### Semester I

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COURSE 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

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS

UNIT III PROCESSOR FUNDAMENTALS

UNIT IV MEMORY

UNIT V I/O DATA TRANSFER

TOTAL: 45 PERIODS

COURSE 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.

REFERENCES:

CA8102 DATABASE MANAGEMENT SYSTEMS  L  T  P  C  3 0 0 3

COURSE 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  9

UNIT II DATABASE DESIGN  9

UNIT III TRANSACTIONS  9

UNIT IV IMPLEMENTATION TECHNIQUES  9

UNIT V ADVANCED TOPICS  9
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

COURSE 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

COURSE 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

UNIT V STREAMS, FILES AND PREPROCESSOR

TOTAL: 45 PERIODS
COURSE 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

COURSE 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 9

UNIT IV SOFTWARE TESTING 9
UNIT V SOFTWARE MAINTENANCE AND SOFTWARE METRICS


TOTAL : 45 PERIODS

COURSE 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:

MA8151 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

COURSE OBJECTIVES:
To introduce mathematical logic, combinatorial and counting techniques, Algebraic structures, Finite state system and grammar as Mathematical Foundation of computer Science so as to understand algorithms, computability and other theoretical aspects of Computer science.

UNIT I LOGIC 9+3

UNIT II COMBINATORICS 9+3
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 9+3
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 9+3
Partial order relation – Posets - Hasse diagram - Lattices - Special Lattices - Boolean Algebra.

UNIT V FINITE STATE AUTOMATA AND GRAMMARS 9+3
Finite state automata - Deterministic and non-deterministic model - languages accepted by Finite State Automata - Regular expressions - Context-free grammars - Derivation trees.

L: 45 +T: 15 TOTAL: 60 PERIODS
COURSE 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 L T P C 0 0 3 2

COURSE 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 / Programing Languages.
10. Database Design and Implementation (Case Study).

TOTAL:45 PERIODS

COURSE 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.
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

COURSE 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.

CA8201 COMPUTER COMMUNICATIONS AND NETWORKS

COURSE 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

COURSE 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:

CA8202 DATA STRUCTURES AND ALGORITHMS

COURSE 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  9

UNIT V  ALGORITHM DESIGN TECHNIQUES  9

TOTAL: 45 PERIODS

COURSE 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

COURSE 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 Micro-controller - 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

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

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

TOTAL: 45 PERIODS

COURSE 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
L T P C
3 0 0 3

COURSE 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 9

UNIT IV INHERITANCE 9
Derived Class – Virtual Functions – Polymorphism - Abstract Base Class – Multiple Inheritance.

UNIT V I/O AND EXCEPTION HANDLING 9

TOTAL: 45 PERIODS

COURSE 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 L T P C
3 0 0 3

COURSE 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 9

UNIT II PROCESS MANAGEMENT 10
UNIT III STORAGE MANAGEMENT

UNIT IV I/O SYSTEMS

UNIT V CASE STUDY

TOTAL:45 PERIODS

COURSE 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 L T P C 0 0 3 2

COURSE 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
COURSE 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

COURSE 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
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.

17
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 IV INTRODUCTION TO BIG DATA 8

UNIT V DATA ANALYSIS 12

TOTAL: 45 PERIODS

COURSE 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

COURSE 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  9
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  9

TOTAL: 45 PERIODS

COURSE 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  L T P C
3 0 0 3

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

UNIT I  INTRODUCTION  9

UNIT II  PYTHON  9
Introduction to Django - templates - models - forms - deploying django - caching - Integrating with legacy databases and applications – security

UNIT III  RUBY  9
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

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 L T P C
3 0 0 3

COURSE 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
UNIT V  SERVER SIDE SCRIPT

TOTAL: 45 PERIODS

COURSE 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

COURSE 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
5. 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

COURSE 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.

COURSE 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
COURSE 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

COURSE 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:
COURSE 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

COURSE 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:
COURSE 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  9

UNIT II  CRYPTOGRAPHY  9

UNIT III  ACCESS CONTROL  9

UNIT IV  HOST AND DATA SECURITY  9
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  9

TOTAL: 45 PERIODS

COURSE 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:
COURSE 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.
   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

COURSE 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.
MOBILE APPLICATION DEVELOPMENT LABORATORY

COURSE 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)

COURSE 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.

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  8

UNIT II  VIRTUALIZATION  9

UNIT III  CLOUD INFRASTRUCTURE  9
UNIT IV PROGRAMMING MODEL

UNIT V SECURITY IN THE CLOUD

COURSE 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:

CA8502 SERVICE ORIENTED ARCHITECTURE

COURSE 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

UNIT II ANALYSIS AND DESIGN OF SOA BASED SYSTEMS
UNIT III  SOA GOVERNANCE  

UNIT IV  SOA IMPLEMENTATION  

UNIT V  SOA ARCHITECTURE  

TOTAL: 45 PERIODS

COURSE 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:

CA8503  SOFTWARE TESTING  

COURSE OBJECTIVES:

- To introduce the basics and necessity of Software testing.
- To introduce various testing techniques along with software production.
- To introduce the concepts of Software bugs and its impact.

UNIT I  INTRODUCTION  

UNIT II  SOFTWARE TESTING METHODOLOGY  

UNIT III  SOFTWARE TESTING TECHNIQUES  
UNIT IV AUTOMATED TESTING AND TEST TOOLS


UNIT V TEST DOCUMENTATION


TOTAL:45 PERIODS

COURSE 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

CA8512 SOFTWARE TESTING LABORATORY

COURSE 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

TOTAL: 45 PERIODS

COURSE 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.

