semester

COURSE OBJECTIVES:

- To familiarize students with the UNIX environment
- Learn the fundamentals of shell scripting/programming
- Know memory management including virtual memory
- Summarize the full range of considerations in the design of file systems
- Understand inter-process communication tools.

COURSE OUTCOMES:

- List the Basic Unix commands
- Familiar with Write shell scripts to automate various tasks
- Explain Unix process structure and related system calls.
- Describe different memory management techniques and signals
- Discuss file system design tradeoffs
- Familiarity with Interprocess Communication using pipes, shared memory, semaphores and message Queues.

UNIT I:

Unix Utilities: Introduction to Unix file system, VI editor, file handling utilities, security by file permissions, process utilities, disk utilities, Networking commands, cp, mv, in, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, umask, ulimit, ps, who, w, finger, telnet, rlogin. Text processing utilities and backup utilities detailed commands to be covered are: cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, pate, join, tee, more, pg, comm,cmp,diff, tr, awk, tar, cpio.

UNIT II:

Shell Programming: What is a shell, shell responsibilities, pipes and input redirection, Output redirection and here documents, the shell as programming Language shell variables, control structures and shell programming.

UNIT III:

Unix Process: Process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, fork, vfork, exit, wait, exec, system functions, user identification.

UNIT IV:

Memory Management: contiguous memory allocation, paging, Segmentation, Demand paging, Performance of demand paging, Page Replacement, Page Replacement algorithm, Allocation of frames, Thrashing

Signals:-Signal functions, reliable signals, Un reliable signals, kill, raise, alarm, pause abort, system, sleep functions.

UNIT-V:File System Interface and Implementation: the concept of a file, Access Methods, Directory structure, file sharing, protection,File system structure, file system implementation, directory implementation, allocation methods, free-space management

UNIT-VI:Inter-process Communication:-Pipe, process pipes, the pipe call, parent-child process, named pipes: FIFOs, Semaphores, message queues and shared memory applications of IPC.

TEXT BOOKS:

1. Abraham Silberschatz, Galvin, John Wiley & Sons , Operating Systems Concepts, 5/e, Inc.

2. W. Richard Stevens Advanced Programming in Unix Environment, AWL / PHI.

3.W. Richard Stevens ,Unix Network Programming, PHI .

REFERENCE BOOKS:

1. William Stallings, Operating Systems, 6/e, PHI/Pearson

2. Dhamdhere, Operating Systems, 2/e, TMH

3.N.B. Venkateswarlu, Advanced Unix Programming, BS Publications

M.Tech (Computer Science & Engineering)

OBJECT ORIENTED PROGRAMMING

Credits :4 **External Marks : 60**
CourseCode:16MCS1005 **Internal Marks: 40**
I Year I Semester

COURSE OBJECTIVES

- Be able to explain the difference between object oriented programming and procedural programming
- Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm
- Cover issues related to the definition, creation and usage of classes, objects and methods.
- Discuss the principles of inheritance and polymorphism and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces.

COURSE OUTCOMES

- Illustrate the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, and encapsulation.
- Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Design and develop programs using packages and interfaces.
- Develop the mechanism of exceptional handling and multithread
- Implements the concept of event handling and GUI interface using Java swings.

UNIT I :

Classes and Objects Concepts of classes and objects, class fundamentals Declaring objects, assigning object reference variables, introducing methods, constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing - call by value, recursion, nested classes and inner classes, exploring the String class.

UNIT II :

Inheritance Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class. Packages and Interfaces Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT III :

Exception Handling and Multithreading Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle, creating multiple

threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.

UNIT IV :

Event Handling Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. AWT : Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics.

UNIT V :

Applets and Swings:Applets-Concepts of Applets,difference b/w applets ans applications, life cycle of an applet, types of applets, creating and passing parameters to applets.Swings- Introduction, limitations of AWT, MVC Architecture, Components,Containers, swing components-JApplet, JFrame, JComponent, Icons, Labels, textfields, buttons-Jbutton calls, checkboxes, radio buttons, combo boxes, Tabbed Panes, Scroll Panes, Trees and Tables.

UNIT VI :

Networking and Java Library Basics of Networking, Inetaddress, TCP/IP sockets, Datagrams, URL, URL connection, String handling, java.util, java.io and java.net packages.

TEXT BOOKS:

1.Herbert Schildt, The Complete Reference Java J2SE 5th Edition, TMH Publishing Company Ltd, NewDelhi.
2. Cay Horstmann, John Wiley and Sons, Big Java 2nd Edition.

REFERENCE BOOKS:

1.H.M.Dietel and P.J.Dietel, Java How to Program, Sixth Edition, Pearson Education/PHI
2. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 1, Fundamentals, Seventh Edition, Pearson Education.
3. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 2, Advanced Features, Seventh Edition, Pearson Education.
4. Iver Horton, Beginning in Java 2, Wrox Publications.
5. Somasundaram, Java, Jaico.

M.Tech (Computer Science & Engineering)
ADVANCED COMPUTER ARCHITECTURE
(ELECTIVE - I)

Credits:4 **External Marks:60**
CourseCode: 16MCS1006 **Internal Marks:40**
I Year I Semester

COURSE OBJECTIVES

This course helps:

- To get the knowledge on system performance dependence attributes and calculation of system throughput.
- To learn memory hierarchy concepts and how to improve the performance of cache memory.
- Understand how the coherence, inclusion and locality properties are satisfied in memory hierarchy.
- Understand the linear and nonlinear scheduling processes in pipelining.
- Distinguish the design of Shared Memory MIMD and Distributed Memory MIMD machines
- Understand the message passing system to avoiding the inconsistency in multiprocessors.

COURSE OUTCOMES

Upon the completion of the course the students will be able to:

- Infer knowledge on Hardware and System Design concepts.
- Learn about memory hierarchy and performance of cache memory.
- Design E-cube routing in Hypercube computers and X-Y routing in 2-D mesh.
- Justify identify permissible latencies and forbidden latencies for the given non-linear pipeline.
- Distinguish between RISC and CISC architectures.
- Design the input-output connections in an Omega Network using perfect shuffle method.

UNIT – I

Parallel Computer: State of computing, Elements of modern computer, Flynn's classification of parallel processors, System attributes to performance, Multiprocessors and Multicomputer, Shared memory multiprocessors, Distributed memory multiprocessors.

UNIT – II

Memory Hierarchy Design: Basic memory hierarchy, Optimization of cache performance, Small and simple first level cache to reduce hit time and power, Way prediction to reduce hit time, Pipelined cache access to increase cache band width, Non-blocking cache to increase cache band width.

UNIT – III

Design Space of Processors, Instruction set architectures, Characteristics of typical CISC and RISC architecture, Hierarchical memory technology, Inclusion, Coherence and locality.

UNIT – IV

Linear Pipeline Processors: Asynchronous and synchronous models, Clocking and timing control, Speedup, Efficiency and Throughput.
Non-Linear Pipeline Processors: Reservation and latency analysis problems, Collision free scheduling problems.

UNIT – V

Multiprocessors and Multivector Computers: Inter connection structure-Crossbar switch and multiport memory, Multistage and combining network routing.
Multivector computers: Vector processing principles, Vector instruction types, Vector access memory schemes.

UNIT – VI

Cache coherence and Message Passing Mechanisms: Cache coherence problems-Two protocol approach, Snoopy protocol, Directory based protocol.
Message Passing Mechanisms-Message routing schemes, Flow control strategies, Multicast routing algorithm.

TEXT BOOKS:

1. Kai Hwang and NareshJotwani"Advanced Computer Architecture-parallelism, Scalability, Programmability"
2. John L. Hennessy & David A. Patterson Morgan Kufmann"Computer Architecture A quantitative approach"
.

REFERENCE BOOKS :

1.Kai Hwang and A.Briggs,"Computer Architecture and parallel Processing" International Edition McGraw-Hill.
2.Garrit A Blaauw"Computer Architecture, Concepts and Evolutions", PEA.

M.Tech (Computer Science & Engineering)
COMPILER DESIGN
(Elective - I)

Credits :4 **External Marks : 60**
CourseCode: 16MCS1007 **Internal Marks: 40**
Semester: I Year I Semester

COURSE OBJECTIVES:

After completing this course, the student should be able to:

- Introducing students to the concepts and principles of compiler design.
- Providing students with basic understanding of grammars and language definition.
- Introducing students to the various phases of designing a compiler and CODE optimization techniques, machine CODE generation
- Introducing students to the various programming techniques and structures used in compiler construction.
- Providing students with practical programming skills necessary for constructing a compiler.

COURSE OUTCOMES:

After completing this course, the student should be able:

- To use the knowledge of patterns, tokens & regular expressions for solving a problem.
- To apply the knowledge of lex tool &yacc tool to devleop a scanner & parser.
- To develop program to solve complex problems in compiler
- To write the new CODE optimization techniques to improve the performance of a program in terms of speed & space.
- To employ the knowledge of modern compiler & its features.
- To experiment the new tools and technologies used for designing a compiler

UNIT I:

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, LEX lexical analyzer generator.

UNIT II

Top down Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing.

UNIT III

Bottom up parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, handling ambiguous grammar, YACC – automatic parser generator.

UNIT IV

Semantic analysis: Intermediate forms of source Programs – abstract syntax tree, polish notation and three address CODEs. Attributed grammars, Syntax directed translation, Type checker.
Symbol Tables: Symbol table format, organization for block structures languages. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

UNIT V

CODE optimization: Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, DAG representation.
Data flow analysis: Flow graph, global optimization, redundant sub expression elimination, Induction variable elements, live variable analysis, Copy propagation.

UNIT VI

CODE generation: Object CODE forms, machine dependent CODE optimization, register allocation and assignment generic CODE generation algorithms, DAG for register allocation.

TEXT BOOKS:

1. Principles of compiler design -A.V. Aho. J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

REFERENCE BOOKS:

1. Lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Dick Grune, Henry E. Bal, Cariel T. H. Jacobs,Wileydreamtech ,Modern Compiler Design.
3. Cooper & Linda, Elsevier ,Engineering a Compiler.
4. Louden, Thomson, Compiler Construction.

M.Tech (Computer Science & Engineering)
ARTIFICAL INTELLIGENCE
(Elective - I)

Credits: 4 **External Marks: 60**
CourseCode: 16MCS1008 **Internal Marks: 40**
I Year I Semester

COURSE OBJECTIVES:

- To learn the difference between optimal reasoning Vs human like reasoning.
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

COURSE OUTCOMES:

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

UNIT I

Introduction: AI problems, foundation of AI and history of AI intelligent agents:

Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT II

Searching:Searching for solutions, uniformed search strategies–Breadth first search, depth first search, Depth limited search, Iterative deepening depth first search bi-direction search-comparison. Search with partial information (Heuristic search) Greedy best first search, A*search, Memory bounded heuristic search, Heuristic functions.

UNIT III

Local search Algorithms, Hill climbing, simulated, annealing search, local beam search, genetical algorithms. Constrain satisfaction problems: Backtracking search for CSPs local search for constraint satisfaction problems. Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, and cutting of search.

UNIT IV

Knowledge Representation & Reasons logical Agents, Knowledge–Based Agents, the Wumpus

world, logic, propositional logic, Resolution patterns in propos ional logic, Resolution, Forward & Backward, Chaining.First order logic. Inference in first order logic, propositional Vs first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT V

Planning–Classical planning problem, Language of planning problems,Expressiveness and extension, planning with state –space search, forward states spare search,backward states space search, Heuristics for stats space search, Planning search, planning with state space search, partial order planning Graphs.

UNIT VI

Learning –Forms of learning, Induction learning, Learning Decision Tree, Statistical learning methods, learning with complex data, learning with Hidden variables –The EM Algorithm, Instance Based learning, Neural Networks.

TEXT BOOKS:

1. Artificial Intelligence –A Modern Approach. Second Edition, Stuart Russel,PeterNorvig, PH I/Pearson Education.
2. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

REFERENCE BOOKS:

1. Artificial Intelligence, 2nd Edition, E.Rich and K.Knight (TMH).
2. Artificial Intelligence and Expert Systems–Patterson PHI
3. Expert Systems: Principles and Programming-Fourth Edn, Giarrantana/ Riley, Thomson
4. PROLOG Programming for Artificial Intelligence. Ivan Bratka-Third Edition–Pearson Education.

M.Tech (Computer Science & Engineering)
BIO-INFORMATICS
(Elective- I)

Credits : 4 **External Marks : 60**
CourseCode:16MCS1009 **Internal Marks : 40**
I Year I Semester

COURSE OBJECTIVES:

The objective of the program in Bioinformatics is to prepare students for careers in academia and industry, and in particular to deepen their knowledge in both the biosciences and computational sciences to apply this knowledge to manage and analyze data in the life sciences and to train them in research.
In this course, we aim to cover the following:
1. The concepts of computer science that relate to problems in biological sciences.
2. Commercial and academic perspectives on bioinformatics.
3. The impact of bioinformatics on the methodologies used in biological science.
4. The influence biological science has on computing science.

COURSE OUTCOMES:
Graduates of the Bioinformatics program will demonstrate expertise in the following core competencies essential to success:
1. Extract information from different types of bioinformatics data (gene, protein, disease, etc.), including their biological characteristics and relationships
2. Employ different data representation models and formats used for bioinformatics data representation, including markup languages such as SBML and CellML, and ontologies such as GO ontology
3. Apply the different approaches used for data integration and data management, including data warehouse and wrapper approaches
4. Master computational techniques and diversified bioinformatics tools for processing data, including statistical, machine learning and data mining techniques
5. Analyze processed data with the support of analytical and visualization tools

UNIT I
HISTORY OF BIOINFORMATICS: History of Bioinformatics-role of Bioinformatics in biological sciences- scope of bioinformatics -introduction to internet-WWW, network basics, LAN & WAN standards-network topologies and protocols- ftp, http - division of Bioinformatics- Bioinformatics and internet-challenges in Bioinformatics.

UNIT-II
INTRODUCTION TO HOMOLOGY: Introduction to Homology (with special mention to Charles Darwin, Sir Richard Owen, Willie Henning, Alfred Russel Wallace).
SPECIAL TOPICS IN BIOINFORMATICS: DNA mapping and sequencing, Map alignment

UNIT III
DATABASES IN BIOINFORMATICS : Databases in Bioinformatics- Genbank, NCBI, EMBL, DDBJ, UniGene, SGD, EMI Genomes, -protein databases-PIR, SWISSPROT, TrEMBL, Prosite, PRINTS -

structural databases-PDB, SCOP, CATH, PDB_SELECT, PDBSUM, DSSP, FSSP, DALI, PRODOM, protein families & pattern databases

UNIT-IV

SECONDARY DATABASES: Introduction to Secondary Databases Organization and management of databases Swissprot, PIR,KEGG

UNIT V

BIO CHEMICAL DATA BASES: Introduction to BioChemical databases-organization and Management of databases. KEGG, EXGESCY, BRENDA, WIT.

UNIT VI

FILE FORMATS: File formats-raw/plain format-NCBI, Genbank flat file format-ASN.1, GCG, FASTA, EMBL, NBRF, PIR, swissprot sequence formats, PDB format, etc. - introduction to structure prediction methods.

TEXT BOOKS :

1. Bioinformatics Basics. Applications in Biological Science and Medicine by Hooman H. Rashidi and Lukas K.Buehler CAC Press 2000.
2. Algorithms on Strings Trees and Sequences Dan Gusfiled. Cambridge University Press 1997.

REFERENCES :

1. Bioinformatics: A Machine Learning Approach P. Baldi. S. Brunak, MIT Press 1988.
2. Bioinformatics. David Mount, 2000. CSH Publications
3.Attwood T.K and Parry-Smith, “Introduction to Bioinformatics”, Addison Wesley Longman, 1999.

M.Tech(Computer Science & Engineering)
SYSTEMS LAB

Credits: 2 **External Marks : 60**
CourseCode: 16MCS1101 **Internal Marks : 40**
I Year I Semester

COURSE OBJECTIVES:

Upon Completion of this course, students will be able to

- To educate students with fundamental concepts of Database Design, Data Models, Different Database Languages (SQL/PLSQL).
- Understand the scope of Block, Nested Blocks, and Labels
- To learn the fundamentals of shell scripting/programming.
- Introduce the student to Unix/Linux kernel programming techniques.
- Compare and contrast various inter-process communication facilities.

COURSE OUTCOMES:

After the completion of this course the student

- Able to create database with different types of integrity constraints and use of SQL commands such as DDL, DML, DCL, TCL to access data from database objects.
- Map the model into a relational database system.
- Implement the given schema on a relational DBMS.
- Develop advanced packages, stored procedures, triggers and functions using PL/SQL.
- Classify system calls in UNIX
- Analyze the concepts of process, threads and file structure
- Implement IPC using pipes, semaphores, Shared Memory and messages.

LIST OF DBMS EXPERIMENTS

1. Introduction to SQL, an exercise on data types in SQL & Data Definition Language Commands
2. Exercise on Data Manipulation Language and transaction control commands
3. Exercise on Types of Data Constraints.
4. Exercise on Joins (single-table or multi-table) and using normalization
5. Exercise on group-by clause and date arithmetic.
6. Exercise on different functions (aggregate, math and string)
7. Exercise on different types of sub queries
8. Introduction to PL/SQL, Control Structures, Procedures and Functions, view

9. Introduction to triggers and cursors.
10. Write a program that creates the function and calculating area of circle.
11. Write a program that uses the concept of user defined exception

LIST OF OS EXPERIMENTS

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d)Priority
2. Simulate all file allocation strategies
   a) sequential b)indexed c)Linked
3. Simulate bankers algorithm for dead lock prevention
4. Simulate page replacement algorithms
   a)FIFO b) LRU c)LFU
5. Write a shell script (small calculator) that adds, subtracts, multiplies and divides the given two integers. There are two divisions' options: one returns the quotient and the other returns reminder. The script requires 3 arguments: The operation to be used and two integer numbers. The options are add (-a), subtract(-s), multiply(-m), quotient(-c) and reminder(-r).
6. Write a C program that counts the number of blanks in a text file.
7. Implement in C the following UNIX commands using system calls.
   a) cat b) ls c) mv d)grep e) R login
8. Write a C program that illustrates how to execute two commands concurrently with a command pipe.
9. Write a C program that illustrates the creation of child process using fork system call.

TEXT BOOKS:

1. William Stallings, Operating Systems, 6/e, PHI/Pearson
2. N.B. Venkateswarlu, Advanced Unix Programming, BS Publications
3. Ivan Bayross, SQL, PL/SQL programming language of oracle.

REFERENCE BOOKS:

1. D.M. Dhamdhere,Operating Systems, 2/e, Tata McGraw Hill 2nd edition.
2. SharanamShah,Vaishali Shah, Oracle for professionals.

M.Tech(Computer Science & Engineering)
DATA MINING AND KNOWLEDGE DISCOVERY

Credits: 3 **External Marks: 60**
CourseCode: 16MCS1010 **Internal Marks: 40**
I Year II Semester

COURSE OBJECTIVES:

- To introduce basic concepts, principles, major techniques and algorithms in Data Mining. These include concepts and techniques for data preprocessing, OLAP, association rule mining, data classification, and data clustering.

- To discuss Applications, Emerging Areas in Data Mining and the role of it in Society.

COURSE OUTCOMES:

Upon completion of this course, students will be able to

- Recognize types of Data, Data Quality, need of preprocessing and different measures of similarity and dissimilarity.
- Explain in detail major techniques and algorithms involved in data mining, including techniques and algorithms for data preprocessing, association rule mining, data classification, and data clustering.
- Evaluate the performance of a classifier.
- Compare and contrast different classification and clustering algorithms.
- Apply data mining algorithms and techniques adaptively to real world problem solving.

UNIT -I:

Introduction to Data Mining: Data Mining Tasks, Types of Data, Data Quality, Data Preprocessing, Measures of Similarity and Dissimilarity: Basics, Similarity and Dissimilarity between simple Attributes, Dissimilarities between Data Objects, Similarities between Data Objects, Examples of Proximity Measures, Issues in Proximity Calculation; Exploring Data: Data Set, Summary Statistics, OLAP and Multidimensional Data Analysis.

UNIT -II:

Basic Classification: Preliminaries,General approach to solving a classification problem, Decision Tree induction, Model Overfitting: Due to presence of noise, due to lack of representation samples, Handling Overfitting in Decision Tree Induction; Evaluating the performance of classifier.

UNIT -III:

Alternative Classification Techniques: Nearest Neighbor classifiers, Bayesian Classifiers, classification by Backpropagation(ANN), Support Vector Machines: Linear SVM, Separable and Non Separable case, Characteristics of SVM; Ensemble Methods.

UNIT -IV:

Basic Association Analysis: Problem Definition, Frequent Itemset Generation: The Apriori Principle, Frequent Itemset Generation in the Apriori Algorithm, Candidate Generation and Pruning, Support Counting, Rule Generation, Compact Representation of Frequent Itemsets, FP–Growth Algorithm.

UNIT V:

Extended Association Analysis: Handling Categorical Attributes, Continuous Attributes, A Concept Hierarchy, Sequential Patterns, Subgraph Patterns.

UNIT VI:

Cluster Analysis: Overview, the Basic K–means Algorithm, Additional Issues, Bisecting K-means, K-means and Different Types of Clusters, Strengths and Weaknesses, Basic Agglomerative Hierarchical Clustering Algorithm, specific techniques, Key Issues, Strengths and Weaknesses, DBSCAN Algorithm, Strengths and Weaknesses.

TEXT BOOKS:

1. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, PEA.
2. Data Mining, Concepts and Techniques, 3/e, Jiawei Han , MichelineKamber , Elsevier.

REFERENCE BOOKS:

1. GK Gupta , Introduction to Data Mining with Case Studies, Prentice Hall.
2. H Dunham, 2008 Data Mining: Introductory and Advanced Topics, Margaret, PEA.
3. Jarke, Lenzerini, Vassiliou, Vassiliadis, Fundamentals of data warehouses, 2/e, Springer.
4. Soman, Diwakar, Ajay, Data Mining Theory and Practice, PHI, 2006.

M.Tech(Computer Science & Engineering)
SOFTWARE ENGINEERING

Credits:4 **External Marks : 60**
CourseCode: 16MCS1011 **Internal Marks : 40**
I Year II Semester

COURSE OBJECTIVES:

- Gives the basic knowledge in Software Engineering process, focusing on the different process models.
- Learn how to perform feasibility study of the projects under the requirement engineering process and system models.
- Categorize different design concepts and architecture styles, evaluating the steps for designing a good model.
- Highlight how technology changes in the last two decades has impacted the traditional approach.
- Identifies various testing strategies for software quality

COURSE OUTCOMES:
On completion of the course, students should be able to

- Understand the engineering issues that form the background to develop complex and evolving software-intensive systems.
- Apply an effective software engineering process, based on knowledge of widely used development lifecycle models.
- Analyze and translate requirements specification into an implementable design, following a structured and organized process.
- Formulate a testing strategy for a software system, employing techniques such as black box and white box testing strategies.
- Evaluate the quality of the requirements, analysis and design work done during the module.

UNIT I
Introduction -The evolving role of software, Changing Nature of Software. Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI).
Process Models- The waterfall model, Incremental process models, Evolutionary
Process models, The Unified process, An Agile View of Development- Agile Process, Agile Process Models (XP, ASD)

UNIT II
Software Requirements - Functional and Non-functional requirements, User Requirements, System requirements, Interface specification, the software requirements document.
Requirements Engineering Process (REP) - Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
System models - Context Models, Behavioral models Data models, Object models,Structured Charts

UNIT III

Design Engineering - Design process and Design quality, Design concepts, the design model.
Creating an architectural design - Software architecture, Data design, Architecturalstylesand patterns, Architectural Design.

UNIT IV

Object-Oriented Design - Objects and object classes, An Object-Oriented design process, Design evolution. Performing User interface design-Golden rules, User interface analysis and Design, interface analysis, interface design steps, Design evaluation.

UNIT V

Testing Strategies - A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.
Testing Object Oriented Applications – Object Oriented Testing methods, testing methods applicable at class level, interclass test case design.

UNIT VI

Risk management -Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk Projection, Risk refinement, RMMM, RMMM Plan.
Software Reengineering - A software reengineering process model, software reengineering activities.
Quality Management – Quality Concepts, SQA, Software Reviews, FTR, SSQA, Software Reliability

TEXT BOOKS:

1. Roger S.Pressman , Software Engineering, 7/e , McGraw Hill Education
2. Somerville, Software Engineering, 8/e, Pearson Education

REFERENCE BOOKS:

1. PankajJalote,Software engineering A precise approach –Wiley
2. Alistair Cockburn, Agile Software Development- first edition, Pearson Education.

M.Tech (Computer Science & Engineering)
OBJECT ORIENTED ANALYSIS AND DESIGN

Credits : 4 **External Marks : 60**
CourseCode: 16MCS1012 **Internal Marks : 40**
I Year II Semester

COURSE OBJECTIVES:

- Develop the different UML diagrams for a software system based on the given requirements.
- Apply forward engineering to convert diagram to code and reverse engineering to convert code to diagram.
- Analyze & design a s/w system in object oriented approach, using unified modeling language.

COURSE OUTCOMES:

At the end of this course the student should be able to

- Illustrate the use of unified modeling language for object oriented analysis and design
- Understand the syntax of different UML diagrams.
- Apply object oriented analysis and design to build a software system.

UNIT I:

Introduction to UML : Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.
Basic Structural Modeling : Classes, Relationships, common Mechanisms, and diagrams.

UNIT II:

Advanced Structural Modeling : Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.
Class & Object Diagrams : Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT III:

Basic Behavioral Modeling: Terms , concepts, common modeling technique for interactions, Use cases, Usecase Diagrams , Interaction diagrams, Activity Diagrams,

UNIT IV:

Advanced Behavioral Modeling: Terms, concepts, modeling techniques for Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT V:

Architectural Modeling : Components, Deployment, Collaborations,,Component diagrams and Deployment diagrams.

UNIT-VI:

Terms, concepts, modeling techniques of System and models, case study of the Unified Library application.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: Uml 2 Toolkit, Wiley- Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY Dreamtech India Pvt. Ltd.
3. AtulKahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGrawHill

M.Tech (Computer Science & Engineering)
WEB TECHNOLOGIES

Credits: 4 **External Marks: 60**
CourseCode: 16MCS1013 **Internal Marks: 40**
Semester: I YEAR II SEMESTER

COURSE OBJECTIVES:

- Understand the various steps in designing a creative and dynamic website.
- They will able to write html, JavaScript, CSS CODEs.
- They will have clear understanding of hierarchy of objects in HTML and XML.
- Know regarding internet related technologies. Systematic way of developing a website.
- Design dynamic and interactive web pages by embedding Java Script CODE in HTML. Use Java Script to validate user input.
- Understand the concepts of JDBC, Servlets, JSP and Spring.
- Understand the fundamentals of dynamic application development.
- Understand the fundamentals of Web Hosting.

COURSE OUTCOMES:

After completion of this course, the students would be able to:

- Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, JavaScript in the workings of the web and web applications
- Analyze a web page and identify its elements and attributes.
- Create web pages using HTML, DHTML and Cascading Styles sheets.
- Create dynamic web pages using JavaScript (client side programming).
- Build web applications using JSP
- Build web applications using JDBC, Servlets.
- Create XML documents and XML Schema.
- Understand, analyze and apply the language JavaScript when developing a web site.
- Will create a fully functional website(online book store) using MVC architecture

UNIT I:

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets; Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT II:

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

UNIT III:

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters. javax.servlet HTTP package, Handling Http Request & Response, Using Cookies-Session Tracking, Security Issues.

UNIT IV:

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing.

JSP Application Development: Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Method, Error Handling and Debugging, Sharing Data between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations.

UNIT-V:

Database Access : Database Programming using JDBC, Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions, Deploying JAVA Beans in a JSP Page.

UNIT-VI

Introduction to Spring Framework Architecture,Beans and Containers, The Application Context, Data Validation and Conversion, Using JDBC with Spring.

TEXT BOOKS:

1. Chris Bates , Web Programming, building internet applications, 2nd edition,WILEYDreamtech
2. Patrick Naughton and Herbert Schildt, The complete Reference Java 2, Fifth Edition. TMH (Chapters: 25)
3. Hans Bergsten, SPD O'Reilly , Java Server Pages
4. J. Sharma, AshishSarin, Getting started with Spring Framework, CreateSpace Independent Publishing Platform

REFERENCE BOOKS:

1. Sebesta, Programming world wide web,Pearson
2. Marty Hall and Larry Brown , Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Pearson
3.Dietel and Nieto, Internet and World Wide Web – How to program, PHI/Pearson Education Asia.
4. Bill Siggelkow, Jakarta Struts Cookbook , S P D O'Reilly for chap 8.
5. Murach, Murach's beginning JAVA JDK 5, SPD

M.Tech (Computer Science & Engineering)
MOBILE COMPUTING
(Elective- II)

Credits: 4 **External Marks: 60**
CourseCode: 16MCS1014 **Internal Marks: 40**
Semester: I YEAR II SEMESTER

COURSE OBJECTIVES:

- To present necessary concepts for the mobile communications
- Understanding different mobile devices and system
- Understanding the cellular system design
- Study co channel and non co channel interferences
- Understanding channel assignments and handoff
- Study digital cellular system

COURSE OUTCOMES:

At the end of this course the student should be able to

- Discover the characteristics of pervasive computing applications including the major system components and architectures of the systems
- Analyze the strengths and limitations of the tools and devices for development of pervasive computing systems
- Explore the characteristics of different types of mobile networks on the performance of a pervasive computing system
- Analyze and compare the performance of different data dissemination techniques and algorithms for mobile real-time applications.

UNIT I

Introduction to Mobile Communications and Computing
Mobile Computing (MC): Introduction to MC, novel applications, limitations, andarchitecture GSM: Mobile services, System architecture, Radio interface, Protocols,Localization and calling, Handover, Security, and New data services

UNIT II

(Wireless) Medium Access Control Motivation for a specialized MAC (Hidden and exposed terminals, Near and farterminals), SDMA, FDMA, TDMA, CDMA.

UNIT III

Mobile Network Layer and Transport Layer
Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agentadvertisement and discovery, registration, tunneling and encapsulation, optimizations),Dynamic Host Configuration Protocol (DHCP). Traditional TCP, Indirect TCP,Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-outfreezing, Selective retransmission, Transaction oriented TCP.

UNIT IV

Database Issues
Hoarding techniques, caching invalidation mechanisms, client server computing withadaptation, power-aware and context-aware computing, transactional models, queryprocessing, recovery, and quality of service issues , Communications asymmetry,classification of new data delivery mechanisms, push-based mechanisms, pullbasedmechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT V

Mobile Ad hoc Networks (MANETs)
Overview, Properties of a MANET, MANET applications, routing andvarious routing algorithms, security in MANETs.

UNIT VI

Protocols and Tools
Wireless Application Protocol-WAP. (Introduction, protocol architecture, andtreatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAClayer, networking, security, link management)

TEXT BOOKS:

1.Jochen Schiller, 2004, Mobile Communications, 2/e, Addison-Wesley.
2. Stojmenovic , Cacute,Wiley, 2002Handbook of Wireless Networks and Mobile Computing
3. Sivarammurthy, Manoj,, 2009 Adhoc Wireless Networks, 2/e, Pearson

REFERENCE BOOKS:

1. Reza Behravanfar,2004Mobile Computing Principles: Designing and Developing Mobile Applications withUML and XML, Cambridge, University Press.
2. Adelstein, Frank, Gupta,Sandeep KS. Richard III, Golden , Schwiebert, Loren,2005 Fundamentals of Mobile and Pervasive Computing, TMH.
3. Hansmann, Merk, Nicklous, Stober,2003, Principles of Mobile Computing, 2/e, Springer.
4.MartynMallick, 2003Mobile and Wireless Design Essentials, Wiley DreamTech
5. Rajkamal,2008 Mobile Computing, Oxford
6. Sivarammurthy, manoj, 2009Adhoc Wireless Networks, 2/e, Pearson

M.Tech (Computer Science & Engineering)
CRYPTOGRAPHY AND NETWORK SECURITY
(Elective – II)

Credits:4 **External Marks : 60**
CourseCode: 16MCS1015 **Internal Marks : 40**
I Year II Semester

COURSE OBJECTIVES:

- To clearly recognizes the differentSecurity Attacks, Security Services and Security Mechanisms.
- To list out the importance and applications of Non-Cryptographic and Software Vulnerabilities.
- To demonstrate the basic categories of Cryptographic Systems.
- To compute different Conventional Encryption Algorithms.
- To describe the important public-key cryptosystems.
- To analyze the authentication by studying different authentication applications.
- To describe the security approaches related to Electronic Mail
- To express the overall structure of IPSec
- To categorize Intrusions and intrusion detection techniques.
- To develop the different firewall principles.

COURSE OUTCOMES:

At the end of this course the student will be able to

- Recognize different Security Attacks, Services and Mechanisms
- Classify and explain categories of different encryption and decryption techniques
- Identify the authentication applications such as Kerberos and x.509 directory services
- Analyze the representation of PGP and S/MIME
- Familiar with the importance of IP Security and Web Security
- Exposed to viruses and related threats and design principles of firewalls

UNIT I

Introduction: Security Attacks, Security Services and Security Mechanisms, A Model for Networksecurity. Non-Cryptographic Protocol Vulnerabilities – DoS, DDoS, Session Hijacking and Spoofing, Software Vulnerabilities – Phishing, Buffer Overflow, Format String Attacks, SQL Injection, **Basics of Cryptography:** Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Other Cipher Properties – Confusion, Diffusion, Block and Stream Ciphers.

UNIT II

Secret Key Cryptography: DES, Strengths of DES, Block Cipher Design Principles and Modes of Operations, Triple DES, Blowfish, IDEA, CAST-128 and AES

UNIT III

Public-Key Cryptography: Public Key Cryptography Principles, RSA, Diffie-Hellman Key Exchange, Introduction to Elliptic Curve Cryptography

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Secure Hash Algorithm, Message Authentication CODEs – Message Authentication Requirements and Functions, Digital Signatures, DSS.

UNIT IV

Authentication Applications – Kerberos, Key Management and Distribution, X.509 Authentication Service, Public Key Infrastructure. Electronic Mail Security - Pretty Good Privacy, S/MIME

UNIT V

IP Security: Overview, Architecture, AH Protocol, ESP Protocol
Web Security: Considerations, **SSL:** Architecture, Record Protocol, Change Cipher Spec Protocol, Alert Protocol, Handshake Protocol, **TLS**, **SET:** Overview, Dual Signatures, Payment Processing.

UNIT VI

Intruders: Intrusion Techniques, Password Protection, Intrusion Detection.
Viruses and Related Threats: Malicious Programs, The Nature of Viruses, Types of Viruses.
Firewalls: Design Principles, Characteristics, Types of Firewalls, Firewall Configurations. **Trusted Systems.**

TEXT BOOKS:

1. William Stallings, Network Security Essentials: Applications and Standards, Pearson Education.
2. Behrouz A. Fourouzan and DebdeepMukhopadhyay, 2010, Cryptography and Network, 2nd Edition, McGraw-Hill.

REFERENCE BOOKS:

1. William Stallings, Cryptography and Network Security: Principles and Practice, Pearson Education.
2. Whitman, Thomson, Principles of Information Security.Introduction to Cryptography, Springer

MTech (Computer Science & Engineering)

MACHINE LEARNING

(Elective – II)

Credits : 4 **External Marks : 60**
CourseCode: 16MCS1016 **Internal Marks : 40**
I Year II Semester

COURSE OBJECTIVE:

- The objective of this course is to give students basic knowledge about the key algorithms and theory that form the foundation of machine learning.
- Identify and apply the appropriate Machine learning technique to classification, Patter Recognition, and Optimization and Decision problems.

COURSE OUTCOMES:

At the end of the course, a student will be able to

- Describe and design the concepts of learning.
- Describe and apply learning algorithms.
- Explain the first principles of neural networks.
- Describe basics of sampling theory and hypothesis testing.
- Explain Bayesian learning theorem.

UNIT-I

INTRODUCTION TO MACHINE LEARNING:

Well-Posed Learning Problem, Designing a Learning system,Perspectives and Issues in Machine Learning.

CONCEPT LEARNING AND THE GENERAL-TO-SPECIFIC ORDERING:

Introduction, A Concept Learning Task, Concept Learning as Search, FIND-S: Finding a Maximally Specific Hypothesis, Version Spaces and the Candidate Elimination Algorithm, Remarks on Version spaces and Candidate-Elimination, Inductive Bias

UNIT-II

DECISION TREE LEARNING:

Introduction, Decision Tree Representation, Appropriate Problems for Decision Tree Learning, The Basic Decision Tree Learning Algorithm, Hypothesis Space Search in Decision Tree Learning, Inductive Bias in Decision Tree Learning, Issues in Decision Tree Learning

UNIT-III

ARTIFICIAL NEURAL NETWORKS:

Introduction, Neural Network Representations, Appropriate Problems for Neural Network Learning, Perceptrons, Multilayer Networks and the Backpropagation Algorithm, Remarks on Back Propagation Algorithm, An Illustrative Example: Face Recognition, Advanced Topics in Artificial Neural Networks

UNIT-IV

EVALUATING HYPOTHESES:

Motivation, Estimating Hypothesis Accuracy, Basics of Sampling Theory , A General Approach for Deriving Confidence Intervals, Differene in Error of Two Hypotheses, Comparing Learning Algorithms

BAYESIAN LEARNING:

Introduction, Bayes Theorem, Bayes Theorem and Concept Learning, Maximum Likelihood and Least-Squared Error Hypothesis, Maximum Likelihood Hypothesis for Predicting Probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naive Bayes Classifier, An Example: Learning to Classify Text, Bayesian Belief Networks, The EM Algorithm

UNIT-V

COMPUTATIONAL LEARNING THEORY:

Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning

UNIT-VI

INSTANCE BASED LEARNING:

Introduction, k-Nearest neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

TEXT BOOKS:

1. Tom Mitchell, 1997 *"Machine Learning"*, McGrawHill publications

2.Tom M. Mitchell (Editor), Jaime G. Carbonell (Editor), Ryszard S. Michalski (Editor), October 14, 2011 Machine Learning: A Guide to Current Research (The Springer International Series in Engineering and Computer Science) Paperback

REFERENCE BOOKS:

1. Christopher.M.Bishop, October 2007 *"Pattern Recognition and Machine Learning"*, Springer publications.
2. EthemAlpaydin, 2010 *"Introduction to Machine Learning"*, 2nd Edition, MIT Publishers

WEB REFERNCES:
https://www.coursera.org/course/ml

MTech (Computer Science & Engineering)

CLOUD COMPUTING

(Elective- II)

Credits :4 **External Marks : 60**
CourseCode: 16MCS1017 **Internal Marks : 40**
I Year II Semester

COURSE OBJECTIVES:

- To Paraphrase the emerging area of "cloud computing" and how it relates to the corporate world .
- To gain competence in cloud services and search engines Specifically
- To Paraphrase and be able to cloud environment is collaborating with various webmail services and databases
- To Paraphrase how virtualization is well-known in cloud computing
- To gain competence in Cloud Security and Open Cloud delivering highly-interactive Web applications.

COURSE OUTCOMES:

- Articulate the basic concepts, key technologies, strengths,and limitations of cloud computing and the possible applications for state-of-the-art cloud computing
- Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
- Identify the Collaborations of Cloud and evaluate webmail services .
- Provide the appropriate cloud computing solutions and recommendations according to the applications used.
- Attempt to generate new ideas and innovations based on Virtualization in cloud computing.Provide Security for cloud applications

UNITI:

Introduction to Cloud Computing
Cloud Introduction and overview- Components, Infrastructure and Services, Why UseCloud Computing, Benefits and Limitations, Cloud Application Architectures, CloudInfrastructure Models, Cloud Computing Technology- Hardware & SoftwareInfrastructure.

UNIT II:

Cloud Computing Architecture
Requirements, Introduction to Cloud Computing Architecture, various kinds of CloudComputing Architecture, Grid Computing, Transactional Computing, On DemandComputing, and Distributed Computing.

UNIT III:

SecuritySecurity issues in Cloud Computing - Data Security, Network Security, and HostSecurity.

UNIT IV:

Introduction to Virtualization Objectives of virtualization, History of virtualization, Benefits of virtualizedtechnology, the virtual service desk, what can be virtualized, related forms ofcomputing, cloud computing, software as a service – SaaS, grid computing, utilitycomputing, virtualization processes.

UNIT V:

Virtualization Technologies-I Ubuntu (server edition),altiris, windows, server, software virtualization, vmware, intelvirtualization, red hat virtualization, softgrid application, Linux virtualization, desktop, virtualization, hardware virtualization, resource virtualization, processor virtualization,application virtualization.

UNITVI:

Virtualization Technologies-II Storage virtualization, virtualization density,para-virtualization, OS virtualization,virtualization software, data storage virtualization, Intel virtualizationtechnology,thinstall virtualization suite, net framework virtualization, windowsvirtualization on fedora, storage virtualization technologies, virtualization level,security monitoring and virtualization, oracle virtualization.Case Studies: Amazon S3,Google APP Engine, IBM Clouds, Oracle OBIEE

TEXT BOOKS:

1. Ivanka Menken, Gerard Blokdijk, 2009, Cloud Computing Virtualization Specialist Complete Certification Kit – StudyGuide Book,.
2. George Reese, 2009, Cloud Application Architectures Building Applications and Infrastructure in theCloud, O'Reilly Media Press.

REFERENCE BOOKS:

1. Anthony T.Velte, TobeJ.Velte, RobertElsenpeter, 2009, Cloud Computing: A Practical Aprroach, Publication Person Education.
2. Tom Clark,Addison, 2005Storage Virtualization: Technologies for Simplifying Data Storage andManagement-Wesley.
3. Curtis Franklin Jr.Brian J.S. Chee**,**2010, Cloud Computing Technologies and Strategies of the Ubiquitous DataCenter,
4. Timothy Chou,2009, Introduction to Cloud Computing: Business & Technology.

M.Tech (Computer Science and Engineering)
SOFT COMPUTING
(Elective – III)

Credits:4 **External marks: 70**
CourseCode:16MCS1018 **Internal marks: 30**
I Year II Semester

COURSE OBJECTIVE:

By the end of this course, the student should be able to

- Explain the concepts of neural networks, fuzzy logic, and genetic algorithms.
- Solve problems that are appropriately solved by neural networks, fuzzy logic, and Genetic algorithms.

COURSE OUTCOME:

- Explain the learning and adaptation capability of neural and fuzzy systems and genetic algorithm.
- Describe the learning and retrieval procedures of various neural networks.
- Comprehend the fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.

UNIT I

Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, neural network architecture: single layer and multilayer feed forward networks, recurrent Networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.

UNIT II

Learning ProcessError Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process

UNIT III

Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient; back Propagation algorithm, factors affecting backpropagation training, applications.

UNIT IV

Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT V

Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications&Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT VI

Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (Encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

TEXT BOOKS:

1. S. Rajsekaran& G.A. VijayalakshmiPai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications" Prentice Hall of India.
2. SimanHaykin,"Neural Networks" Prentice Hall of India

REFERENCE BOOKS:

1. N.P.Padhy,"Artificial Intelligence and Intelligent Systems" Oxford University Press.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India.
3. Kumar Satish, "Neural Networks" Tata McGraw Hill.

M.Tech (Computer Science & Engineering)
SIMULATION AND MODELING
(Elective – III)

Credits: 4 **External Marks: 70**
CourseCode: 16MCS1019 **Internal Marks: 30**
I Year II Semester

COURSE OBJECTIVES:

- Educate students with fundamental knowledge of continuous and discrete system models
- Gain some fundamental knowledge about system simulation techniques
- Gain idea about continuous system simulation and different models of continuous system simulation
- Gain knowledge probability theory and probability functions.
- Acquire knowledge queuing theory with solutions
- gain knowledge on discrete system simulation and different models of discrete system simulation
- Familiarize with discrete system programming tasks.
- Acquire knowledge about simulation programming techniques.
- Explain some elementary features of SIMSCRIPT and GPSS algorithms.

COURSE OUTCOMES:

This course will assist students in their career preparation as computer simulation and modeling designer or managers. Upon successful completion of this course, students should be able to:

- Classification and study of system modeling.
- Describe the steps involved in continuous system simulation
- Analyze System Dynamics
- Study Probability concepts in Simulation and apply different random number generation Techniques and their applications.
- Articulate queuing disciplines with mathematical solutions and Outline methods for discrete system simulation
- Organize SIMSCRIPT and GPSS for analyzing, estimating and processing the problems for deriving the simulation output.

UNITI

Introduction to Modeling and Simulation: Nature of Simulation: Systems, Models and Simulation, Continuous and Discrete Systems, System modeling, concept of simulation, Components of a simulation study, Principles used in modeling,Static and Dynamic physical models, Static and Dynamic athematical models Introduction to Static and Dynamic System simulation, Advantages, Disadvantages and pitfalls of Simulation.

UNIT II

System Simulation: Types of System Simulation: Monte Carlo Method, Comparison of analytical and Simulationmethods, Numerical Computation techniques for Continuous and Discrete Models, Distributed LagModels, Cobweb Model.

UNIT III

Continuous System Simulation and System Dynamics Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators.Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time Delays.

UNIT IV

Probability concepts in Simulation: Discrete and Continuous probability functions, Continuous Uniformly Distributed RandomNumbers, Generation of a Random numbers, Generating Discrete distributions, Non-UniformContinuously Distributed Random Numbers, Rejection Method.

UNIT V

Simulation of Queuing Systems and Discrete System Simulation Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution QueuingDisciplines, Simulation of single and two server queue. Application of queuing theory in computersystem.Discrete Events, Generation of arrival patterns, Simulation programming tasks, Gatheringstatistics, Measuring occupancy and Utilization, Recording Distributions and Transit times.

UNIT VI

Introduction to Simulation languages and Analysis of Simulation outputGPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements.SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements.Estimation methods, Replication of Runs, Batch Means, Regenerative techniques, Time SeriesAnalysis, Spectral Analysis and Autoregressive Processes.

TEXT BOOKS:

1. Gorden G., “System simulation”, Prentice Hall.
2. Seila, “Simulation Modeling” , Cengage Learning

REFERENCE BOOKS:

1. Law,“Simulation Modeling And Analysis”. McGraw Hill
2. Deo,“System Simulation with Digital Computer”, PHI
3. Harrington, “Simulation Modeling methods”, McGraw Hill
4. Severance , " System Modeling & Simulation”, Willey Pub

M.Tech (Computer Science & Engineering)
PARALLEL COMPUTING AND ALGORITHMS
(Elective – III)

Credits :4 **External Marks : 60**
CourseCode: 16MCS1020 **Internal Marks : 40**
I Year II Semester

COURSE OBJECTIVES:

- To learn parallel and distributed algorithms development techniques for shared memory and message passing models.
- To study the main classes of parallel algorithms.
- To study the complexity and correctness models for parallel algorithms

COURSE OUTCOMES:

- Upon successful completion of the course students should be able to
- Identify the need of Parallel Computing Algorithms.
- Analyze the performance of the parallel algorithms.
- Practice Vector matrix –Multiplications.

UNIT I

Introduction: Computational demand in various application areas, advent of parallel processing, terminology-pipelining, Data Parallelism and control parallelism-Amdahl's law. Basic parallel random access Machine Algorithms- definitions of P, NP and NP-Hard, NP- Complete Classes.

UNIT II

Scheduling: Organizational features of Processor Arrays, Multi processors and multi-computers. Mapping and scheduling aspects of algorithms. Coffman-graham scheduling algorithm for parallel processors.

UNIT III

Algorithms-1: Elementary Parallel algorithms on SIMD and MIMD machines, Analysis of these algorithms. Matrix Multiplication algorithms on SIMD and MIMD models.

UNIT IV

Algorithms-2: Fast Fourier Transform algorithms. Implementation on Hyper cube architectures. Solving linear file-system of equations, parallelizing aspects of sequential methods back substitution and Tri diagonal.

UNIT V

Array processors: Array processors, 2D-Mesh processor and Hypercube Processor Array. Sorting: Parallel sorting methods, Odd-even transposition Sorting on processor arrays. Parallel Quick-sort on Multi processors

UNIT VI

Graph Algorithms - Connected Graphs, search and traversal, Combinatorial Algorithms- Permutation, Combinations, Derangements.

TEXTBOOKS:

1. Michel J.Quinn, Parallel computing theory and practice.
2. M.J. Quinn, "Designing Efficient Algorithms for Parallel Computer" by McGraw Hill.
3. Guy E. Blelloch, Programming Parallel Algorithms, Communications of the ACM
4. K.A.Berman and J.L.Paul, Algorithms, Cengage Learning.

REFERENCE BOOKS:

1. N.A.Lynch, Distributed Algorithms, Morgan Kaufmann Publishers, Elsevier.
2. Henri Casanova, A.Legrand, Y.Robert, Chapman &Hall/CRC, Taylor and Francis Group, Parallel Algorithms.
3. S.Rajasekaran, John Reif, Chapman & Hall/CRC,Taylor and Francis Group, Handbook of Parallel Computing.

M.Tech (Computer Science & Engineering)
DIGITAL IMAGE PROCESSING
(Elective – III)

Credits : 4 **External Marks : 60**
CourseCode: 16MCS1021 **Internal Marks : 40**
I Year II Semester

COURSE OBJECTIVES:

- Cover 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.
- Hands-on experience in using computers to process images.
- Formulate solutions to general image processing problems
- Familiar with image manipulations and analysis

COURSE OUTCOMES:

- Explain basic concepts in image Processing
- Apply spatial domain techniques for image enhancement
- List the image compression techniques
- Discuss various morphological algorithms
- Classify various image segmentation techniques
- Describe different color models and color transformations

UNIT I

Digital Image Fundamentals: Fundamental steps in Digital image processing, components of an image processing of system. Image sampling and quantization: Basic Concepts in sampling and quantization, Representing Digital images, Spatial and Gray level resolution, Zooming and Shrinking Digital images.some basic Relationship between pixels: Neighbors of a pixel, Adjacency, Connectivity, Regions and Boundaries, Distance Measures, Image operations on a pixel basis.

UNIT II

Image Enhancement: Some Basic gray level transformations, histogram processing, Enhancement using Arithmetic/logical operations, Basics of spatial filtering, smoothing spatial filters: Smoothing Linear filters , Order-Statistics filters ,sharpening spatial filters: Foundation, Second derivative for Image Enhancement,First derivative for Enhancement.

UNIT III

Morphology: Preliminaries, Erosion and Dilation, Opening and closing, Hit-or-Miss transform, basic morphological algorithms: Boundary Extraction, Region filling, Extraction of connected components, Convex Hull,Skeletons, Pruning, Gray-Scale Morphology.

UNIT IV

Image Segmentation: Detection of Discontinuities: Point detection, line detection, Edge detection, Edge linking and boundary detection: Local processing, Global is processing via Graph theoretic techniques, Thresholding: Basic global thresholding, Basic Adaptive thresholding, optimal global and Adaptive thresholding,thresholding based on several variables, Region Based Segmentation.

UNIT V:

ImageCompression: Image compression Types and requirements, Coding Redundancy, Interpixel Redundancy ,Psycho visual redundancy, Fidelity Criteria, Image compression models, Some Basic Compression Methods: Huffman Coding, Arithmetic Coding, LZW Coding, Bit Plane Coding.

UNIT VI:

Color Image Processing: Color fundamentals, Color models: RGB, CMY, CMYK, HSI models, Color Transformations: Formulation, Color Complements, Color slicing, Tone and color corrections.

TEXT BOOK:

1. R.C Gonzalez and R.E. Woods,1992 “Digital Image Processing”, Addison Wesley.

REFERENCE BOOKS:

1. A.K.Jain, “Fundamentals of Digital Image Processing”, Prentice Hall of India.
2. M. Anji Reddy, Digital Image Processing, BS Publications.

M.Tech (Computer Science & Engineering)
OBJECT ORIENTED ANALYSIS & DESIGN LAB

Credits: 2 **External Marks: 50**
CourseCode: 16MCS1102 **Internal Marks: 25**
I Year II Semester

COURSE OBJECTIVES:

- provides a brief overview of the Unified Modeling Language (UML)
- Documenting user requirements using the UML
- Designing of various diagrams of UML
- The usage of different structural and behavioral diagrams
- Explain and apply the key facts, concepts, principles of UML
- Analyze problems, select and apply appropriate things from UML
- Effectively use current techniques, skills, and tools necessary in design
- Design, implement, and test software systems that meet the needs of a client

COURSE OUTCOMES:

- Implementation of the diagrams in Unified Modeling Language
- The Difference between Static and Dynamic diagrams designing
- Create and analyze use case, sequence and other diagrams
- Apply forward and reverse engineering techniques.
- make the transition from business model to use cases and even to other models

The student is expected to take up about five mini-projects and model them andproduce Use Cases, Analysis Documents - both static & dynamic aspects, Sequence

Diagrams and State-Charts, Database Design using Rational Products A samplecollection of ideas is given. Numerous other ideas can be found in the pages from thelist of references given below.

Mini-Project - I:

A Point-of-Sale (POS) System : A POS system is a computerized application used torecord sales and handle payments; it is typically used in a retail store, it includeshardware components such as a computer and bar CODE scanner, and software to runthe system. It interfaces to various service applications, such as a third-party taxcalculator and inventory control. These systems must be relatively fault tolerant; thatis, even if remote services are temporarily unavailable they must still be of capturingsales and handling at least cash payments. A POS system must support multiple andvaried client-side terminals and interfaces such as browser, PDAs, touch-screens.

Mini-Project - II:

Online Bookshop Example: Following the model of amazon.com or bn.com, designand implement an online bookstore.

Mini-Project - III:

A Simulated Company: Simulate a small manufacturing company. The resultingapplication will enable the user to take out a loan, purchase a machine, and over aseries of monthly production runs, follow the performance of their company.

Mini-Project - IV:

A Multi-Threaded Airport Simulation: Simulate the operations in an airport. Yourapplication should support multiple aircrafts using several runways and gates avoidingcollisions/conflicts. Landing: an aircraft uses the runway, lands, and then taxis over tothe terminal. Take-Off: an aircraft taxies to the runway and then takes off

Mini-Project -V:

An Automated Community Portal :Business in the 21st Century is above all BUSY.Distractions are everywhere. The current crop of "enterprise intranet portals" are oftenhigh noise and low value, despite the large capital expenditures it takes to stand themup. Email takes up 30 - 70% of an employee's time. Chat and Instant Messaging areeither in the enterprise or just around the corner. Meanwhile, management is taskedwith unforseen and unfunded leadership and change-agent roles as well as leadership67development and succession management. What is needed is a simplified, repeatable process that enhances communications within an enterprise, while allowingmanagement and peers to self-select future leaders and easily recognize highperformance team members in a dynamic way.Additionally, the system should function as a general-purpose confent management,business intelligence and peer-review application.GlassCODE's goal is to build that system. The software is released under a proprietarylicense, and will have the following features: Remote, unattended moderation ofdiscussions However, it will have powerful discovery and business intelligencefeatures, and be infinitely extendable, owing to a powerful API and adherence to Javaplatform standards. Encourages peer review and indicates for management potentialleaders, strong team players and reinforces enterprise and team goals seamlessly andwith zero administration.

Mini-Project -VI:

A Content Management System : The goal is to enable non-technical end users toeasily publish, access, and share information over the web, while giving administratorsand managers complete control over the presentation, style, security, and permissions.

Features

- Robust Permissions System
- Templates for easy custom site designs
- Total control over the content
- Search engine friendly URL's
- Role based publishing system
- Versioning control
- Visitor profiling

Mini-Project-VII:

An Auction Application:
Several commerce models exist and are the basis for a number of companies likeeBay.com, pricellne.com etc. Design and implement an auction application that68provides auctioning services. It should clearly model the various auctioneers, thebidding process, auctioning etc.

Mini-Project -VIII:

A Notes and File Management System : In the course of one's student years andprofessional career one produces a 1 lot of personal notes and documents. All thesedocuments are usually kept 1 on papers or individual files on the computer. Either waythe bulk of the I information is often erased corrupted and eventually lost. The goal ofthis 1 project is to build a distributed software application that addresses this "| problem. The system will provide an interface tocreate, organize and manage Ipersonal notes through the Internet for multiple users. The system will also allow usersto collaborate by assigning permissions for multiple users to view and edit notes.

Mini-Project - IX:

A Customizable Program Editor : A programmer's editor which will be focused on anindividual programmer's particular needs and style. The editor will act according to thespecific language the current source file is in, and will perform numerous features,such as auto-completion or file summarization, on the file. These features will be ableto be turned on or off by the programmer, and the programming style of the user willbe used to create as efficient an editing environment as possible.

Mini-Project - X:

A Graphics Editor : Design and implement a Java class collection that supports theconstruction of graph editing applications, i.e., applications that include the ability todraw structured and unstructured diagrams.E.g., The goal of the GEF project is to build a graph editing library that can be used toconstruct many, high-quality graph editing applications. Some of GEF's features are:A simple, concrete design that makes the framework easy to understand and extend.Node-Port-Edge graph model that is powerful enough for the vast majority ofconnected graph applications.

Model-View-Controller design based on the Swing Java Ul library makes GEF ableto act as a Ul to existing data structures, and also minimizing learning time fordevelopers familiar with Swing.

High-quality user interactions for moving, resizing, reshaping, etc. GEF alsosupports several novel interactions such as the broom alignment tool and selectionaction-buttons. Generic properties sheet based on JavaBeans introspection. XMLbasedfile formats based on the PGML standard

TEXT BOOK:

1. "Applying UML and Patterns: An Introduction to Object-Oriented Analysis andDesign and the Unified Process", Craig Larman, Pearson Education Asia, 2002, 2ndEdition

REFERENCE BOOKS:

1. Simon Sennet, SteveMcRobb, and Ray Farmer,2002, "Object Oriented Systems Analysis and Design using UML", McGraw Hill, 2ndEdition
2. Andrew Haigh, 2001, "Object-Oriented Analysis & Design," Tata McGraw-Hill.

Various Net Resources and projects:

http://user-mode-linux.sourceforge.net/case-studies.html
http://www.onesmartclick.com/programming/case-studies.html
http://www.tigris.org/sarvlets/ProjectList?type=P rejects
http://hotscripts.com/
http://www.developingwebs.net/
http://sourceforge.net/projects/
http://governing.com/gpp/gponline.htm
http://www.cio.com/research/government/gov.html
http://www.whitehouse.gov/omb/inforeg/egovstrategy.pdf
http://www.andhrapradesh.com/
http://www.ap-lt.com/

M.Tech (Computer Science & Engineering)

WEB TECHNOLOGIES LAB

Credits: 2 **External Marks: 50**
CourseCode: 16MCS1103 **Internal Marks: 25**
Semester: I Year II Semester

COURSE OBJECTIVES:

- Understand the various steps in designing a creative and dynamic website.
- They will able to write html, JavaScript, CSS and XML .
- Design dynamic and interactive web pages by embedding Java Script CODE in HTML. Use Java Script to validate user input.
- Understand the concepts of JDBC, Servlets and JSP and Spring.

COURSE OUTCOMES:

After completion of this course, the students would be able to:

- Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, JavaScript in the workings of the web and web applications
- Analyze a web page and identify its elements and attributes.
- Build web applications using JSP
- Build web applications using JDBC, Servlets.
- Will create a fully functional website (online book store) using MVC architecture.

1.Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**
The static home page must contain three **frames**.
Top Frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left Frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"M.Tech."** the catalogue for M.Tech.Books should be displayed in the Right frame.

Right Frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.

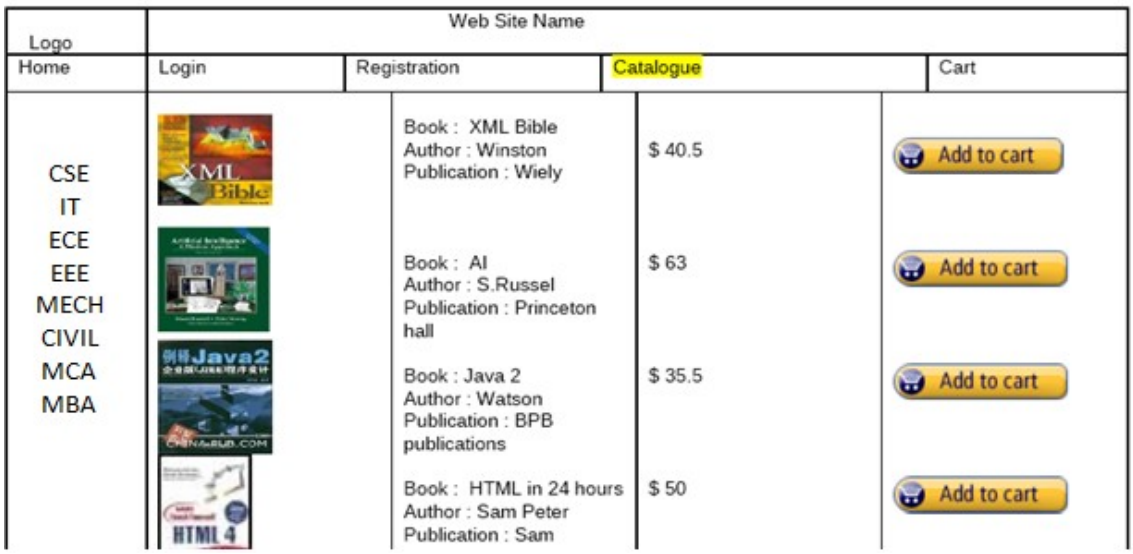
Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE IT ECE EEE MECH CIVIL MCA MBA				

2) LOGIN PAGE:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE IT ECE EEE MECH CIVIL MCA MBA	Reset Login: Password: Submit			

3) **CATOLOGUE PAGE:**
The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.



4. **REGISTRATION PAGE:**
Create a "*registration form* "with the following fields
1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date of birth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

5. **VALIDATION:**
Write *JavaScript* to validate the following fields of the above registration page.
1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern (name@domain.com)
4. Phone number (Phone number should contain 10 digits only).
Note : You can also validate the login page with these parameters.

6. Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:
1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.).
Then, in the body of your pages, you refer to these selectors to activate the styles

7. Write an XML file which will display the Book information which includes the following:
1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price
Write a Document Type Definition (DTD) to validate the above XML file.

8. Write servlet program to read parameters from web.xml

9. Write a servlet program using cookie management

10. Write servlet program to illustrate HttpSession

11.Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount)) of each category. Modify your catalogue page (experiment- 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

12. Write a JSP program to connect to the database and retrieve records

13. Write a JSP program to Sort List of Names and Search for a Key.

14. Write a spring application to display Hello World.

TEXT BOOKS:

1. Chris Bates , Web Programming, building internet applications, 2nd edition,WILEYDreamtech
2. Patrick Naughton and Herbert Schildt, The complete Reference Java 2, Fifth Edition. TMH (Chapters: 25)
3. Hans Bergsten, SPD O'Reilly , Java Server Pages
4. J. Sharma, AshishSarin, Getting started with Spring Framework, CreateSpace Independent Publishing Platform

REFERENCE BOOKS:

1. Sebesta, Programming world wide web,Pearson
2. Marty Hall and Larry Brown , Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Pearson
3.Dietel and Nieto, Internet and World Wide Web – How to program, PHI/Pearson Education Asia.
4. Bill Siggelkow, Jakarta Struts Cookbook , S P D O'Reilly for chap 8.
5. Murach, Murach's beginning JAVA JDK 5, SPD