RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

COMPUTER SCIENCE

COURSE STRUCTURE

I M.TECH, I-SEMESTER (CS)

COURSE STRUCTURE

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
	Operating Systems	4	-	4	40	60	100
	Advanced Data Structures and Algorithms	4	-	4	40	60	100
	Computer Organization	4	-	4	40	60	100
	Database Management Systems	4	-	4	40	60	100
	Software Engineering	4	-	4	40	60	100
	Web Technologies	4	-	4	40	60	100
	ADS & DBMS Lab	-	3	2	40	60	100
	Web Technologies Lab	-	3	2	40	60	100
	Comprehensive Viva-I			2		50	50
	Total	**24**	**6**	**30**	**320**	**530**	**850**

I M.TECH, II-SEMESTER (CS)

COURSE STRUCTURE

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
	Mobile Application Development	4	-	4	40	60	100
	Object Oriented Analysis and Design	4	-	4	40	60	100
	Computer Networks	4	-	4	40	60	100
	Data Warehousing and Data Mining	4	-	4	40	60	100
	Elective-I	4	-	4	40	60	100
	Elective-II	4	-	4	40	60	100
	OOAD Lab	-	3	2	40	60	100
	Data Warehousing and Data Mining Lab	-	3	2	40	60	100
	Comprehensive Viva-II			2		50	50
	Total	**24**	**6**	**30**	**320**	**530**	**850**

Elective – I
Software Quality Assurance and Testing
Advanced Computer Architecture
Distributed Databases
Storage Area Networks

Elective – II
Human Computer Interaction
Software Project Management
Image Processing
Distributed Systems

II M.TECH, III-SEMESTER & IV-SEMESTER (CS)

COURSE STRUCTURE

Code	Subject	Credits	Internal Marks	External Marks	Total
	Seminar	2	100	-	100
	Project work	12	-	-	-

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I Year M.Tech(CS) - I Sem　　　　　　　　　　　　　　　　　　　　**T　　C**
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OPERATING SYSTEMS

OBJECTIVES:

- This course deals with functions, structures and history of operating systems.
- To understand the design issues associated with operating systems.
- To understand various process management concepts including scheduling, synchronization, deadlocks.
- To be familiar with multithreading and the concepts of memory management including virtual memory.
- To understand the issues related to file system interface and implementation, disk management with protection and security mechanisms. Some example operating systems (UNIX, Windows, Solaris etc.)

OUTCOMES:
- At the end of the course the students knows the need and requirement of an interface between Man and Machine.
- To enable them to identify the difference between the system software and the application software and their design requirements.
- Students will be able to relate the features of operating systems and the fundamental theory associated with process, memory and file management components of different operating systems.
- Students will learn about and understand theoretical concepts and programming constructs used for the operation of modern operating systems.
- Students will gain practical experience with software tools available in modern operating systems such as semaphores, system calls, sockets and threads.

UNIT I
Operating Systems Overview: What operating Systems do, Computer System Organization, Computer System Architecture, and Operating-System Operations.
Operating systems structures: Operating system services, Systems calls, Types of System calls, System programs, operating system structure, Operating system generation.

UNIT II
Process Management: Process concept, Process Scheduling, Interprocess communication.
Multithreaded Programming: Overview, Multithreaded Models.
Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling algorithms.

UNIT III
Synchronization: Background, The critical-section problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic problems of synchronization, Monitors.
Principles of deadlock: System model, Deadlock characterization, Deadlock prevention, Detection and Avoidance, Recovery form deadlock.

UNIT IV
Memory Management: Background**,** Swapping, Contiguous memory allocation, Paging, Structure of the page table, segmentation.
Virtual memory Management: Background, Demand paging, Page-replacement (Basic Page replacement, FIFO, Optimal, LRU), Allocation of frames, Thrashing.

UNIT V
File system: File concept, Access Methods, Directory and Disk Structure, File sharing, Protection.
Implementing File Systems: File system structure, File system implementation, Directory implementation, Allocation methods, and Free-space management.

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UNIT VI
Secondary Storage Structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, Disk Management, Swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

TEXT BOOKS:
1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Operating Systems, A Concept based Approach-   D.M.Dhamdhere, Second Edition, TMH.

REFERENCES:
1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.

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ADVANCED DATA STRUCTURES AND ALGORITHMS

OBJECTIVES:

- This course explores data structures, and the practical problems of implementing those structures in real programming languages and environments
- How the field of algorithms are developed.
- Significance of algorithm efficiency.
- Significance and importance of program correctness.

OUTCOMES:

- Explain the basic concepts of time and space complexity, divide-and-conquer strategy, dynamic programming, greedy algorithms, amortized analysis.
- Describe the methodologies of how to analyze an algorithm.
- Identify the complexity of problems.
- Solve a problem using an algorithm and evaluate its correctness.
- Formulate the time-complexity analysis for an algorithm.

UNIT I
Trees and Graphs: Introduction, Definition and Basic terminologies of trees and binary trees, Representation of trees and Binary trees, Binary tree Traversals, Threaded binary trees, Graphs-basic concepts, representation and traversals.

UNIT II
Binary Search Trees, AVL Trees and B Trees
Introduction, Binary Search Trees: Definition, Operations and applications. AVL Trees: Definition, Operations and applications. B Trees: Definition, Operations and applications.

UNIT III
Red – Black Trees, Splay Trees and Hash Tables
Red – Black Trees, Splay Trees and its applications. Hash Tables: Introduction, Hash Tables, Hash Functions and its applications.

UNIT IV
Algorithm Analysis
Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Time complexity of an algorithm using O notation, Polynomial Vs. Exponential Algorithms, Average, Best, and Worst Case Complexities, Analyzing Recursive Programs.

UNIT V
Divide – and – Conquer & Greedy Method
General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Stassen's Matrix Multiplication, Greedy Method- General Method, Minimum Cost Spanning Trees, Single Source Shortest Path.

UNIT VI
Dynamic Programming and Back Tracking
General Method, All Pairs Shortest Path, Single Source Shortest Path, 0 / 1 Knapsack problem, Reliability Design, Traveling Sales Person's Problem. **Back Tracking:** General Method, 8 – Queen's Problem, Graph Coloring.

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TEXT BOOKS:

1. Data Structures and Algorithms by G.A.V. Pai, 2009, TMH.
2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press.

REFERENCE BOOKS:

1. Classic Data Structures by D. Samanta, 2005, PHI
2. Design and Analysis of Computer Algorithms by Aho, Hopcraft, Ullman 1998, PEA.
3. Introduction to the Design and Analysis of Algorithms by Goodman, Hedetniemi, TMG.
4. Design and Analysis of Algorithms by E. Horowitz, S. Sahani, 3rd Edition, Galgotia.
5. Data Structures and Algorithms in C++ by Drozdek 2nd Edition, Thomson.

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COMPUTER ORGANIZATION

OBJECTIVES:

- To understand the structure, function, characteristics and performance issues of computer systems.
- To understand the design of the various functional units of digital computers.
- To understand the basic processing unit and how they are connected and how it generates control signals (using hardwired and micro programmed approaches).
- To understand the architecture of 8086.
- To understand the different types of memory and how they are related.

OUTCOMES:

- Students will learn about computer performance, computer design, and trade-offs between cost and performance as well as between hardware and software.
- Students will formulate and solve problems, understand the performance requirements of systems.
- Students will learn to communicate effectively and learn to think creatively and critically, both independently and with others.
- Students will learn about all the detailed design issues and circuits of each unit.

UNIT-I
BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Data Representation, Fixed Point Representation, Floating – Point Representation, Error Detection codes.

UNIT-II
REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, Logic micro operations, Shift micro operations.
BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt.
CENTRAL PROCESSING UNIT: Stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control, Reduced Instruction set computer.

UNIT-III
MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, design of control unit, Hardwired control, Micro programmed control
COMPUTER ARITHMETIC: Addition, subtraction, multiplication and Division Algorithms, Floating – point Arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT-IV
THE MEMORY SYSTEM: Basic concepts semiconductor RAM memories, Read-only memories, Cache memories, Performance considerations, Virtual memories, Secondary storage, Introduction to RAID.

UNIT-V
PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

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UNIT-VI
MULTI PROCESSORS: Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherence, Shared Memory Multiprocessors.

TEXT BOOKS:
1. Computer Systems Architecture – M. Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

REFERENCES:
Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI

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DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

- Advantages applications of DBMS and Database system structure.
- Schema design: ER model and conceptual design.
- Relational model and SQL basics.
- Relational algebra and Query optimization.
- Storage and efficient retrieval of data: various indexing techniques.

OUTCOMES:

- Students will learn about the need for DBMS, the largeness of the data and why it gives rise to steam oriented processing and strategies and are at higher level than general purpose programming language such as JAVA.
- Students will learn about storage and efficient retrieval of large Information via algebraic query optimization and the use of indexing.
- Students will also learn basics of SQL and about primary key concepts and foreign key concepts. They will also learn about data manipulation (insertions deletions & updation) and triggers.
- Students will learn about functional dependency and the need for schema refinement (normalization) to remove redundancy of data.
- Students will also learn about transaction management concurrency Control and crash recovery.

UNIT – I
Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor – History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model

UNIT – II
Relational Model : Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.
Relational Algebra and Calculus: Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra Queries – Relational calculus – Tuple relational Calculus – Domain relational calculus.

UNIT – III
Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOTR – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT – IV
Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – forth Normal Form.