CA8001  BIO METRICS  L  T  P  C
3  0  0  3

COURSE 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

TOTAL: 45 PERIODS

COURSE 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:

CA8002 CRYPTOGRAPHY AND NETWORK SECURITY L T P C
3 0 0 3

COURSE 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

UNIT III HASH FUNCTIONS AND SIGNATURES

UNIT IV NETWORK SECURITY

UNIT V SYSTEM SECURITY

COURSE 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:

CA8003 CUSTOMER RELATIONSHIP MANAGEMENT L T P C
3 0 0 3

COURSE 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  9

UNIT III  CRM STRUCTURES  9

UNIT IV  CRM PLANNING AND IMPLEMENTATION  9

UNIT V  TRENDS IN CRM  9
e- CRM Solutions – Data Warehousing – Data mining for CRM – An introduction to CRM software packages.

TOTAL: 45 PERIODS

COURSE 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:
UNIT II DATA MINING & DATA PREPROCESSING 9
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 8
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 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 – 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 10
Cluster Analysis - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Clustering Analysis – Outlier Analysis.

COURSE 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:

CA8005 DATABASE TUNING L T P C
3 0 0 3

COURSE 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 8
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

COURSE 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:

CA8006 DIGITAL IMAGE PROCESSING  L T P C 3 0 0 3

COURSE 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  9

UNIT II  IMAGE ENHANCEMENT AND RESTORATION  9

UNIT III  IMAGE SEGMENTATION AND IMAGE FEATURE ANALYSIS  9

UNIT IV  MULTI RESOLUTION ANALYSIS AND MORPHOLOGICAL PROCESSING  9

UNIT V  IMAGE PATTERN RECOGNITION AND CASE STUDIES  9

TOTAL: 45 PERIODS

COURSE 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:
COURSE 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  8

UNIT II  DISTRIBUTED OPERATING SYSTEMS  12

UNIT III  DISTRIBUTED RESOURCE MANAGEMENT  10
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  7

UNIT V  CASE STUDIES  8
Distributed Object-Based System – CORBA – COM+ – Distributed Coordination - Based System – JINI.

TOTAL: 45 PERIODS

COURSE 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:
CA8008  E – LEARNING TECHNIQUES  L T P C  3 0 0 3

COURSE 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

COURSE 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:

CA8009  ENTERPRISE RESOURCE PLANNING  L T P C  3 0 0 3

COURSE 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  9

UNIT IV  INTEGRATION  9

UNIT V  CASE STUDY  9

TOTAL: 45 PERIODS

COURSE 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  LT P C  3 0 0 3

COURSE 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  9
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  9
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

Indian capital and stock market - New issues market Long term finance - Shares - Debentures and term loans - lease - Hire purchase - Venture capital financing - Private Equity.

TOTAL: 45 PERIODS

COURSE 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

COURSE 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

UNIT II GAME DESIGN PRINCIPLES
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

UNIT IV GAMING PLATFORMS AND FRAMEWORKS
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

COURSE 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

COURSE 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  10
UNIT IV   FILE FORMATS

UNIT V   DIGITAL ELEVATION MODELS

TOTAL: 45 PERIODS

COURSE 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

UNIT III   DATA AND KNOWLEDGE GRID
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

COURSE 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

COURSE 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 Biophysiology 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
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.

TOTAL: 45 PERIODS

COURSE 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:

CA8015 HIGH SPEED NETWORKS L T P C 3 0 0 3

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 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.


TOTAL:45 PERIODS
COURSE 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

COURSE 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

COURSE 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

COURSE 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

COURSE 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
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
Formulation - Graphical solution - Simplex method - Two-phase method - Transportation and Assignment Models.

UNIT III NON-LINEAR PROGRAMMING

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

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

COURSE 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:
COURSE 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

UNIT II PROFESSIONAL ETHICS AND RESPONSIBILITIES

UNIT III INTELLECTUAL PROPERTY RIGHTS

UNIT IV FRAMEWORKS

UNIT V COMPUTER ETHICS

TOTAL: 45 PERIODS

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

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

COURSE 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:
CA8021    SOFTWARE QUALITY MANAGEMENT    L T P C  
3 0 0 3

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  

UNIT II    CONTROLLING AND DOCUMENTING  

UNIT III    QUALITY STANDARDS  

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

TOTAL:45 PERIODS

COURSE 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    L T P C  
3 0 0 3

COURSE 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  INRODUCTION 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

COURSE 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

COURSE 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.

TOTAL: 45 PERIODS

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:
COURSE 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
General Overview of the System - History - System structure - User perspective - Operating system services - Assumptions about hardware - Introduction to the Kernel - Architecture of the UNIX operating system - Introduction to system concepts - The Buffer Cache - Buffer headers - Structure of the buffer pool - Scenarios for retrieval of a buffer – Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.

UNIT II FILE SUBSYSTEM
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

UNIT IV PROCESSES

UNIT V MEMORY MANAGEMENT AND I/O

TOTAL: 45 PERIODS

COURSE 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:
COURSE 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.

COURSE 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:
COURSE 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

UNIT III  NETWORK VIRTUALIZATION  10

UNIT IV  VIRTUALIZING STORAGE  8

UNIT V  VIRTUAL MACHINES PRODUCTS  9

COURSE 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:
CA8027            VISUALIZATION TECHNIQUES            L T P C

3 0 0 3

COURSE 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

COURSE 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:

COURSE OBJECTS:

- 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

TOTAL: 45 PERIODS

COURSE 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: