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OBJECTIVES:

- To understand the fundamentals of Boolean logic and functions.
- To have a thorough understanding of the basic structure and operation of a digital computer.
- To design and realize digital systems with basic gates and other components using combinational and sequential circuits.
- To discuss in detail about the operation of the arithmetic and logic unit.
- To study the instruction sets and operation of a processor.
- To study the different ways of communication with I/O devices and standard I/O Interfaces.
- To study the hierarchical memory system including cache memories and virtual memory.

UNIT I DIGITAL FUNDAMENTALS

- Digital systems
- Binary numbers
- Octal
- Hexadecimal conversions
- Signed binary numbers
- Complements
- Logic gates
- Boolean algebra
- K-maps
- Standard forms
- NAND-NOR implementation.

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS

- Combinational circuits
- Adder
- Subtractor
- ALU design
- Decoder
- Encoder
- Multiplexers
- Sequential circuits
- Latches
- Flip-flops
- Registers
- Memories
- Up-down Counters.

UNIT III PROCESSOR FUNDAMENTALS

- Von-Neumann architecture
- Processor
- Definition
- Structure
- Category
- Technology
- ALU concept
- Stored programs
- Fetch execute cycle
- Instruction formats
- Clock rate instruction rate
- Pipeline
- Current processors
- Multi core processors.

UNIT IV MEMORY

- Physical memory
- Addressing
- Virtual memory
- Address translation
- Paging
- Cache
- L1-L2-L3 cache memories
- Cache mapping
- LRU replacement.

UNIT V I/O DATA TRANSFER

- Data transfer
- Serial and Parallel data transfer
- Full duplex
- Half duplex interaction
- Bus interface
- Programmed I/O
- Polling
- Interrupt driven I/O
- Hardware interrupt mechanism
- Interrupt vectors
- Multi level of interrupts
- DMA
- Buffer chaining
- Operation chaining.

OUTCOMES:

Upon Completion of the course, the students should be able to:

- Master the binary and hexadecimal number systems including computer arithmetic.
- Design and implement digital systems with basic gates and other components using combinational and sequential circuits.
- Familiarize the Von Neumann architecture.
- Familiarize the functional units of the processor and addressing modes, instruction sets.
- Familiarize the memories and cache subsystem.
- Familiarize the different ways of communication with I/O devices and standard I/O interfaces.

TOTAL: 45 PERIODS
REFERENCES:

CA8102 DATABASE MANAGEMENT SYSTEMS

OBJECTIVES
- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To know the fundamental concepts of transaction processing - concurrency control techniques and recovery procedure.
- To have an introductory knowledge about the Storage and Query processing Techniques.

UNIT I RELATIONAL DATABASES

UNIT II DATABASE DESIGN

UNIT III TRANSACTIONS

UNIT IV IMPLEMENTATION TECHNIQUES
UNIT V  ADVANCED TOPICS
Distributed Databases – Architecture - Transaction Processing - Data Warehousing and Mining – Classification - Association rules – Clustering - Information Retrieval - Relevance ranking - Crawling and Indexing the Web - Object Oriented Databases - XML Databases.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
• Design and create tables in database and query them.
• Know how transaction processing is done.
• Compare different types of databases.

REFERENCES:

CA8103  PROBLEM SOLVING AND C PROGRAMMING  L T P C
3 0 0 3

OBJECTIVES:
• To understand the various problem solving techniques.
• To be aware of the top down design technique.
• To learn the syntax of C.
• To get exposed to the file processing techniques of C.
• To get familiarized with the preprocessor directives.

UNIT I  PROBLEM SOLVING

UNIT II  BASICS OF C PROGRAMMING

UNIT III  REPETITION CONTROL STRUCTURES, FUNCTIONS AND ARRAYS
UNIT IV  
POINTERS, STRINGS AND AGGREGATE DATA TYPES
9

UNIT V  
STREAMS, FILES AND PREPROCESSOR
9

OUTCOMES:
Upon completion of the course, the students should be able to:
• Design and implement C programs for any given problem.
• Work with existing programs and modify it as per the requirements.
• Identify the errors in a C program.
• Identify the output of a C program without actually executing it.

REFERENCES:

CA8104  
SOFTWARE ENGINEERING
L T P C 3 0 0 3

OBJECTIVES:
• To provide information about wider engineering issues that form the background to develop complex, evolving (software-intensive) systems.
• To plan a software engineering process to account for quality issues and non-functional requirements.
• To employ a selection of concepts and techniques to complete a small-scale analysis and design in mini projects.
• To impart knowledge to translate requirement specifications into a design, and then realize that design practically, all using an appropriate software engineering methodology.
• To provide basic knowledge about software project management.

UNIT I  
INTRODUCTION
9

UNIT II  
REQUIREMENT ANALYSIS
9
UNIT III SOFTWARE DESIGN

UNIT IV SOFTWARE TESTING

UNIT V SOFTWARE MAINTENANCE AND SOFTWARE METRICS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Familiarize the basic concepts of Software design and implementation.
- Perform software testing on various applications.
- Apply various software metrics on software quality products.

REFERENCES:
UNIT II        COMBINATORICS  
Permutations and Combinations - Mathematical Induction - Pigeonhole principle - Principle of Inclusion and Exclusion - Recurrence relations - Solution by generating functions and characteristics equations.

UNIT III        ALGEBRAIC STRUCTURES  
Groups - Cyclic group - Permutation group (Sn and Dn) - Substructures - Homomorphism - Cosets and Lagrange’s Theorem - Normal Subgroups - Rings and Fields (definition and examples).

UNIT IV        LATTICES  
Partial order relation – Posets - Hasse diagram - Lattices - Special Lattices - Boolean Algebra.

UNIT V        FINITE STATE AUTOMATA AND GRAMMARS  
Finite state automata - Deterministic and non-deterministic model - languages accepted by Finite State Automata - Regular expressions - Context-free grammars - Derivation trees.

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

- Understand mathematical logic and develop analytical solutions for logical problems and they will be equipped with counting techniques to solve combinatorial problems.
- Comprehend the algebraic structure and formal languages with their applications to handle abstract generalizations and computability.

REFERENCES:

CA8111 DATABASE MANAGEMENT SYSTEMS LABORATORY  
OBJECTIVES:
- To understand the concepts of DBMS.
- To familiarize with SQL queries.
- To write stored procedures in DBMS.
- To learn front end tools to integrate with databases.

EXPERIMENTS IN THE FOLLOWING TOPICS:
1. Data Definition - Manipulation of Tables and Views.
2. Database Querying – Simple queries - Nested queries - Sub queries and Joins.
3. Triggers.
4. Transaction Control.
5. Embedded SQL.
6. Database Connectivity with Front End Tools.
7. Front End Tools / Programming Languages.

10. Database Design and Implementation (Case Study).

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Design and Implement databases.
- Formulate complex queries using SQL.
- Design and Implement applications that have GUI and access databases for backend connectivity.

CA8112 PROGRAMMING LABORATORY (Unix Platform) L T P C
0 0 3 2

COURSE OBJECTIVES:
- To learn the syntax of C.
- To be exposed to the file processing techniques of C.
- To be familiarized with the preprocessor directives.

The following experiments should be practiced
1. Non-iterative control structures.
2. Iterative control structures and arrays.
3. Functions with parameters.
4. Functions with arrays - structures as arguments.
5. Character and String Handling Libraries.
6. Files – Sequential access and random access.
7. Preprocessor directives for other features like macros - conditional compilation.

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Design and implement C programs for any given problem.
- Work with existing programs and modify it as per the requirements.
- Identify the errors in a C program.
- Identify the output of a C program without actually executing it.
OBJECTIVES:
- To understand data communication techniques.
- To know Network Fundamentals.
- To understand Network layers and its functionalities.

UNIT I INTRODUCTION

UNIT II NETWORK FUNDAMENTALS

UNIT III NETWORK LAYER

UNIT IV TRANSPORT LAYER

UNIT V APPLICATIONS

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Trace the flow of information from one node to another node in the network.
- Identify the components required to build different types of networks.
- Work with the division of network functionalities into layers.
- Identify solution for each functionality at each layer.
- Choose the required functionality at each layer for given application.

REFERENCES:
OBJECTIVES:
- To gain comprehensive introduction of common data structures, and algorithm design and analysis.
- To master the design of tree, sets and graph structures and its applications.
- To learn about sorting techniques and understand how common computational problems can be solved efficiently on a computer.

UNIT I    BASIC DATA STRUCTURES
From Problems to programs - Abstract Data Types - Data Types - Data Structures - and Abstract Data Types - The Running Time of a program - Calculating the Running Time of a program - Good Programming Practice - Basic Data Types - List - Implementation of Lists – Stacks – Queues – Mappings - Stacks and Recursive Procedures.

UNIT II   TREES & SETS

UNIT III  GRAPHS

UNIT IV   SORTING AND ALGORITHM ANALYSIS

UNIT V    ALGORITHM DESIGN TECHNIQUES

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Describe, explain, and use abstract data types including stacks, queues and lists.
- Design and Implement Tree data structures and Sets.
- Design algorithms using graph structure to solve real-life problems.
- Implement a variety of algorithms for sorting, including insertion sort, selection sort, merge sort, quick sort, and heap sort.
- Describe the asymptotic performance and algorithm design techniques studied in this course and understand the practical implications of that information.
REFERENCES:

CA8203 EMBEDDED SYSTEMS L T P C 3 0 0 3

OBJECTIVES:
- To understand the architecture of embedded processor, microcontroller and peripheral devices.
- To appreciate the nuance of programming micro controllers in assembly language for embedded systems.
- To understand challenges in Real time operating systems.
- To learn programming the embedded systems in high level languages such as C.

UNIT I INTRODUCTION TO EMBEDDED SYSTEM 9
Introduction to Embedded system - Microprocessor V/s Microcontroller - 8051 Microcontroller - General architecture - Instruction set and Assembly programs- Embedded C programs.

UNIT II MEMORY AND INTERFACE 9
Memory organization and interfacing - I/O devices and interfacing Counters and Timers - Serial data communication - Interrupts.

UNIT III INTERFACING PERIPHERALS 9

UNIT IV ADVANCED CONTROLLER AND PROCESSORS 9
Advanced Microcontrollers - PIC - ARM - ATOM processor - Architecture-Instruction set.

UNIT V DESIGNING AND DEVELOPMENT OF APPLICATIONS 9
Design methodologies and tools - designing hardware and software components - system analysis and architecture design - system integration – debugging - case studies

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Have the ability to understand architecture of embedded processors and microcontroller.
- Have the ability to use Assembly language to develop embedded software.
- Have the ability to use ANSI C to develop embedded software.
- Interface to peripherals, and have the knowledge of typical interfacing standards.
- Design and Develop the prototype of Embedded system (including interfacing to microcontroller, and control from software).
REFERENCES:

CA8204 OBJECT ORIENTED PARADIGM AND PROGRAMMING

OBJECTIVES:
- To understand the OO paradigm.
- To be aware of the OO design technique.
- To learn the syntax of C++.
- To be exposed to the file processing and exception handling techniques of C++.
- To be familiarized with the Standard Template Library.

UNIT I INTRODUCTION

UNIT II ABSTRACT DATA TYPES

UNIT III GENERIC PROGRAMMING

UNIT IV INHERITANCE
Derived Class – Virtual Functions –Polymorphism - Abstract Base Class – Multiple Inheritance.

UNIT V I/O AND EXCEPTION HANDLING

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Design and implement C++ programs for any given problem.
- Understand an existing program and modify it as per the requirements.
- Identify the errors in a C++ program.
- Identify the output of a C++ program without actually executing it.
- Write generic programs using STL.
REFERENCES:

CA8205 OPERATING SYSTEM CONCEPTS

OBJECTIVES:
- To Learn the Operating System basics.
- To Study the process management of Operating system.
- To Gain knowledge in storage management and I/O systems of Operating system.
- To Explore the case studies with various operating systems.

UNIT I OPERATING SYSTEMS OVERVIEW

UNIT II PROCESS MANAGEMENT

UNIT III STORAGE MANAGEMENT

UNIT IV I/O SYSTEMS

UNIT V CASE STUDY

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Discuss on the basics of OS.
- Familiarize the in depth knowledge in process management, memory management and I/O management of various operating systems.
REFERENCES:

CA8211 DATA STRUCTURES AND ALGORITHMS LABORATORY

OBJECTIVES:
- To develop skills in design and implementation of data structures and their applications.
- To learn and implement linear, non-linear and tree data structures.
- To learn Set ADT and Graph data structures and its applications.
- To study, implement and analyze the different sorting techniques.

The following experiments should be practiced
1. Abstract Data type Implementation of List - Stack and Queues.
2. Tree ADT.
3. Tries Implementation.
4. Set ADT - Bit Vector Implementation.
5. Graph Representations.
6. Graph Traversals.
7. Shortest Path Implementation.
8. Spanning Tree Implementation.

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Work with basic data structures that are suitable for the problems to be solved efficiently.
- Design and implement linear, tree, and graph structures and its applications.
- Design various sorting techniques, its algorithm design and analysis.

CA8212 OS AND NETWORKING LABORATORY

OBJECTIVES:
- To know about various Process scheduling algorithms
- To realize the differences between OS and Distributed OS
- To learn Socket programming
- To study about Networking Tools
EXPERIMENTS:

1. Implementation of Process scheduling algorithms.
2. Simulation of Deadlock detection, prevention and recovery process.
5. Implementation of Distributed OS Resource Scheduling algorithms
6. Two-Phase Commit Protocol in Distributed OS.
7. Client-server programming
8. Socket programming (TCP/UDP)
9. Network analyser
10. Traffic Analysis
11. Protocol Analysis
12. Study of Software Defined Networking tools

TOTAL:45 PERIODS

OUTCOMES:
At the end of the course the student should be able to
- Implement process scheduling and deadlock detection, prevention algorithms
- Write programs for distributed process management.
- Write Socket programs with TCP/UDP
- Develop networking applications

CA8301 DATA MINING AND ANALYTICS L T P C
3 0 0 3

OBJECTIVES:
- To understand data mining principles and techniques.
- To expose the students to the concepts of Big Data.
- To understand various data analysis tasks.

UNIT I DATA PREPROCESSING & ASSOCIATION RULE MINING 9
Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT II CLASSIFICATION & PREDICTION 10
Classification vs Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT III CLUSTERING 10
UNIT I V  INTRODUCTION TO BIG DATA  8

UNIT V  DATA ANALYSIS  12

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Perform Classification and Clustering of data.
- Mine Big data by applying various mining techniques.
- Analyze data using various Modeling techniques.

REFERENCES:

CA8302  OBJECT ORIENTED SYSTEM DESIGN  L T P C  3 0 0 3

OBJECTIVES:
- To understand the basics of Object Oriented SDLC.
- To learn UML models and tools.
- To apply Design patterns on various applications.

UNIT I  INTRODUCTION  10

UNIT II  UML  8

UNIT III  SYSTEM DESIGN  9
UNIT IV    DESIGN PATTERNS
Patterns – Analysis and Design patterns – GoF Patterns - Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint.

UNIT V    APPLICATION OF DESIGN PATTERNS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Familiarize with the topics of object oriented System designs.
- Design Patterns using UML.
- Apply design patterns to various applications.

REFERENCES:

CA8303    OPEN TECHNOLOGIES

OBJECTIVE:
- To introduce open technologies
- To develop web applications using python and ruby
- To understand the use of content management system

UNIT I    INTRODUCTION

UNIT II    PYTHON
Introduction to Django - templates - models - forms - deploying django - caching - Integrating with legacy databases and applications – security

UNIT III    RUBY
Ruby on rails - introduction - ruby, ruby gems, rails and git - deploying - building a demo app - static and dynamic pages - rails flavored ruby – users

UNIT IV    CONTENT MANAGEMENT SYSTEMS
Drupal / Joomla – Creating a basic page – Modules – User Interface – Media Management – Event Management – Multilingual capabilities
UNIT V          APPLICATIONS
Case study – Web applications using django - web sites using ruby on rails

TOTAL : 45 PERIODS

OUTCOMES:
- Analyze the various open web frameworks
- Write web applications using python and ruby
- Design for extendibility and code reuse
- Understand deployment options

REFERENCES:

CA8304          WEB PROGRAMMING

OBJECTIVES:
- To understand the basics of web forms and validation.
- To learn the concepts of XML related technologies.
- To learn the fundamentals of java.
- To understand the importance of server side programming and web development.

UNIT I          HTML AND JAVA SCRIPT

UNIT II         XML TECHNOLOGIES

UNIT III        JAVA BASICS

UNIT IV         JAVA GUI AND DATABASE CONNECTIVITY

TOTAL : 45 PERIODS
UNIT V  SERVER SIDE SCRIPT

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
• Design and implement web forms and client side validation.
• Work with XML authoring, Parsing, and related technologies.
• Develop object oriented programming using Java.
• Design and develop GUI based applications using Swing components.
• Design and develop servlet and JSP application with database connectivity.

REFERENCES:

CA8311  CASE TOOLS LABORATORY  L T P C 0 0 3 2

OBJECTIVES:
• To understand the software engineering methodologies for project development.
• To gain knowledge about open source tools for Computer Aided Software Engineering.
• To develop an efficient software using case tools.

SOFTWARE REQUIRED:
Open source Tools: StarUML / UMLGraph / Topcased
Prepare the following documents for each experiment and develop the software using software engineering methodology.

Problem Analysis and Project Planning - Thorough study of the problem – Identify Project scope - Objectives and Infrastructure.

1. Software Requirement Analysis - Describe the individual Phases/modules of the project and Identify deliverables.

2. Data Modelling - Use work products – data dictionary - use case diagrams and activity diagrams - build and test class diagrams - sequence diagrams and add interface to class diagrams.

3. Software Development and Debugging – implement the design by coding

4. Software Testing - Prepare test plan - perform validation testing - coverage analysis - memory leaks - develop test case hierarchy - Site check and site monitor.

Sample Experiments:

Academic domain
1. Course Registration System
2. Student marks analysing system

Railway domain
3. Online ticket reservation system
4. Platform assignment system for the trains in a railway station
Medicine domain
5. Expert system to prescribe the medicines for the given symptoms
6. Remote computer monitoring

Finance domain
7. ATM system
8. Stock maintenance

Human Resource management
9. Quiz System
10. E-mail Client system.

TOTAL : 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Use open source CASE tools to develop software.
- Analyze and design software requirements in an efficient manner.

CA8312 WEB PROGRAMMING LABORATORY

COURSE OBJECTIVES:
- To learn web page creation.
- To understand the real time requirements of web page such as validation, use of DOM, role of XML.
- To understand OOP concepts and basics of Java language.
- To learn and use client server architecture based applications.
- To explore server side functionalities of an application.

The following experiments should be practiced using open source technologies:
2. Creation of XML file and validation using XML schema and generation of XML using tools.
3. Simple xml based applications using DOM, SAX and XSL.
4. Basic Java programming covering objects, inheritance, polymorphism, interfaces, packages and exception handling.
5. String handling programs and regular expression programs.
6. Creation of applet based GUI's.
7. Application involving applet based GUI, JDBC, Servlet, JSP/PHP, cookies and session tracking.

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Make Web site creation and validation.
- Work with XML based technologies.
- Develop simple console application using Java.
- Develop GUI application using Swing and Applet.
- Build web based applications using JDBC, Servlet / JSP.

TOTAL : 45 PERIODS
OBJECTIVES:
- To understand the advanced concepts of Java.
- To learn the concepts of MVC architecture and security issues.
- To learn the concept of distributed objects including web services.
- To understand the importance of other advanced frameworks.

UNIT I  JAVA BASICS  12

UNIT II  JAVA NETWORK PROGRAMMING  12

UNIT III WEB APPLICATION DEVELOPMENT  12

UNIT IV SOFTWARE COMPONENTS  12
Distributed objects - RMI programming model - Parameters and return values in remote methods - Remote object activation - Web services and JAX-WS - Publishing and consuming SOAP based web services - REST-based web services - REST-based JSON web services - Session tracking.

UNIT V  ADVANCED FRAMEWORK  12

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Work with Java I/O streams, networking and GUI based application development.
- Work with Web application development using Java Server Faces.
- Work with Security features supported in Java.
- Develop web services using REST/SOAP/JSON.
- Design and develop applications using other frameworks.

REFERENCES:
OBJECTIVES:
- To learn the characteristics of mobile applications.
- To understand the intricacies of UI required by mobile applications.
- To study about the design aspects of mobile application.
- To learn development of mobile applications.

UNIT I INTRODUCTION

UNIT II USER INTERFACE

UNIT III APPLICATION DESIGN

UNIT IV APPLICATION DEVELOPMENT

UNIT V TOOLS

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- To design and implement the user interfaces for mobile applications.
- To design the mobile applications that is aware of the resource constraints of mobile devices.
- To develop advanced mobile applications that accesses the databases and the web.
- To develop useful mobile applications in the current scenario using Google Android and Eclipse simulator.

REFERENCES:
OBJECTIVES:
- To understand the concepts and models of security in computing.
- To understand the cryptographic techniques used.
- To explain the security standards followed at the network level and at the application level.
- To estimate the level of security risk faced by an organization and the counter measures to handle the risk.
- To learn secure software development.

UNIT I  SECURITY – OVERVIEW

UNIT II  CRYPTOGRAPHY

UNIT III  ACCESS CONTROL

UNIT IV  HOST AND DATA SECURITY
Host Hardening – OS hardening – Managing vulnerabilities - Permissions - Data protection – Application security – Issues – E-commerce security – E-mail security - Incident and Disaster Response.

UNIT V  SECURE CODING

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Compare various Cryptographic Techniques.
- Design secure applications.
- Inject secure coding in the developed applications.

REFERENCES:
OBJECTIVES:
- To learn Java and Enterprise Java intensively.
- To understand many advanced technologies of Java such as Multithreading, Streaming, Networking, Generic collections, RMI.
- To learn and use MVC architecture for application development.
- To learn and use web services and advanced frameworks for web application development.

The following experiments should be practiced
1. Design and Implement java programs that deals with the following:
   a. Classes and Objects and Interfaces.
   b. Exception Handling with user defined Exceptions.
   c. String Handling (String Class objects - String Manipulation functions).
   e. Multiple Threads Creation
   f. Implementation of Thread Synchronization using any application.
   g. Reading and Writing Objects using Serialization.
   h. Creation of User Interfaces using SWING.
   i. Creation of Smiley-Drawings-Cartoons-Symbols-Simple animations using Java Graphics.
   j. Usage of Recursion.
   k. Creation and Manipulation of generic objects.
   l. Reading websites using URL class.
   m. File Transfer using UDP.
   n. Chat Application using TCP.
2. Implementation of any Information System using JDBC.
3. Simple JSF programs.
4. Session Management and Implementation of Cookies using JSF.
5. Development of a Web application using JSF.
6. Database Connectivity using Java Bean.
7. Development of security applications using JAAS.
9. Creation of Web Services using JAX-WS.
10. Creation of REST based web services and its access using JSON.
11. Database access using Hibernate.

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Become an intermediate or advanced developer of Java.
- Write programs on advanced technologies of Java such as Streaming, Networking, Multithreading and Generic collections.
- Develop chat and file transfer applications.
- Implement Server Side Programming and dynamic software components.
- Design and Develop GUI based components and Animations.
- Design and implement an interactive web sites.
- Work with online databases.
- Create distributed applications using RMI, JAX-WS, and REST based services.
- Create MVC applications using advanced frameworks.
CA8412                  MOBILE APPLICATION DEVELOPMENT LABORATORY

OBJECTIVES:
• To know about various platforms and tools available for developing mobile applications.
• To realize the differences between the development of conventional applications and mobile applications.
• To learn programming skills in J2ME and Android SDK.
• To study about micro browser based applications to access the Internet using Sun Java Toolkit.

The following experiments to be practiced
2. Form design for mobile applications.
3. Applications using controls.
4. Graphical and Multimedia applications.
5. Data retrieval applications.
7. Gaming applications.
   (Perform the experiments from 2 to 7 in J2ME and Android SDK framework)
8. Micro browser based applications using WAP, WML and WML scripts.
   (Perform experiments in 8 using Sun Java Wireless toolkit)

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
• Develop useful mobile applications for the current scenario in mobile computing and pervasive computing.

CA8501                  CLOUD COMPUTING

COURSE OBJECTIVES:
• To understand the concept of cloud and utility computing.
• To understand the various issues in cloud computing.
• To familiarize themselves with the lead players in cloud.
• To appreciate the emergence of cloud as the next generation computing paradigm.
• To be able to set up a private cloud.

UNIT I                  INTRODUCTION

UNIT II                 VIRTUALIZATION
UNIT III  CLOUD INFRASTRUCTURE  9
Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development –
Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform
Deployment – Global Exchange of Cloud Resources.

UNIT IV  PROGRAMMING MODEL  10
Parallel and Distributed programming Paradigms – MapReduce - Twister and Iterative MapReduce –
Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine -

UNIT V  SECURITY IN THE CLOUD  9

TOTAL:45 PERIODS
OUTCOMES:
Upon Completion of the course, the students should be able to:
• Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
• Identify the architecture, infrastructure and delivery models of cloud computing.
• Explain the core issues of cloud computing such as security, privacy and interoperability.
• Choose the appropriate technologies, algorithms and approaches for the related issues.

REFERENCES:
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4. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the
Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice), O'Reilly, 2009.
Elsevier/Morgan Kaufmann, 2005.
Business Perspective on Technology and Applications”, Springer.

CA8502  SERVICE ORIENTED ARCHITECTURE  L T P C
3 0 0 3
OBJECTIVES:
• To understand various architecture for application development.
• To learn the importance of SOA in Application Integration.
• To learn web service and SOA related tools.

UNIT I  INTRODUCTION TO SOA  9
Software Architecture – Types of IT Architecture – SOA – Evolution – Key Components – Perspective
of SOA – Enterprise-Wide SOA – Architecture – Enterprise Applications – Solution Architecture for
Enterprise Application – Software Platforms for Enterprise Applications – Patterns for SOA –
SOA Programming Models.
UNIT II  ANALYSIS AND DESIGN OF SOA BASED SYSTEMS  9

UNIT III  SOA GOVERNANCE  9

UNIT IV  SOA IMPELEMENTATION  9

UNIT V  SOA ARCHESTRATION  9

TOTAL: 45 PERIODS

OUTCOMES: Upon Completion of the course, the students should be able to:
- Compare different IT architecture.
- Analyze and design SOA based applications.
- Implement web service and obtain the realization of SOA.
- Implement RESTful Services.
- Design and implement SOA based Application Integration using BPEL.

REFERENCES:
UNIT II SOFTWARE TESTING METHODOLOGY

UNIT III SOFTWARE TESTING TECHNIQUES

UNIT IV AUTOMATED TESTING AND TEST TOOLS

UNIT V TEST DOCUMENTATION

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Perform automated testing using test tools.
- Document the testing procedures.

REFERENCES:

CA8511 CLOUD LABORATORY

1. Create and destroy a Virtual machine using Xen hypervisor
2. Use single Virtual Machine n-number of times
3. Create a VM image which has a C compiler along with an operating system and do the following experiments
   a. Fibonacci Series
   b. File Operations
4. Write a program to communicate between two Virtual Machines
5. Store a video image in Walrus and playback the same using a VM
6. Implement a cryptographic algorithm to secure data in the VM
7. Data storing in remote database
8. Data storing in multiple data centers
9. Access control for databases
10. Simulate a cloud scenario using Cloud Sim (Mini Project)

TOTAL: 45 PERIODS
OBJECTIVES:
- To study various testing tools.
- To implement various testing techniques.

The following experiments should be practiced:
1. Study of software testing tools such as WinRunner, LoadRunner, Rational Rose Test Suite etc.,
2. Implementation of testing techniques using tools:
   (1) Function testing
   (2) System testing
   (3) Acceptance testing
   (4) Usability testing
   (5) Agile testing
   (6) Configuration testing
   (7) Compatibility testing
   (8) Foreign language testing
   (9) Security testing
3. Mini-project: developing automated test case generation tool for following domains:
   a) Website development
   b) Passport management system
   c) Health care
   d) Finance management
   e) Travel reservation system
   f) Mobile application

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Perform automated testing on applications using test tools.
- Design and develop automated test case generation tools.

OBJECTIVES:
- To understand the basic ideas and principles in biometrics.
- To understand the basic concepts of statistical data analysis for validating the biometrics projects.
- To familiarize the student with the image processing facilities in MATLAB and its equivalent open source tools like OpenCV.
- To appreciate the use of biometrics Industrial applications and to understand the role of biometrics in modern security environment.
- To understand and implement more advanced topics in current research literature.
- To understand the role of multi-biometrics.
UNIT I  BIOMETRICS FUNDAMENTALS  9

UNIT II  FINGER AND FACIAL SCAN  9
Finger scan – Features – Components – Operation (Steps) – Competing finger Scan technologies – Strength and weakness - Types of algorithms used for interpretation - Facial Scan - Features – Components – Operation (Steps) – Competing facial Scan technologies – Strength and weakness.

UNIT III  IRIS AND VOICE  9
Iris Scan - Features – Components – Operation (Steps) – Competing iris Scan technologies – Strength and weakness. Voice Scan - Features – Components – Operation (Steps) – Competing voice Scan (facial) technologies – Strength and weakness.

UNIT IV  PHYSIOLOGICAL BIOMETRICS  9

UNIT V  BIOMETRICS APPLICATION DEVELOPMENT  9

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Implement basic biometrics related algorithms.
- Familiar with the use of MATLAB and its equivalent open source environments.
- Design and implement industrial applications that incorporate different concepts of biometrics.
- Critically analyze different approaches to implement mini projects in industrial environment and in security related projects.

REFERENCES:
OBJECTIVES:
- To understand the mathematics behind Cryptography.
- To understand the standard algorithms used to provide confidentiality, integrity and authenticity.
- To get the knowledge of various security practices applied in the field of information technology.

UNIT I  FUNDAMENTALS AND MATHEMATICS OF CRYPTOGRAPHY  9

UNIT II  ENCRYPTION TECHNIQUES  9

UNIT III  HASH FUNCTIONS AND SIGNATURES  9

UNIT IV  NETWORK SECURITY  9

UNIT V  SYSTEM SECURITY  9

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Understand the basic security algorithms required by any computing system.
- Predict the vulnerabilities across any computing system.
- Design a security solution for any computing system.

REFERENCES:
OBJECTIVES:
- To understand the importance of CRM in strategic management.
- To gain knowledge about CRM structures, planning and implementation.
- To get acquainted with the recent trends in CRM.

UNIT I INTRODUCTION

UNIT II UNDERSTANDING CUSTOMERS

UNIT III CRM STRUCTURES

UNIT IV CRM PLANNING AND IMPLEMENTATION

UNIT V TRENDS IN CRM
e- CRM Solutions – Data Warehousing – Data mining for CRM – An introduction to CRM software packages.

OUTCOMES:
Upon completion of the course, the students should be able to:
- Implement CRM in strategic management.
- Describe about CRM structures, planning and implementation.
- Design CRM solutions.

REFERENCES:
OBJECTIVES:
- To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence.
- To expose the students to the concepts of Data warehousing Architecture and Implementation.
- To study the overview of developing areas – Web mining, Text mining and ethical aspects of Data mining.
- To identify Business applications and Trends of Data mining.

UNIT I DATA WAREHOUSE

UNIT II DATA MINING & DATA PREPROCESSING
Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III ASSOCIATION RULE MINING
Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint - Based Association Mining.

UNIT IV CLASSIFICATION & PREDICTION
Classification vs Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V CLUSTERING

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Evolve Multidimensional Intelligent model from typical system.
- Discover the knowledge imbibed in the high dimensional system.
- Evaluate various mining techniques on complex data objects.

REFERENCES:
OBJECTIVES:

- To understand the basic principles of tuning.
- To learn about the performance criteria of choosing a DBMS.
- To understand and use suitable troubleshooting mechanisms for tuning databases.

UNIT I  FUNDAMENTALS OF TUNING

UNIT II  INDEX TUNING
Types of Queries – Data Structures – B tree – B* Tree - Hash Structures – Bit Map Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Hot Tables – Comparison of Indexing and Hashing Techniques.

UNIT III  QUERY OPTIMIZATION

UNIT IV  TROUBLESHOOTING

UNIT V  CASE STUDIES

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Gain knowledge on the significance of database tuning.
- Optimize queries for tuning databases.
- Develop tuning based E-Commerce applications.

REFERENCES:
OBJECTIVES:

• To understand the basic concepts and algorithms of digital image processing.
• To familiarize the students with the image processing environments like MATLAB and its equivalent open source Image processing environments.
• To expose the students to a broad range of image processing techniques and issues and their applications, and to provide the students with practical experience using them.
• To appreciate the use of image processing in current technologies and to expose the students to real-world applications of image processing.

UNIT I  FUNDAMENTALS OF IMAGE PROCESSING

UNIT II  IMAGE ENHANCEMENT AND RESTORATION

UNIT III  IMAGE SEGMENTATION AND IMAGE FEATURE ANALYSIS

UNIT IV  MULTI RESOLUTION ANALYSIS AND MORPHOLOGICAL PROCESSING

UNIT V  IMAGE PATTERN RECOGNITION AND CASE STUDIES

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:

– Implement basic image processing algorithms using MATLAB tools.
– Design an application that incorporates different concepts of Image Processing.
– Apply and explore new techniques in the areas of image enhancement- restoration- segmentation- compression-wavelet processing and image morphology.
– Critically analyze different approaches to implement mini projects.
– Explore the possibility of applying Image processing concepts in various domains.
REFERENCES:

CA8007 DISTRIBUTED SYSTEMS

OBJECTIVES:
- To understand the concepts of distributed system.
- To learn about distributed system resource management.
- To understand various fault tolerant techniques.

UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT

UNIT II DISTRIBUTED OPERATING SYSTEMS

UNIT III DISTRIBUTED RESOURCE MANAGEMENT
Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.

UNIT IV FAULT TOLERANCE AND CONSENSUS

UNIT V CASE STUDIES
Distributed Object-Based System – CORBA – COM+ – Distributed Coordination – Based System – JINI.

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Develop fault tolerant distributed applications.
- Compare various distributed operating system characteristics.
- Apply efficient Resource allocation methodologies in distributed applications.

REFERENCES:
OBJECTIVES:
- To gain knowledge about modern technology for learning.
- To acquaint with the e-Learning Tools.
- To learn technologies involved in e-learning application development.
- To become aware of the current business potential of e-learning based business.

UNIT I  INTRODUCTION

UNIT II  E-LEARNING STRATEGY AND TOOLS

UNIT III  DESIGN ASPECTS OF E-LEARNING

UNIT IV  BUSINESS CASES
Measurement and Results – Making business case - different approaches - Return on investment – expectation - Six Sigma - evaluation check list.

UNIT V  OPENSOURCE E-LEARNING APPLICATION
Moodle 2.0 E-Learning Course Development – Features - Architecture - Installation and configuring site - Adding static course material - Evaluating student.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Work with technologies involved in e-Learning Applications.
- Design and Develop e-Learning Application and working with e-Learning tools.

REFERENCES:

OBJECTIVE:
To make the students aware of the enterprise resource planning using information technology.

UNIT I  INTRODUCTION TO ERP
UNIT II ENTERPRISE SYSTEMS

UNIT III PROCESS IN ERP

UNIT IV INTEGRATION

UNIT V CASE STUDY

TOTAL: 45 PERIODS

OUTCOMES:
• Upon completion of this course, the students should be able to:
• Understand the traditional ecosystem and the use of technology in enterprises.

REFERENCES:

CA8010 FINANCIAL MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:
• To understand the operational nuances of a Finance Manager.
• To comprehend the technique of making decisions related to finance function.

UNIT I FOUNDATIONS OF FINANCE
Financial management – An overview - Time value of money - Introduction to the concept of risk and return of a single asset and of a portfolio - Valuation of bonds and shares - Option valuation.

UNIT II INVESTMENT DECISIONS
Capital Budgeting - Principles and techniques - Nature of capital budgeting - Identifying relevant cash flows - Evaluation Techniques – Payback - Accounting rate of return - Net Present Value - Internal Rate of Return - Profitability Index - Comparison of DCF techniques - Project selection under capital rationing - Inflation and capital budgeting - Concept and measurement of cost of capital - Specific cost and overall cost of capital.
UNIT III  FINANCING AND DIVIDEND DECISION  9
Financial and operating leverage - capital structure - Cost of capital and valuation - designing capital structure - Dividend policy - Aspects of dividend policy - practical consideration - forms of dividend policy - forms of dividends - share splits.

UNIT IV  WORKING CAPITAL MANAGEMENT  9

UNIT V  LONG TERM SOURCES OF FINANCE  9
Indian capital and stock market - New issues market Long term finance - Shares -Debentures and term loans - lease - Hire purchase - Venture capital financing - Private Equity.

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Possess the techniques of managing finance in an organization.

REFERENCES:

CA8011  GAME PROGRAMMING  L T P C  3 0 0 3

OBJECTIVE:
- To understand Game Designing and Development.
- To design the logic and develop Game Engine Model.
- To enable the students to create Interactive Games.

UNIT I  3D GRAPHICS FOR GAME PROGRAMMING  9

UNIT II  GAME DESIGN PRINCIPLES  9
Character development - Story Telling - Narration - Game Balancing - Core mechanics - Principles of level design - Genres of Games - Collision Detection - Game Logic - Game AI - Path Finding.
UNIT III   GAMING ENGINE DESIGN  9

UNIT IV   GAMING PLATFORMS AND FRAMEWORKS  9

UNIT V   GAME DEVELOPMENT  9
Developing 2D and 3D interactive games using OpenGL - DirectX – Isometric and Tile Based Games - Puzzle games - Single Player games - Multi Player games.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students should be able to:
• Model and develop a new Gaming System.
• Develop interactive games with their knowledge gained out of various Gaming Platforms.

REFERENCES:

CA8012   GEOGRAPHICAL INFORMATION SYSTEM   L T P C
3 0 0 3

OBJECTIVES:
• To give a brief overview of Geographic Information System.
• To acquire knowledge about Spatial and Non-Spatial Data.
• To understand about various File Formats.

UNIT I   GIS COMPONENTS  7
GIS – Definition - History of GIS - Basic Components of GIS – Hardware - Software Data - Methods - People – List of GIS Software: Popular software - Open Source software

UNIT II   CLASSIFICATION OF DATA  10
UNIT III MODELS

UNIT IV FILE FORMATS

UNIT V DIGITAL ELEVATION MODELS

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
• Apply the fundamental concepts and techniques related to the use of Geographic Information System.
• Apply this knowledge to a wide range of spatial/environmental problems.
• Describe GIS data models and spatial data collection.

REFERENCES:

CA8013 GRID COMPUTING

COURSE OBJECTIVES:
• To understand Grid Architecture.
• To understand different types of grids.
• To know about Grid standards.
• To apply grid computing in various areas.

UNIT I INTRODUCTION
UNIT II  FRAMEWORK  9

UNIT III  DATA AND KNOWLEDGE GRID  9
Data Source – Collective Data Service - Data Management - Knowledge Oriented Grid.

UNIT IV  GRID MIDDLEWARE  9

UNIT V  APPLICATIONS  9
Scientific – Medical – Bioinformatics – Federated – ERM – Collaborative Science – Case Study.

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:

- Create a Grid Middleware architecture.
- Explain the services offered by grid.
- Utilize grid for various applications.

REFERENCES

CA8014  HEALTHCARE INFORMATION SYSTEMS  L T P C
3 0 0 3

OBJECTIVES:
- To provide the students, the knowledge to address the current challenges in HIS.
- To focus on the storage, integration, querying and management of heterogeneous, voluminous, geographically dispersed biomedical data.
- To address the analysis of the experimental data and methods.

UNIT I  INTRODUCTION  9
Computational Biology - Genomes – Networks - Evolution- Imaging Biophysicsology and Clinical Apps - Biomedical Computing - Medical Decision Support - Biomedical Information Technology.

UNIT II  NEURAL PROCESSING  9
UNIT III ACOUSTICS INFORMATION SYSTEMS 9

UNIT IV FUNCTIONAL MAGNETIC RESONANCE IMAGING 9
FMRI - Data Acquisition and Analysis - Image Reconstruction in MRI – Disease Analysis tools – Disease Decision Support System.

UNIT V DATA ANALYTICS AND CASE STUDIES 9
Economics of the Health Care Industries - Strategic Decision Making in the Biomedical Business - Critical Reading and Technical Assessment of Biomedical Information - Dynamics of Biomedical Technologies - Case Studies and Strategies in Drug Discovery and Development.