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UNIT – V

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

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

UNIT – VI

Overview of Storage and Indexing : Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations. **Storing data: Disks and Files :** The Memory Hierarchy – Redundant Arrays of Independent – Disks – Disk Space Management – Buffer Manager – Files of records – Page Formats – record formats
.

TEXT BOOKS:
1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw-Hill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, IV edition.

REFERENCES:
1. Introduction to Database Systems, By ITL Education Solutions Ltd.(Pearson Publisher)
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition. Thomson
3. Data base Management System, Elmasri Navrate Pearson Education
4. Data base Management System Mathew Leon, Leon Vikas.
5. Data base Systems, Connoley Pearson education.

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I Year M.Tech(CS) - I Sem

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SOFTWARE ENGINEERING

OBJECTIVES:

- To understand Software development as a process.
- Various software process models and system models.
- Various software designs: Architectural, object oriented , user interface etc.
- Software testing methodologies overview: various testing techniques including white box testing black box testing regression testing etc.
- Software quality: metrics, risk management quality assurance etc.

OUTCOMES:

- Students will learn to work as a team and to focus on getting working project done on time with each student being held accountable for their part of the project.
- Student will learn about risk management and quick prototyping de-risk project management.
- Students will learn about and go through the software life cycle with emphasis on different process requirements design and implementation phases.
- Students will learn about software process models and hoe to choose an Appropriate model for their project will learn about risk management and quick prototyping to de-risk projects.

UNIT I
Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.
A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns.

UNIT II
Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.
System models: Context Models, Behavioral models, Object models.

UNIT III
Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
Software Requirements: Functional and non-functional requirements, User requirements, System requirements, the software requirements document.

UNIT IV
Design Engineering: Design process and Design quality, Design concepts.
Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

UNIT V
Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing.

UNIT VI

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Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition.McGrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson education.

REFERENCES:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Systems Analysis and Design- Shely Cashman Rosenblatt, Thomson Publications.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

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WEB TECHNOLOGIES

OBJECTIVES:

- This course demonstrates an in-depth understanding of the Web technologies necessary for business application design and development. The course covers client side scripting like HTML, JavaScript and server side scripting like servlets, JSPs. And also XML and web servers and database interfacing.

OUTCOMES:

- Development of a business application.
- Implementation of given client side and server side technologies.
- Design and develop static and dynamic web pages.
- Validate web page data with database data.
- Knowledge on Web Application Development.

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:
Java Beans:
Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API.

Unit IV:
Web servers & Servlets:
Tomcat Server installation & Testing.
Introduction to Servelets:
Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading initialization parameters, The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

Unit V:
Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC architecture.
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 Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data.

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

TEXT BOOKS:
1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNIT 1, 2)
2. The complete Reference Java 2 Fifth Edition, Patrick Naughton and Herbert Schildt., TMH (Chapters: 25) (UNIT 2,3)
3. Java Server Pages –Hans Bergsten, SPD O'Reilly (UNITs 3,4,5)

REFERENCE BOOKS:
1. Programming world wide web-Sebesta, Pearson Core   SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Marty Hall and Larry Brown Pearson

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ADS & DBMS LAB

OBJECTIVES:

- Learn how to implement some useful data structures.
- Understand the effect of data structures on an algorithm's complexity.
- To develop skills to design and analyze simple linear data structures
- Create and delete database schemas and execute SQL queries
- Make Use of PL/SQL Variables.

OUTCOMES:

- Basic ability to analyze algorithms and to determine algorithm correctness and time efficiency class.
- At the end of this lab session, the student will be able to design and analyze the time and space efficiency of the data structure
- Have practical knowledge on the application of data structures
- Implement the given schema on a relational DBMS.
- Design, develop, and maintain Oracle Database Objects.

1). Write a C/C++ program to implement Binary Tree Traversals.

2). Write a C/C++ program to implement AVL tree.

3). Write a C/C++ program to implement Binary Search Tree.

4). Write a C/C++ program to implement Quick Sort method

5). Write a C/C++ program to implement Minimum cost spanning trees.

6). Write a C/C++ program to implement all pairs Shortest Path.

7). Consider the Insurance database given below. The primary keys are underlined and the data types are specified:

> **PERSON** (driver-id:string,name:string,address:string)
> **CAR** (Regno:string,model:string,year:int)
> **ACCIDENT** (report-number:int,date:date,location:string)
> **OWNS** (driver-id:string,regno:string)
> **PARTICIPATED** (driver-id:string,regno:string,report-number:int,damage-amount:int)

1. create the above tables by properly specifying the primary keys and the foreign keys
2. Enter atleast five tuples for each relation
3. Demonstrate how you
   a. Update the damage amount for the car with a specific regno in accident with report number 12 to 25000
   b. Add a new accident to the database
4. Find the total number of people who owned cars that were involved in accidents in 2006.
5. Find the number of accidents in which cars belonging to a specific model were involved.

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8). Consider the following relations for an order processing database application in a company.

CUSTOMER (Cust #: int, Cname: string, City: string)
ORDER (Order #: int, Odate: date, Cust #: int, Ord-Amt: int)
ORDER-ITEM (Order #: int, Item #: int, qty: int)
ITEM (Item #: int, Unit Price: int)
SHIPMENT (Order #: int, Warehouse #: int, Ship-Date: date)
WAREHOUSE (Warehouse #: int, City: string)

i) Create the above tables by properly specifying the primary keys and the foreign keys.
ii) Enter at least five tuples for each relation.
iii) Produce a listing: **CUSTNAME**, **NO_OF_ORDERS**, **AVG_ORDER_AMT**, where the middle column is the total number of orders by the customer and the last column is the average order amount for that customer.
iv) List the **Order#** for the orders that were shipped from all the warehouses that the company has in a specific city.
v) Demonstrate how you delete **Item# 10** from the **ITEM** table and make that field *null* in the **ORDER-ITEM** table.

9). Consider the following database of student enrollement in courses and books adopted for each course .

STUDENT (regno :string , name : string , major : string , bdate : int)
COURSE (course# : int , cname : string , dept : string)
ENROLL (regno : string , course#: int , sem : int , marks : int)
BOOK_ADAPTION (course#: int , sem : int , book_isbn :int)
TEXT(book_isbn : int , book-title : string , publisher : string , author : string).

i) Create the above tables by properly specifying the primary keys and the foreign key.
ii) Enter atleast five tuples for each relation .
iii) Demonstrate how you add a new text book to the database and make this book be adopted by some department.
iv) Produce a list of text books (include course # ,book_isbn, book-title) in the alphabetical order for courses offered by the cs department that use more than 2 books.
v) List any department that has all its adopted books published by specific publisher.

10). Consider the following relations for the details maintained by a book dealer.

AUTHOR (Author-id: int, Name: string, City: string, Country: string)
PUBLISHER (Publisher-id: int, Name: string, City: string, Country: string)
CATALOG (Book-id: int, title: string, author-id: int, Publisher-id: int, Category-id: int, Year: int, Price: int)
CATEGORY (Category-id: int, Description: string)
ORDER-DETAILS (Order-no : int, Book-id: int, Quantity: int)

i) Create the above tables by properly specifying the primary keys and the foreign keys.
ii) Enter at least five tuples for each relation.
iii) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.
iv) Find the author of the book which has maximum sales.
v) Demonstrate how you increase the price of books published by a specific publisher by 10%.

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11). Consider the following database for a banking enterprise

BRANCH (*branch_name*: string, branch_city: string, assets: real)

ACCOUNT (*accno*: int, **branch_name**: string, balance: real)

CUSTOMER (*customer_name*: string, customer_street: string, city:string)

DEPOSITOR (*customer_name*: string, *accno*: int)

LOAN (*loan_number*: int, **branch_name**: string, amount: real)

BORROWER (*customer_name*: string, *loan_number*: int)

i)   Create the above tables by properly specifying the primary keys and the foreign keys.

ii)   Enter at least five tuples for each relation.

iii)   Find all the customers who have at least two accounts at the MAIN branch.

iv)   Find all the customers who have an account at all branches located in a specific city.

v)   Demonstrate how you delete all account tuples at every branch located in a specific city.

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I Year M.Tech(CS) - I Sem

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WEBTECHNOLOGIES LAB

Objective:

- To create a fully functional website with mvc architecture.
- To develop an online Book store using we can sell books (Ex amazon .com).

Hardware and Software required:

- A working computer system with either Windows or Linux.
- A web browser either IE or firefox.
- Tomcat web server and Apache web server
- XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free] , Stylus studio , etc.,
- A database either MySQL or Oracle.

1. Write HTML to implement lists.

2. Write HTML to navigate from one page to another and to navigate within the page.

3. Write HTML to display time-table in a web page.

4. Write HTML for registration form.

5. Write HTML for login form.

6. Write HTML to develop home page using frames.

7. Write HTML to implement cascading style sheets.

8. Write java script to validate login form.

9. Write java script to validate registration form.

10. Write a simple XML for customer information of a super market.

11. Validate XML using Document Type Definition.

12. Write an XSL to display library data held by an XML.

13. Write an XML for student data. Retrieve second student data and display it using DOM.

14. Develop colors java bean using BDK.

15. Install tomcat web server. Write a simple servlet that displays a message.

16. Write a servlet that reads input data from request and displays them as response.

17. Write a servlet that handles HTTP GET & HTTP POST.

18. Write a servlet that creates and retrieves cookie.

19. Write a servlet that implements a session.

20. Write a JSP to implement cookie.

21. Write a servlet that retrieves data base data and displays in a web page.

22. Write a servlet that validates login form with data base data.

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I Year M.Tech(CS) - I Sem   **C**
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COMPREHENSIVE VIVA-I

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II SEM

I Year M.Tech(CS) - IISem   T   C
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Mobile Application Development

OBJECTIVES:

- Describe those aspects of mobile programming that make it unique from programming for other platforms,
- Critique mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced phone features, and
- Deploy applications to the Android marketplace for distribution.

OUTCOMES:

- Be exposed to technology and business trends impacting mobile applications
- Be competent with the characterization and architecture of mobile applications.
- Be competent with understanding enterprise scale requirements of mobile applications
- Be competent with designing and developing mobile applications using one application development framework

UNIT I
J2ME Overview: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices.
Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants, Mobile Power, Set-Top Boxes, Smart Cards.

UNIT II
J2ME Architecture and Development Environment: J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit.

UNIT III
J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices.
Commands, Items and Event Processing: J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

UNIT IV
High-Level Display Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class

UNIT V
Low-Level Display Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

UNIT VI
Record Management System- Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.
JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions.

TEXT BOOKS:

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.

REFERENCES:
1. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao Yuan, Pearson Education, 2004
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
4. Kicking Butt with MIDP and MSA:Creating Great Mobile Applications,1st edition,J.Knudsen,Pearson.

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OBJECT ORIENTED ANALYSIS AND DESIGN

OBJECTIVES:

- Describe and explain concepts and principles of object oriented software development
- Describe and explain fundamental theories, techniques and methods in software engineering
- Master basic object oriented modelling principles
- Describe and explain basic concepts and constructs in the Java programming language
- Implement programs in the Java programming language

OUTCOMES:

- Analyze and model requirements and develop software using object-oriented analysis and design.
- Express object models in UML
- Use CASE tools for software design.
- Work as a member of a software development team.

UNIT I
Introduction to UML:
Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT II
Basic Structural Modeling:
Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling:
Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT III
Class & Object Diagrams:
Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT IV
Basic Behavioral Modeling-I:
Interactions, Interaction diagrams.
Basic Behavioral Modeling-II:
Use cases, Use case Diagrams, Activity Diagrams.

UNIT V
Advanced Behavioral Modeling:
Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT VI
Architectural Modeling:
Component, Deployment, Component diagrams and Deployment diagrams.
Case Study: The Unified Library application.

TEXT BOOKS:

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

REFERENCES:

1. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Pearson Education.
2. Modeling Software Systems Using UML2, Pascal Roques, WILEY- Dreamtech India Pvt. Ltd.
3. Object Oriented Analysis and Design, Atul Kahate, The McGraw-Hill Companies.
4. Object-Oriented Analysis and Design with the Unified Process, John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
5. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.
6. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
7. UML and C++, R.C.Lee and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis,Design and Implementation, B.Dathan and S.Ramnath, Universities Press.
9. OODesign with UML and Java, K.Barclay, J.Savage, Elsevier.
10. Mark Priestley: Practical Object-Oriented Design with UML, TMH.

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COMPUTER NETWORKS

OBJECTIVES:

- An understanding of the overriding principles of computer networking, including protocol design, protocol layering, algorithm design, and performance evaluation.
- An understanding of computer networking theory, including principles embodied in the protocols designed for the application layer, transport layer, network layer, and link layer of a networking stack.
- An understanding of specific implemented protocols covering the application layer, transport layer, network layer, and link layer of the Internet (TCP/IP) stack.
- An understanding of security issues.

OUTCOMES:

- Students will learn to list and classify network services, protocols and architectures, explain why they are layered.
- Student will learn to explain key Internet applications and their protocols.
- Students will learn to explain security issues in computer networks.
- To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
- To master the concepts of protocols, network interfaces, and Design/performance issues in local area networks and wide area networks.

UNIT 1
Introduction: Uses of computer networks, Network Hardware, Network Software, References Models, ARPANET, NSFNET

UNIT II
The Physical Layer: The Theoretical Basis for Data Communication Guided Transmission Media, Wireless Transmission, Switching, Circuit Switching, Packet Switching, Message Switching.

UNIT III
The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, Sliding Window Protocols, HDLC, The data Link layer in the Internet.

UNIT IV
The Medium Access Control Sublayer: The Channel allocation Problem, Multiple Access protocols, Ethernet-Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol. The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless Lans- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC Sub Layer Protocol, The 802.11 Frame Structure.

UNIT V
The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms. Internetworking, The Network Layer in the Internet.

UNIT VI
The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP.

TEXT BOOKS:

1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.

REFERENCES:

1. Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning.
2. Computer Networks: Principles, Technologies and Protocols for Network Design, Natalia Olifer, Victor Olifer, Wiley India.
3. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill.
4. Understanding Communications and Networks, Third Edition, W.A.Shay, Cengage Learning.
5. Computer and Communication Networks, Nader F. Mir, Pearson Education
6. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, Third Edition, Pearson Education.
7. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group.

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DATAWAEHOUSING AND DATA MINING

OBJECTIVES:

- With the basic data warehousing and data mining concepts.
- To learn mining rules in large databases.
- To get idea on clustering analysis.
- Applications that can enable them to set up and manage an industrial data warehousing and data mining system.
- To learn about OLTP and OLAP systems.

OUTCOMES:

- Ability to do Conceptual, Logical, and Physical design of Data Warehouses.
- Familiarity with Requirements Engineering for Data Warehouses.
- OLAP applications and OLAP deployment.
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining.
- Learn broad classes of data mining technologies.

UNIT – I
Introduction:
Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining task primitives, Integration of data mining system with Data base or Data Warehouse system, Major issues in Data Mining.

UNIT – II
Data Warehouse and OLAP Technology:
Overview of Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

UNIT – III
Data Preprocessing:
Need of preprocessing the data, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT – IV
Mining Frequent patterns, Associations, and Correlations:
Basic Concepts, Efficient and Scalable Frequent Item set Mining methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT – V
Classification
Overview of Classification and Prediction, Issues Regarding Classification and Prediction, Bayesian Classification, Classification by Decision Tree Induction, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Lazy Learners: k-Nearest-Neighbor Classifiers, Prediction, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor, Ensemble Methods- Increasing the Accuracy.

UNIT – VI
Cluster Analysis I:
Overview of Cluster Analysis, Types of data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods.

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TEXT BOOKS:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India, second edition.

REFERENCES:

1. Data Mining Introductory and advanced topics–MARGARET H DUNHAM, PEARSON EDUCATION
2. Data Mining Techniques – ARUN K PUJARI, University Press.
3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edition Asia.
4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION
5. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION.

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SOFTWARE QUALITY ASSURANCE AND TESTING
(ELECTIVE-I)

OBJECTIVES:

- Software Testing plays a key role in software development and is a key measure that is taken against producing quality product. This course demonstrates an in-depth understanding of the Software Testing, various quality metrics that are necessary and also on various kinds of testing tools that are helpful in testing process.

OUTCOMES:

- Understanding importance of Quality & Software Testing.
- Identifying various quality metrics & standards followed by various organizations.
- Understanding various kinds of software testing techniques.
- Understanding various kinds of automation testing tools available.

UNIT I
Testing Methodology: Introduction to software Testing, Evolution of Software Testing, Goals of Software Testing, Software testing as a Process. Software Testing Terminology, Software Testing Life Cycle. Verification & Validation: Verification and Validation Activities, Verification and its requirements, Validation.

UNIT II
Software Quality Assurance Framework and Standards SQA Framework: What is Quality? Software Quality Assurance, Components of Software Quality Assurance – **Software Quality Assurance Plan:** Steps to develop and implement a Software Quality Assurance Plan – **Quality Standards:** ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma

UNIT III
Software Quality Assurance Metrics and Measurement Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs

UNIT IV
Software Testing Strategy and Environment: Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing, Defects hard to find, functional and structural testing, workbench concept

UNIT V
Software Testing Techniques:
Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White-Box Testing

UNIT VI
Test Automation: Need for Automation, Categorization of Testing Tools, Overview of Some Commercial Testing Tools: WinRunner, LoadRunner, QTP, Selenium.

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TEXT BOOKS:

1. Effective Methods for Software Testing, 2nd Edition, William E. Perry , Second Edition, Wiley India, 2006.
2. Software Testing Principles and Practices by NARESH CHAUHAN, OXFORD HIGHER EDUCATION, university Press.
3. Software Quality, Mordechai Ben-Menachem/Garry S. Marliss, Thomson Learning publication,1997.

REFERENCE BOOKS:

1. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
2. Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press
3. Managing the Testing Process, by Rex Black, Wiley
4. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I.McManus, Second Edition, International Thomson Computer Press
5. Software Testing and continuous Quality Improvement, by William E.Lewis, Gunasekaran Veerapillai, Second Edition, Auerbach Publications

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ADVANCED COMPUTER ARCHITECTURE (ELECTIVE-I)

OBJECTIVES:

* A broad understanding of computer architecture.
* To the extent possible, an understanding of the current state-of-the-art in uni-processor computer architecture.
* Study how to use technology to build the best computer/processor.
* To know different levels of parallelism.

OUTCOMES:

* Broad understanding of the design of computer systems, including modern architectures and alternatives.
* Understanding of the interaction amongst architecture, applications and technology.
* Understanding of a framework for evaluating design decisions in terms of application requirements and performance measurements.
* A historical perspective on computer system design.

UNIT - I
Fundamentals of Computer design- Technology trends- cost- measuring and reporting performance quantitative principles of computer design.

UNIT - II
Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes for signal processing-operations in the instruction set- instructions for control flow-encoding an instruction set.-the role of compiler

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

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

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

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

TEXT BOOK :

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

REFERENCES:

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

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DISTRIBUTED DATABASES (ELECTIVE-I)

OBJECTIVES:

- Present the principles underlying the functioning of distributed database systems.
- Create an awareness of the major technical challenges in distributed database systems design and implementation.
- Provide experience in the implementation of typical algorithms used in distributed systems.

OUTCOMES:

- Explain what a distributed database system is, why you would design a system as a distributed database system, and what the desired properties of such systems are.
- List the principles underlying the functioning of distributed database systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions.
- Recognize how the principles are applied in contemporary distributed database systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems.

UNIT – I
Features of Distributed versus Centralized Databases, Principles Of Distributed Databases , Levels Of Distribution Transparency, Reference Architecture for Distributed Databases , Types of Data Fragmentation, Integrity Constraints in Distributed Databases.

UNIT – II
Translation of Global Queries to Fragment Queries, Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

UNIT – III
Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries.

UNIT – IV
The Management of Distributed Transactions, A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions.

UNIT - V
Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, and Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT – VI
Reliability, Basic Concepts, Non-blocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection.

TEXT BOOKS:
Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill.

REFERENCES:
Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez – Pearson Education.

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STORAGE AREA NETWORKS (ELECTIVE-I)

OBJECTIVES:

- Describe the Challenges in Data Storage and Data Management.
- Create an awareness of the major physical components of a Disk drive and its functioning.
- Provide experience in the implementation of different RAID levels and their suitability for different application environments.

OUTCOMES:

- Understand the architecture of backup/Recovery and various topologies.
- List various Replication technologies and their role in ensuring information availability.
- Explain various Remote Replication technologies.
- Provide the knowledge of various Industry Standards for Data Centric monitoring and management.
- Describe Information security and critical security attributes for information systems.

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

UNIT II
Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

UNIT III
Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system.

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

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

UNIT VI
Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center.
Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain.
Virtualization technologies, block-level and file-level virtualization technologies and processes.

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TEXT BOOKS:

1. Information Storage and Management, EMC Corporation, Wiley.

REFERENCES:

1. Storage Networks: The Complete Reference, Robert Spalding, Tata McGraw Hill , Osborne, 2003.
2. Building Storage Networks, Marc Farley, Tata McGraw Hill, Osborne, 2001.
3. Storage Area Network Fundamentals, Meeta Gupta, Pearson Education Limited, 2002.

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HUMAN COMPUTER INTERACTION (ELECTIVE-II)

OBJECTIVES:

1. To expose students to the central concepts of Human-Computer Interaction.
2. Establish target users, functional requirements, and interface requirements for a given computer application
3. Describe and explain user interface design principles, and apply them to designing an interface.
4. Develop quick-and-dirty interface designs using rapid prototyping methods.

OUTCOMES:

1. Apply HCI principles and a user-centered approach to interaction design.
2. Analyze user needs and requirements.
3. Design and develop prototypes based on user assessments (needs and requirements), while applying HCI principles and models.
4. Apply evaluation and usability testing methods to interactive products to validate design decisions.

UNIT - I
Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

UNIT - II
The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - III
Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT - IV
Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - V
Windows – Select the proper kinds of Windows: Characteristics, Components of a window, Presentation Styles, Types of Windows, Window Management, Window Operations. Select the Proper Device-Based controls: Characteristics, Selecting the Proper Device-Based Control.

UNIT - VI
Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.
Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES :

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL
2. BEALG, PEARSON.
3. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
4. User Interface Design, SorenLauesen , Pearson Education.

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SOFTWARE PROJECT MANAGEMENT (ELECTIVE-II)

Objective:

1. The objective of the course is to familiarize students in practice with the initiation, management and supervision of a software project.
2. During the course, actual software projects are defined and their implementation is managed and supervised.
3. To provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects.
4. The module is designed to provide an understanding of the particular issues encountered in handling IT projects and to offer students methods, techniques and 'hands-on' experience in dealing with them.

Outcomes:

1. Understand and practice the process of project management and its application in delivering successful IT projects;
2. evaluate a project to develop the scope of work, provide accurate cost estimates and to plan
3. the various activities;
4. understand and use risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales;
5. Identify the resources required for a project and to produce a work plan and resource schedule;

UNIT - I
Conventional Software Management: The waterfall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections

UNIT - II
The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

UNIT - III
Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.
Model based software architectures: A Management perspective and technical perspective.
Work Flows of the process: Software process workflows, Iteration workflows.

UNIT - IV
Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT - V
Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.
Process Automation: Automation Building blocks, The Project Environment.

UNIT - VI
Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.
Tailoring the Process: Process discriminants, Example: small-scale versus large-scale project.

TEXT BOOK:
1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCES:
1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

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IMAGE PROCESSING (ELECTIVE-II)

OBJECTIVES:

- To learn the fundamentals of Image Processing.
- To learn sampling and reconstruction procedures.
- To learn the various transforms used in image Processing.
- To study various concepts of image enhancement, reconstruction and image compression.
- To design image processing systems.

OUTCOMES:

- Develops ability to identify, formulate &solve problems involving images.
- Develops ability to design &conduct experiments, analyze &interpret image data.
- To design a software, Component or process as per needs &specifications.
- It will demonstrate the skills to use modern engineering tools, software's &equipment to analyze problems.
- Develop confidence for self-education & ability for life-long learning.

UNIT - I
Introduction : Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels (p.nos. 15-17, 21- 44, 50-69).

UNIT - II
Image enhancement in the spatial domain : Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods (p.nos 76-141).

UNIT - III
Image restoration : A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function (p.nos 147-167, 220-243, 256-276).

UNIT - IV
Color Image Processing : Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation (p.nos: 282- 339).

UNIT - V
Image Compression : Fundamentals, image compression models, error-free compression, lossypredictive coding, image compression standards (p.nos: 409-467,492-510).

UNIT - VI
Morphological Image Processing : Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms (p.nos:519-550).
Image Segmentation : Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation (p.nos: 567-617).

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TEXT BOOK :

1. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

REFERENCES :

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications
4. Digital Image Processing using Matlab, Rafeal C.Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.
5. Digital Image Processing, William K. Prat, Wily Third Edition
6. Digital Image Processing and Analysis, B. Chanda, D. Datta Majumder, Prentice Hall of India, 2003.

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DISTRIBUTED SYSTEMS (ELECTIVE-II)

OBJECTIVES:

- Present the principles underlying the functioning of distributed systems;
- Create an awareness of the major technical challenges in distributed systems design and implementation;
- Expose students to modern and classic technology used in distributed systems and their software;
- Provide experience in the implementation of typical algorithms used in distributed systems

OUTCOMES:

- Explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
- List the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
- Recognise how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
- Design a distributed system that fulfils requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognise when this is not possible, and explain why;

UNIT-I
Introducton of Distributed System: Goals, Hardware Concepts, Software Concepts, the Client-Server Model.

UNIT-II
Communication: Remote Procedure Call, Remote Object Invocation, Message Oriented Communication, Stream-Oriented Communication.

UNIT-III
Processes: Threads, Clients, Servers, Code Migration, Software Agents. NAMING: Naming Entities, Locating Mobile Entities.

UNIT-IV
Synchronization: Clock Synchronization, Logical Clocks, Global State, Election Algorithms, Mutual Exclusion, Distributed Transactions.

UNIT-V
Consistency And Replication: Introduction, Data-Centric Consistency Models, Client Centric Consistency Models, Distribution Protocols, Consistency Protocols, Examples.

UNIT-VI
Fault Tolerance: Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.

TEXT BOOKS
1. Andrew S. Tanenbaum, Maarten Van Steen. Distributed Systems – Principles and Paradigms 2/e, PHI, 2004.

REFERENCE BOOKS
1. Pradeep K. Sinha, "Distributed Operating Systems Concepts and Design", PHI 2002.
2. Randy Chow Theodore Johnson, "Distributed Operating Systems and Algorithm Analysis", PEA, 2009.
3. George Couloris, Jean Dollimore, Tim Kind berg, "Distributed Systems Concepts and Design", 3/e, PEA, 2002.

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OOAD LAB

Objectives:

- Individually, or in teams, perform specific software development task; collecting and analysing requirements; develop and evaluate a design; test and document an implementation
- Individually, or in teams, perform a software development project using object oriented technology.

Outcomes:

- Use case tools for software design.
- Express object models in UML

1. The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e. Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

2. Student has to take up some more case studies of his/her own interest and do the same whatever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned in theory syllabus can be referred for some idea.

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DATA WAREHOUSING AND DATA MINING LAB

Objectives:

- Applications that can enable them to set up and manage an industrial data warehousing and data mining system.
- To get knowledge by practicing programs.

Outcomes:

- Familiarity with requirements engineering for data warehouses.
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining.

1) Implement the following data mining Techniques in C/C++/Java Language Preprocessing techniques

   a) Data Cleaning

   b) Data Integration and Transformation

   c) Data Reduction

   d) Data Discretization and Concept hierarchy Generation

2) Association Rule Mining

   a) Apriori Algorithm (With candidate generation)

   b) FP-Growth Algorithm (Without candidate generation)

3) Classification methods

   a) Naïve Bayes

   b) Back Propagation

   c) SVM

   d) k-NNC

4) Clustering Methods

   a) k-Means

   b) k-Medoids(Partition Medoids)

   c) BIRCH

   d) DBSCAN

Implementation of data mining algorithms by attribute relation file formats in weka tool.

5) Develop an application to implement OLAP rollup, slice and dice operation.

6) Develop an application to construct a multidimensional data.

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COMPREHENSIVE VIVA –II