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

- Be enriched in analyzing medical data in biomedical information systems.
- Explore the different tools for analyzing the medical data for HIS.
- Present the medical examples of pathway analysis methods and generate the reports.

REFERENCES:
   http://compbio.mit.edu/teaching.html

CA8015 HIGH SPEED NETWORKS

COURSE OBJECTIVES:

- To provide an overview of high-speed networking technologies.
- To learn the enhanced set of functionalities for high-speed networking.
- To understand the underlying concept involved for high performance.

UNIT I HIGH SPEED LANS 9
Ethernet – Fast Ethernet - Gigabit Ethernet - 10 Gigabit Ethernet – Token Ring - Fibre Channel – Wireless LAN’s – IEEE802.11 architecture and services – IEEE802.11 MAC – IEEE802.11 a/b/g/n physical layers - security considerations.
UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9

UNIT III IPV6 9

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9

UNIT V MPLS NETWORKS 9

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- A good appreciation of the building blocks and operation of high speed networking technology including the hardware and software components.

REFERENCES:

CA8016 HUMAN RESOURCE MANAGEMENT L T P C
3 0 0 3

COURSE OBJECTIVES:
To provide knowledge about management issues related to staffing, training, performance, compensation, human factors consideration and compliance with human resource requirements.

UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT 5
UNIT II  THE CONCEPT OF BEST FIT EMPLOYEE  8

UNIT III  TRAINING AND EXECUTIVE DEVELOPMENT  10

UNIT IV  SUSTAINING EMPLOYEE INTEREST  12

UNIT V  PERFORMANCE EVALUATION AND CONTROL PROCESS  10

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:

• Gain knowledge and skills needed for success as a human resources professional.

REFERENCES:

CA8017  M-COMMERCE  L T P C  3 0 0 3

OBJECTIVES:
• To understand Mobile Business strategies.
• To understand Mobile marketing tools and techniques.
• To know about Mobile technologies.

UNIT I  INTRODUCTION  9
Introduction – Mobile Marketing Campaign - Fortune 500 and Mobile Marketing - Consumers Engagement with Mobile Terminologies.
UNIT II MOBILE MARKETING 9

UNIT III MOBILE MARKETING TOOLS 9
Strategic thinking about Mobile Marketing Campaign - Mobile Marketing Tools – Setting up Mobile Website for Different Firms using SMS - MMS And Apps - To Drive Customers to Business and Other Ways to Attract Customers.

UNIT IV MOBILE APPLICATIONS 9
Location Based Marketing – LBS – NFC - Bluetooth and LBA - 2D Codes – Tablet - Other Mobile Applications - Business Firms Connecting To Customers Using Mobile – Case Study - Mobile Marketing For B2B Companies - Mobile E-Commerce to Drive Revenue.

UNIT V MOBILE APPLICATION DEVELOPMENT 9
Mobile Payments - Present and Future Mobile Technology - Mobile Application Development.

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Analyze various mobile marketing strategies.
- Market Mobile based Applications.
- Apply various tools in mobile marketing.

REFERENCES:

CA8018 OPERATIONS RESEARCH

OBJECTIVES:
This course aims at providing the necessary basic concepts of a few deterministic optimization techniques, queuing theory, simulation and applies them to various engineering problems.

UNIT I QUEUEING MODELS 9+3
Markovian Queues - Steady state analysis of Single and Multi-server Models - Little’s Formula - Finite and Infinite capacity models - Machine Interference Model - Self-service Queue.
UNIT II  LINEAR PROGRAMMING  9+3
Formulation - Graphical solution - Simplex method - Two-phase method - Transportation and Assignment Models.

UNIT III  NON-LINEAR PROGRAMMING  9+3

UNIT IV  DYNAMIC PROGRAMMING  9+3
Dynamic programming - Principle of optimality - Forward and backward recursion – Applications of dynamic programming - Problem of dimensionality.

UNIT V  SIMULATION MODELLING  9+3
Monte Carlo Simulation - Types of Simulation - Elements of Discrete Event Simulation - Generation of Random Numbers - Applications to Queuing systems.

L: 45 +T: 15 TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Have a clear perception of the power of mathematical programming tools and acquire skills to analyze queuing models.
- Demonstrate the application of the operations research techniques to problems drawn from industry, management and other engineering fields.

REFERENCES:

CA8019  PROFESSIONAL PRACTICES  L T P C
3 0 0 3

OBJECTIVES:
- To make the students aware of their responsibilities and duties as a computer professional.
- To acquaint and help the students to analyze the social implications of the rapid computerization.
- To gain knowledge about the ethical issues involved in computing, and improve Communication skills.

UNIT I  INTRODUCTION  9
UNIT II  PROFESSIONAL ETHICS AND RESPONSIBILITIES  9

UNIT III  INTELLUCTUAL PROPERTY RIGHTS  9

UNIT IV  FRAMEWORKS  9

UNIT V  COMPUTER ETHICS  9

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Make students aware of their responsibilities and duties as a computer professional.
- Acquaint and help students to analyze the social implications of the rapid computerization.
- Adopt the ethical issues involved in computing, and improve communication skills.

REFERENCES:

CA8020  REAL TIME SYSTEMS  L T P C
  3 0 0 3

COURSE OBJECTIVES:
- To learn the fundamentals of real time computing systems.
- To understand real time databases.
- To familiarize with real time reliability techniques.

TOTAL: 45 PERIODS
UNIT I
INTRODUCTION

UNIT II
PROGRAMMING LANGUAGES AND TOOLS

UNIT III
REAL TIME DATABASES
Real time Databases - Basic Definition - Real time Vs General Purpose Databases - Main Memory Databases - Transaction priorities - Transaction Aborts - Concurrency Control Issues - Disk Scheduling Algorithms - Two-Phase Approach to improve Predictability - Maintaining Serialization Consistency - Databases for Hard Real Time systems.

UNIT IV
COMMUNICATION

UNIT V
EVALUATION TECHNIQUES

OUTCOMES:
Upon Completion of the course, the students should be able to:
• Design and Implement real time applications.
• Apply real time communication techniques in networks.
• Evaluate reliability in real time applications.

REFERENCES:
COURSE OBJECTIVES:
- To give a clear picture on quality management, documentation and control for software quality.
- To provide knowledge on standards, models and tools used for quality management.
- To understand how to perform measurement and assessment of software quality.

UNIT I  BASICS OF SOFTWARE QUALITY  9

UNIT II  CONTROLLING AND DOCUMENTING  9

UNIT III  QUALITY STANDARDS  9

UNIT V  QUALITY METRICS AND ASSESSMENT  9
Fundamentals of Measurement Theory - Software quality Metrics overview – Availability Metrics – Conducting In-Process quality assessment - Conducting software project Assessments.

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Learn how to document, control and manage software quality with the aid of tools and standards.
- Practice the process of measurement and assessment to ensure Software Quality.

REFERENCES:

CA8022  SOFTWARE RELIABILITY AND METRICS  3 0 0 3

OBJECTIVES:
- To introduce the basics of software reliability.
- To illustrate how to perform planning, execution and testing for software reliability.
- To learn about various metrics and models of software reliability.
UNIT I  INTRODUCTION TO RELIABILITY CONCEPTS  9

UNIT II  OPERATING PROFILES  10
Implementing Operational Profiles - Developing Operational Profiles - Using the Graphical Representation of the Operational Profile - Applying the Module Usage Table - Learning Operations and Run Concepts - Applying Operational Profiles.

UNIT III  EXECUTION AND TESTING  9

UNIT IV  FUNDAMENTALS OF MEASUREMENTS  8

UNIT V  METRICS AND MODELS  9

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Learn reliability concepts, metrics and models used to evaluate the software reliability.
- Work with planning, execution and testing of software for reliability.

REFERENCES:

CA8023  TCP/IP DESIGN AND IMPLEMENTATION  L T P C
3 0 0 3

OBJECTIVES:
- To understand the interaction between TCP/IP suite and OS.
- To study about the complicated data structures that are used to implement the various protocols.
- To learn about the routing methodologies within AS and across AS.
- To study about the timer management of TCP in detail.
- To learn the implementation of ICMP and IGMP.

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UNIT I  INTRODUCTION

UNIT II  OTHER PROTOCOLS

UNIT III  IP IMPLEMENTATION

UNIT IV  ICMP & IGMP

UNIT V  TCP IMPLEMENTATION
Data structure and input processing – transmission control blocks – Output processing – Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission – congestion avoidance and control – urgent data processing and push function.

COURSE OUTCOME:
Upon completion of the course, the students should be able to:
• Design a sample protocol stack.
• Come up with more efficient data structures for the protocols.
• Embed the protocol suite in a better and secure way in the OS.
• Come up with the variants of TCP according to the applications.
• Modify IP according to the applications.

REFERENCES:

CA8024   UNIX INTERNALS

OBJECTIVES:
• To understand the design of the UNIX operating system.
• To become familiar with the various data structures used.
• To learn the various low-level algorithms used in UNIX.
UNIT I  OVERVIEW  9

UNIT II  FILE SUBSYSTEM  9
Internal representation of files – Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Allocation of disk blocks.

UNIT III  SYSTEM CALLS FOR THE FILE SYSTEM  9

UNIT IV  PROCESSES  9

UNIT V  MEMORY MANAGEMENT AND I/O  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Design and implement any subsystem of an operating system.
- Modify the existing data structures of Linux kernel.
- Modify the existing subsystem of Linux kernel and rebuild it.
- Design and implement new data structures and algorithms for the kernel of an operating system.
- Critically analyze different data structures and algorithms used in the building of a kernel.

REFERENCES:
OBJECTIVES:
- To know about the user.
- To learn the importance of best interface.
- To know about object oriented user interface (OOUI).
- To know about the merging of PC interface with Internet Web browser interfaces.

UNIT I FOUNDATIONS OF USER INTERFACE DESIGN
Designing quality software user interface – user experiences and expectations – software user interface – user interface models – psychology of humans and computer – golden rules of user interface design.

UNIT II USER INTERFACE EVOLUTION
Computer standards and user interface guidelines – software usability testing – command lines and menus – graphical user interface.

UNIT III OBJECT-ORIENTED USER INTERFACE
Introduction – basic of OOUIs – core skills needed for OOUIs – user interface architecture behind OOUIs – OOUIs and the user’s model – User’s Memory load – Semantics of OOUIs – migrating from GUI to OOUIs.

UNIT IV USER INTERFACE DESIGN PROCESS
An iterative user interface design process – Design Team approach – User involved and learner – Centered design – Four-phase Interface design process – Iterative nature of interface design – Case Study – Gather and analyze user information – Design the user interface – Construct the user interface – Validate the user interface – Testing – evaluation.

UNIT V ADVANCED USER INTERFACE TECHNIQUES AND TECHNOLOGIES
Interface Designer’s Tool kit – Uses of color – Audio and animation in the user interface - top ten usability – Problems with GUI and OOUIs – Help - advisors - wizards and multimedia – Social user interface and intelligent agents – The new worlds of PC – internet user interfaces.

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Design an efficient User interface with required information.
- Analyze user requirements thoroughly.
- Implement Object oriented approach in interface design.

REFERENCES:
OBJECTIVES:
- To understand the concept of virtualization.
- To understand the various issues in virtualization.
- To familiarize the students with the types of virtualization.
- To compare and analyze various virtual machines products.

UNIT I  OVERVIEW OF VIRTUALIZATION  10

UNIT II  SERVER CONSOLIDATION  8
Hardware Virtualization - Virtual Hardware Overview - Sever Virtualization - Physical and Logical Partitioning - Types of Server Virtualization - Business cases for Sever Virtualization - Uses of Virtual server Consolidation - Planning for Development -Selecting server Virtualization Platform.

UNIT III  NETWORK VIRTUALIZATION  10

UNIT IV  VIRTUALIZING STORAGE  8

UNIT V  VIRTUAL MACHINES PRODUCTS  9

TOTAL:45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Create a virtual machine and to extend it to a virtual network.
- Discuss on various virtual machine products.
- Compile all types of virtualization techniques and utilize them in the design of virtual machines.

REFERENCES:
OBJECTIVES:
- To understand the importance of data visualization.
- To know the different types of visualization techniques.
- To create various visualizations.

UNIT I  INTRODUCTION

UNIT II  FOUNDATIONS FOR DATA VISUALIZATION
Visualization stages – Experimental Semiotics based on Perception Gibson's Affordance theory – A Model of Perceptual Processing – power of visual perception -Types of Data -visualization and data objects.

UNIT III  COMPUTER VISUALIZATION
Non-Computer Visualization – Computer Visualization - Exploring Complex Information Spaces – Fisheye Views – Applications – Comprehensible Fisheye views – Fisheye views for 3D data – Interacting with visualization.

UNIT IV  MULTIDIMENSIONAL VISUALIZATION

UNIT V  CASE STUDIES
Small interactive calendars – Selecting one from many – Web browsing through a key Hole – Communication analysis – Archival analysis.

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Compare various visualization techniques.
- Design creative visualizations.
- Apply visualization over different types of data.

REFERENCES:
OBJECTIVIES:

- To learn the basics of XML technology.
- To understand the background of distributed information system.
- To analyze and design a web service based application.
- To learn the security features of web services and service composition.

UNIT I  XML FUNDAMENTALS


UNIT II  DISTRIBUTED INFORMATION SYSTEM


UNIT III  WEB SERVICES


UNIT IV  XML SECURITY


UNIT V  SERVICE COMPOSITION


OUTCOMES:

Upon Completion of the course, the students should be able to:

- Create, validate, parse, and transform XML documents.
- Design a middleware solution based application.
- Develop web services using different technologies.
- Compose set of web services using BPEL.

REFERENCES: