## SEMESTER I

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COURSE OBJECTIVE:
- To introduce the basic concepts of one dimensional and two dimensional Random Variables.
- To provide information about Estimation theory, Correlation, Regression and Testing of hypothesis.
- To enable the students to use the concepts of multivariate normal distribution and principal components analysis.

UNIT I ONE DIMENSIONAL RANDOM VARIABLES

UNIT II TWO DIMENSIONAL RANDOM VARIABLES
Joint Distributions – Marginal and Conditional Distributions – Functions of Two Dimensional Random Variables – Regression Curve – Correlation.

UNIT III ESTIMATION THEORY

UNIT IV TESTING OF HYPOTHESES
Sampling Distributions - Type I and Type II Errors - Tests based on Normal, t,2 and F Distributions For Testing Of Mean, Variance And Proportions – Tests for Independence of Attributes and Goodness of Fit.

UNIT V MULTIVARIATE ANALYSIS

TOTAL:45+15:60 PERIODS

COURSE OUTCOME:
- The course provides the basic concepts of Probability and Statistical techniques for solving mathematical problems which is useful in solving engineering problems.

REFERENCES:
COURSE OBJECTIVES:
- To understand the usage of algorithms in computing.
- To learn and use hierarchical data structures and its operations.
- To learn the usage of graphs and strings and its applications.
- To select and design data structures and algorithms that is appropriate for problems.
- To study about NP Completeness of problems.

UNIT I  ROLE OF ALGORITHMS IN COMPUTING  9

UNIT II  HIERARCHICAL DATA STRUCTURES  9

UNIT III  GRAPHS & STRINGS  9

UNIT IV  ALGORITHM DESIGN TECHNIQUES  9

UNIT V  NP COMPLETE AND NP HARD  9

TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Design data structures and algorithms to solve computing problems.
- Become familiar with the specification, usage, implementation and analysis of hierarchical data structures and algorithms.
- Design algorithms using graph structure and various string matching algorithms to solve real-life problems.
- Apply suitable design strategy for problem solving.

REFERENCES:
COURSE OBJECTIVES:
- To understand the evolution of computer architecture.
- To understand the state-of-the-art in computer architecture.
- To understand the design challenges in building a system.

UNIT I  PIPELINING AND ILP  11

UNIT II  THREAD-LEVEL PARALLELISM  8
Multi-threading – Multiprocessors - Centralized and Distributed Shared Memory Architectures – Cache Coherence Issues - Performance Issues – Synchronization Issues – Models of Memory Consistency - Interconnection Networks – Buses, Crossbar and Multi-Stage Switches – Multi-Core Processor Architectures - Case Study.

UNIT III  SIMD AND GPU ARCHITECTURES  8

UNIT IV  MEMORY HIERARCHY DESIGN  9
Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations – Name Mapping Implementations - Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

UNIT V  WAREHOUSE-SCALE COMPUTERS  9
Programming Models and Workloads – Storage Architectures – Physical Infrastructure – Cloud Infrastructure – Case Study

TOTAL: 45 PERIODS

COURSE OUTCOMES:
At the end of the course, the student will be able to:
- Compare and evaluate the performance of various architectures.
- Design sub-systems to meet specific performance requirements.
- Analyze the requirements of large systems to select and build the right infrastructure.

REFERENCES:
COURSE OBJECTIVES:

- To provide information about wider engineering issues that form the background in developing complex, evolving (software-intensive) systems.
- To plan a software engineering process that 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 and 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 SOFTWARE PRODUCT AND PROCESS

- Introduction
- S/W Engineering Paradigm
- Verification
- Validation
- Life Cycle Models
- Component Based Design
- System Engineering
- Business Process Engineering Overview
- Product Engineering Overview
- Agile Methods
- Open Source Software Development - Crowd Sourcing.

UNIT II SOFTWARE REQUIREMENTS

- Systems Engineering - Analysis Concepts
- Functional and Non-Functional
- Software Document
- Requirement Engineering Process
- Feasibility Studies
- Software Prototyping
- Prototyping in the Software Process
- Data – Functional and Behavioral Models
- Structured Analysis and Data Dictionary.

UNIT III DESIGN CONCEPTS AND PRINCIPLES

- Design Process And Concepts
- Modular Design
- Design Heuristic
- Architectural Design
- Data Design
- User Interface Design
- Real Time Software Design
- System Design
- Real Time Executives
- Data Acquisition System
- Monitoring And Control System.

UNIT IV TESTING

- Taxonomy of Software Testing
- Types of S/W Test
- Black Box Testing
- Testing Boundary Conditions
- Structural Testing
- Test Coverage Criteria Based on Data Flow Mechanisms
- Regression Testing
- Unit Testing
- Integration Testing
- Validation Testing
- System Testing and Debugging
- Software Implementation Techniques.

UNIT V SOFTWARE PROJECT MANAGEMENT

- Measures and Measurements
- ZIPF’s Law
- Software Cost Estimation
- Function Point Models
- COCOMO Model
- Delphi Method
- Scheduling
- Earned Value Analysis
- Error Tracking
- Software Configuration Management
- Program Evolution Dynamics
- Software Maintenance
- Project Planning
- Project Scheduling
- Risk Management
- CASE Tools.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- Implement mini projects incorporating the basic principles of software engineering.
- Familiar with the basic concepts of software design, implementation.
- Familiar with software testing of simple mini projects.
- Familiar with the Rational Rose and its equivalent open source tools for understanding basic software engineering concepts.
- Design and implement some basic cost estimation models.
- Critically analyze and apply software project management principles in simple projects.
REFERENCES:

IF8101 ADVANCED DATABASES L T P C
3 0 0 3

COURSE OBJECTIVES:
- To learn the modeling and design of databases.
- To acquire knowledge on parallel and distributed databases and its applications.
- To study the usage and applications of Object Oriented and Intelligent databases.
- To understand the usage of advanced data models.
- To learn emerging databases such as XML, Cloud and Big Data.
- To acquire inquisitive attitude towards research topics in databases.

UNIT I PARALLEL AND DISTRIBUTED DATABASES
9

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES
9

UNIT III INTELLIGENT DATABASES
9

UNIT IV ADVANCED DATA MODELS
9
UNIT V  EMERGING TECHNOLOGIES

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students will be able,
• To develop in-depth understanding of relational databases and skills to optimize database performance in practice.
• To understand and critique on each type of databases.
• To design faster algorithms in solving practical database problems.
• To implement intelligent databases and various data models.

REFERENCES:

IF8102  NETWORK ENGINEERING  L T P C
3 0 0 3

COURSE OBJECTIVES:
• To provide an introduction to the principles and practices of Network Engineering.
• To understand the architecture of the network devices.
• To learn QoS related methodologies.
• To explore the emerging technologies in network engineering.

UNIT I  FOUNDATIONS OF NETWORKING

UNIT II  QUALITY OF SERVICE
UNIT III HIGH PERFORMANCE NETWORKS

UNIT IV NETWORK DEVICE ARCHITECTURE

UNIT V SOFTWARE DEFINED NETWORKING

TOTAL: 45 PERIODS

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

- Gain an understanding of the principles of network engineering.
- Knowledge of advanced network engineering concepts and techniques.
- Capability development includes gaining an understanding of network engineering principles for network, system and service management.

REFERENCES:

IF8111 DATA STRUCTURES LAB

COURSE OBJECTIVES:

- To acquire the knowledge of using advanced tree structures.
- To learn the usage of heap structures.
- To understand the usage of graph structures and spanning trees.
- To learn the working of various string matching algorithms

EXPERIMENTS:
1. Implementation of a Binary Search Tree
2. Red-Black Tree Implementation
3. Heap Implementation
4. Binomial Heaps
5. Graph Traversals
6. Spanning Tree Implementation
7. Shortest Path Algorithms
8. String Matching Algorithms
9. Approximation Algorithms

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students will be able to:
- Design and implement basic and advanced data structures extensively.
- Design algorithms using graph structure and various string matching algorithms to solve real-life problems.
- Design and develop efficient algorithms with minimum complexity.

IF8112  NETWORKING AND DBMS LAB  L  T  P  C
0  0  3  2

COURSE OBJECTIVES:
- To learn network programming and establish connection between network.
- To acquire knowledge about various networking tools.
- To study the design of databases for applications.
- To practice DBMS query language such as SQL and embedded programming.

EXERCISES:
1. Client-server programming
2. Socket programming (TCP/UDP)
3. Network analyzer
4. Traffic Analysis
5. Protocol Analysis
6. Study of Software Defined Networking tools
7. Data Definition, Manipulation of Tables and Views
8. Database Querying – Simple queries, Nested queries, Sub queries and Joins
9. Triggers
10. Transaction Control
11. Embedded SQL
12. Database Connectivity with Front End Tools
13. Front End Tools / Programming Languages
14. High level language extensions - PL/SQL Basics
15. Procedures and Functions
16. Database Design and Implementation (Case Study)

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to:
- To gain knowledge about network connectivity and network components.
- To design databases for various applications.
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


UNIT IV PROGRAMMING MODEL


UNIT V SECURITY IN THE CLOUD


TOTAL: 45 PERIODS

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:

COURSE OBJECTIVES:
- To understand the basics of Mobile computing and Personal computing.
- To learn the role of wireless networks in Mobile Computing and Pervasive Computing.
- To study about the underlying wireless networks.
- To understand the architectures of mobile and pervasive applications.
- To become familiar with the pervasive devices and mobile computing platforms.

UNIT I INTRODUCTION

UNIT II 3G AND 4G CELLULAR NETWORKS

UNIT III SENSOR AND MESH NETWORKS

UNIT IV CONTEXT AWARE COMPUTING

UNIT V APPLICATION DEVELOPMENT

COURSE OUTCOMES:
At the end of the course the student should be able to,
- To deploy 3G networks.
- To develop suitable algorithms for 4G networks.
- To use sensor and mesh networks to develop mobile computing environment.
- To develop mobile computing applications based on the paradigm of context aware computing.

TOTAL: 45 PERIODS
REFERENCES:

IF8202 WEB INTEGRATED TECHNOLOGIES L T P C
3 0 0 3

COURSE OBJECTIVES
• To understand the issues in the design of web application development.
• To learn the concepts of client side and server side technologies.
• To learn the concept of three tier application using MVC.
• To understand and learn the importance of Java based security solutions.
• To learn the concepts of software components using EJB.
• To learn the concept of other framework.

UNIT I WEB DESIGN PRINCIPLES

UNIT II WEB APPLICATION DEVELOPMENT

UNIT III ENTERPRISE APPLICATION DEVELOPMENT

UNIT IV COMPONENTS AND FRAMEWORKS
UNIT V  SOA BASICS

TOTAL: 45 PERIODS

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

- Design and development of web applications using various models.
- Web application development using HTML and scripting technologies.
- Web application development using advanced features.
- Security features supported in java.
- Developing web services using J2EE and related technologies.
- Design and development of applications using other frameworks.

REFERENCES:

UNIT I  INTRODUCTION TO BIG DATA

UNIT II  DATA ANALYSIS

UNIT III  MINING DATA STREAMS
UNIT IV  FREQUENT ITEMSETS AND CLUSTERING  
Mining Frequent Itemsets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Itemsets in a Stream – Clustering Techniques – Hierarchical – K-Means – Clustering High Dimensional Data – CLIQUE And PROCLUS – Frequent Pattern based Clustering Methods – Clustering in Non-Euclidean Space – Clustering for Streams and Parallelism.

UNIT V  FRAMEWORKS AND VISUALIZATION  

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

- Work with big data platform and its analysis techniques.
- Design efficient algorithms for mining the data from large volumes.
- Model a framework for Human Activity Recognition.

REFERENCES:

IF8251  ADVANCED OPERATING SYSTEM

COURSE OBJECTIVES:
- To learn the fundamentals of Operating system.
- To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols.
- To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols.
- To know the components and management aspects of Real time, Mobile operating systems.

UNIT I  OPERATING SYSTEM BASICS  

UNIT II  DISTRIBUTED OPERATING SYSTEM  
UNIT III DISTRIBUTED RESOURCE MANAGEMENT 9

UNIT IV REAL TIME & MOBILE OPERATING SYSTEMS 9

UNIT V CASE STUDIES 9

TOTAL:45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to:
• A complete overview of process management & memory management of Operating system.
• Ability to demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.

REFERENCES:

COURSE OBJECTIVES:
• To learn how to create a simple web page using HTML along with the usage of style sheets, lists, creation or tables with borders, padding and colors.
• To get acquainted with JavaScript and how to embed JavaScript in HTML code.
• To construct dynamic server-side web pages and integrate the web application with many of the other Java2 Enterprise Edition application server methodologies.
• To develop Java Enterprise Applications using EJB3 and other Java EE technology and J2ME.
EXPERIMENT
1. Web programming with HTML tags, CSS for styling, Page layout
2. Develop webpage using JavaScript for client side programming and HTML forms
3. Using The DOM and the JavaScript object models
4. Website optimization: crunching HTML, using CSS to replace HTML and light-weight graphics to speed up websites
5. Creating XML file with XML DTD and XML schema, SAX, XSL
6. Web site creation with PHP for server side programming for storing current date-time using cookies and for storing page views using sessions
7. Web application development using Servlet/ PHP/ JSP/ ASP.NET
8. Working with PHP and MySQL.
9. Constructing dynamic server-side web pages using JSF and integrate the Web application with many of the other Java2 Enterprise Edition application server methodologies such as Enterprise Java Beans, JavaMail, and SOAP.
10. Developing Java Enterprise Applications Using EJB3 Session beans, entity beans and message-driven beans.
11. Working with JNDI, JDBC and JMS.
12. Application development using J2ME.

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to,
- Web application development using HTML and scripting technologies.
- Hands on experience on Web application development using advanced features.
- Design and development of dynamic server-side web pages.
- Develop web services using J2EE and related technologies.
- Design and development of applications using other frameworks.

TOTAL : 45 PERIODS

IF8211 OS AND MOBILE LAB

COURSE OBJECTIVES:
- To know about various platforms and tools available for developing mobile applications.
- To realize the differences between developing 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.

EXPERIMENTS:
1. Implementation of Process scheduling algorithms.
2. Simulation of Deadlock detection, prevention and recovery process.
4. Implementation of Distributed OS Agreement protocols.
5. Implementation of Distributed OS Resource Scheduling algorithms
6. Two-Phase Commit Protocol in Distributed OS.
7. IOS app development.
8. Survey of Mobile Application Development Tools
9. Form design for mobile applications
10. Applications using controls
11. Graphical and Multimedia applications
12. Data retrieval applications
13. Networking applications
14. Gaming applications
   (Perform the experiments from 2 to 7 in J2ME and Android SDK framework)
15. Micro browser based applications using WAP, WML and WML scripts
   (Perform experiments in 8 using Sun Java Wireless toolkit)

TOTAL: 45 PERIODS

COURSE OUTCOMES:
At the end of the course the student should be able to,
   - Develop useful mobile applications for the current scenario in mobile computing and
     pervasive computing

IF8301 CRYPTOGRAPHY AND INFORMATION 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
Overview - Classical Crypto Systems – Substitution Ciphers – Transposition Ciphers - Stream and
Block Ciphers – Introduction to Number Theory – Congruences – Chinese Remainder theorem –
Modular Arithmetic-Modular Exponentiation – Fermats and Eulers Theorem - Finite Fields – GF(2^n)
Fields.

UNIT II ENCRYPTION TECHNIQUES  9
Symmetric Encryption Techniques – DES – AES- Public-Key Cryptography and RSA – Key
Management - Diffie-Hellman Key Exchange – Elliptic Curve Cryptography – Symmetric Key
Distribution – Kerberos - X.509 Authentication Service - differential cryptanalysis - linear
cryptanalysis - side channel attack - lattice reduction attack - Merkle-Hellman knapsack attack -
Hellman's time-memory tradeoff (TMTO) attack

UNIT III HASH FUNCTIONS AND SIGNATURES  9
Message Authentication and Hash Functions – Description of MD Hash Family – Secure Hash
Algorithms – SHA 512 - Digital Signatures and Authentication Protocols – Digital Signature
Standard – Process, Services, Attacks on Digital Signature- Digital Signature Schemes.

UNIT IV SECURITY PRACTICES  9
Vulnerability Analysis - Flaw Hypothesis Methodology, NRL taxonomy and Aslam’s model -
Auditing - Anatomy of an Auditing System - Design of Auditing Systems - Posteriori Design -
Auditing mechanisms - Risk Analysis and Management - Disaster Recovery Planning/Incident
Response Planning - Intrusion Detection System

UNIT V SECURE DEVELOPMENT  9
Secure Coding - OWASP/SANS Top Vulnerabilities - Buffer Overflows - Incomplete mediation -
XSS - Anti Cross Site Scripting Libraries - Canonical Data Format - Command Injection -
Redirection - Inference – Application Controls - Secure Software Development Life Cycle -
Testing, Maintenance and Operation - Evaluation of Security Systems

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to,
Apply the basic security algorithms required by any computing system.
Predict the vulnerabilities across any computing system and hence be able to design a security solution for any computing system.

REFERENCES:

IF8080 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 SOA BASICS

UNIT II SOA ANALYSIS AND DESIGN

UNIT III SOA GOVERNANCE

UNIT IV SOA IMPLEMENTATION
SOA using REST – RESTful Services – RESTful Services with and without JWS – Role of WSDL, SOAP and Java/XML mapping in SOA – JAXB Data Binding

UNIT V APPLICATION INTEGRATION

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 services and realization of SOA.
- Implement RESTful services.
- Design and implement SOA based application integration using BPEL.

REFERENCES:

IF8008 GRID COMPUTING L T P C
3 0 0 3

COURSE OBJECTIVES:
- To understand Grid Architecture.
- To understand different types of grids.
- To know Grid standards.
- To acquire the knowledge of Grid computing in various areas.

UNIT I INTRODUCTION 9

UNIT II FRAMEWORK 9

UNIT III DATA AND KNOWLEDGE GRID 9

UNIT IV GRID MIDDLEWARE 9

UNIT V APPLICATIONS 9

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to,
- Create Grid Middleware architecture.
- Explain the services offered by grid.
- To utilize grid for various applications.
REFERENCES:

COURSE OBJECTIVES:
- To understand Data mining principles and techniques and introduce Data Mining 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

UNIT V CLUSTERING

TOTAL : 45 PERIODS
COURSE OUTCOMES:
Upon Completion of the course, the students will 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:

IF8081 SOFT COMPUTING L T P C 3 0 0 3

COURSE OBJECTIVES:
- To learn the key aspects of Soft computing and Neural networks.
- To study the fuzzy logic components.
- To gain insight onto Neuro Fuzzy modeling and control.
- To know about the components and building block hypothesis of Genetic algorithm.
- To gain knowledge in machine learning through Support Vector Machines.

UNIT I INTRODUCTION TO SOFT COMPUTING 9
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS 9

UNIT III NEURAL NETWORKS 9

UNIT IV FUZZY LOGIC 9

UNIT V NEURO-FUZZY MODELING 9

TOTAL: 45 PERIODS
COURSE OUTCOMES:
Upon Completion of the course, the students should be able to
- To discuss on machine learning through Neural networks.
- Apply knowledge in developing a Fuzzy expert system.
- Able to model Neuro Fuzzy system for clustering and classification.
- Discover knowledge to develop Genetic Algorithm and Support vector machine based machine learning system.

REFERENCES:

IF8351 VIRTUALIZATION L T P C
3 0 0 3

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

UNIT I OVERVIEW OF VIRTUALIZATION

UNIT II SERVER CONSOLIDATION

UNIT III NETWORK VIRTUALIZATION
UNIT IV VIRTUALIZING STORAGE

UNIT V VIRTUAL MACHINES PRODUCTS

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 design of virtual machines.

REFERENCES:

IF8084 AD HOC AND SENSOR NETWORKS

COURSE OBJECTIVES:
• To understand the basics of Ad-hoc & Sensor Networks.
• To learn various fundamental and emerging protocols of all layers.
• To study about the issues pertaining to major obstacles in establishment and efficient management of Ad-hoc and sensor networks.
• To understand the nature and applications of Ad-hoc and sensor networks.
• To understand various security practices and protocols of Ad-hoc and Sensor Networks.

UNIT I ADHOC NETWORKS FUNDAMENTALS AND MAC PROTOCOLS

UNIT II ADHOC NETWORK ROUTING AND MANAGEMENT
UNIT III SENSOR NETWORK FUNDAMENTALS AND COMMUNICATION PROTOCOLS

UNIT IV SENSOR NETWORK MANAGEMENT AND PROGRAMMING

UNIT V ADHOC AND SENSOR NETWORK SECURITY

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to
- To conversant with Ad-hoc and sensor networks, protocols and standards.
- To establish a sensor network environment for different type of applications.

REFERENCES:

IF8078 IMAGE PROCESSING
COURSE OBJECTIVES:
- To understand the basic concepts and algorithms of digital image processing.
- To familiarize the student with the image processing environments like Matlab and its equivalent open source Image processing environments.
- To expose the student to a broad range of image processing and issues and their applications, and to provide the student 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

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 basic concepts of graphics designs.
- To familiarize the student with the transformation and projection techniques.
- To expose the student to various color models.
- To appreciate the use of multimedia authoring tools and multimedia compression techniques.

UNIT I INTRODUCTION TO GRAPHICS 9
Introduction - Design and Drawing - Pictures Storage and Display - Basic Graphics Pipeline, Bitmap and Vector-Based Graphics - Attributes of output primitives – Line, Circle and Ellipse drawing algorithms and Other Conics.

UNIT II TRANSFORMATION AND PROJECTION 9

UNIT III CURVE AND SURFACE DESIGN AND COLOUR MODELS 9

UNIT IV MULTIMEDIA AUTHORING AND DATA REPRESENTATIONS 9

UNIT V MULTIMEDIA DATA COMPRESSION 9
Lossless and Lossy Compression Algorithms – Image Compression Standards – Basic Audio and Video Compression Techniques – MPEG Audio and Video Coding – Computer and Multimedia Networks – Content Based Retrieval.

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to
- Implement basic graphics transformation and projection techniques.
- Design an application that incorporates different concepts of various color models.
- Apply and explore new techniques in the areas of compression techniques.

REFERENCES:
COURSE OBJECTIVES:
- To understand the basics of Information Retrieval with pertinence to modeling, query operations and indexing.
- To get an understanding of machine learning techniques for text classification and clustering.
- To understand the various applications of Information Retrieval giving emphasis to Multimedia IR, Web Search.
- To understand the concepts of digital libraries.

UNIT I INTRODUCTION

UNIT II PREPROCESSING

UNIT III METRICS

UNIT IV CATEGORIZATION AND CLUSTERING

UNIT V EXTRACTION AND INTEGRATION
Recommender Systems - Collaborative Filtering and Content-Based Recommendation of Documents and Products Information Extraction and Integration - Extracting Data from Text – XML - Semantic Web - Collecting and Integrating Specialized Information on the Web.

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon completion of the course, the students will be able to
- Build an Information Retrieval system using the available tools
- Identify and design the various components of an Information Retrieval system.
- Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.
- Analyze the Web content structure.
- Design an efficient search engine.

REFERENCES:
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 quality and its assurance.

UNIT I INTRODUCTION

UNIT II SOFTWARE TESTING METHODOLOGY

UNIT III EMERGING SPECIALIZED AREAS IN TESTING

UNIT IV SOFTWARE QUALITY MODELS

UNIT V QUALITY THROUGH CONTINUOUS IMPROVEMENT PROCESS
Role of Statistical Methods in Software Quality – Transforming Requirements into Test Cases – Deming’s Quality Principles – Continuous Improvement through Plan Do Check Act (PDCA).

TOTAL: 45 PERIODS

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

- To work with various software testing strategies.
- To design and develop software quality models and implement software quality assurance.

REFERENCES:
UNIT I

INTRODUCTION
9
Introduction – Learning - the role of Training - the role of E-Learning – New Era - E-Learning
Revolution - E-Learning Strategy

UNIT II

KNOWLEDGE MANAGEMENT
9
Computer Based Training – Pitfalls - classroom course to the web-case study - knowledge
Management – types – benefits - knowledge management pyramid - community and collaboration
in knowledge management - knowledge management for professionals – services - building
knowledge management solution

UNIT III

E-LEARNING ARCHITECTURE
9
Integrating E-Learning and Classroom Learning - building Learning Architecture - Learning
Architecture for - sales development - financial consultants - initial call center training, executives -
E-Learning Applications

UNIT IV

LEARNING MANAGEMENT SYSTEM
9
Building and Managing an E-Learning Infrastructure - Learning portals - Learning Management
Systems (LMS) - Building Learning Culture – strategies - E-Learning costs – justification - Quality
– demonstration - E-Learning- service – speed evaluation

UNIT V

CASE STUDY
9
Reinventing the Training Organization – Training at CISCO System – case study - creating E-

TOTAL:45 PERIODS

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

• Work with technologies involved in E-Learning Applications.
• Design and develop E-Learning application and work with E-Learning tools.

REFERENCES:
3. Frank Rennie, "E-Learning and Social Networking Handbook – Resources for Higher
Education", Tara Morrison, 2012

IF8013

MACHINE LEARNING
L T P C
3 0 0 3

COURSE OBJECTIVES:

• To understand the concepts of machine learning.
• To appreciate supervised and unsupervised learning and their applications.
• To understand the theoretical and practical aspects of Probabilistic Graphical Models.
• To appreciate the concepts and algorithms of reinforcement learning.
• To learn aspects of computational learning theory.

UNIT I

INTRODUCTION
9
Learning - Basic Concepts in Machine Learning - Examples of Machine Learning - Applications -
Linear Models for Regression - Linear Basis Function Models - The Bias-Variance Decomposition - Bayesian Linear Regression - Bayesian Model Comparison.

UNIT II SUPERVISED LEARNING

UNIT III UNSUPERVISED LEARNING

UNIT IV PROBABILISTIC GRAPHICAL MODELS

UNIT V ADVANCED LEARNING

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon completion of the course, the students will be able to,
• To implement a neural network for an application of your choice using an available tool.
• To implement probabilistic discriminative and generative algorithms for an application of your choice and analyze the results.
• To use a tool to implement typical clustering algorithms for different types of applications.
• To design and implement an HMM for a sequence model type of application
• To identify applications suitable for different types of machine learning with suitable justification.

REFERENCES:
COURSE OBJECTIVES:
- To learn the principles and fundamentals of human computer interaction (HCI).
- To analyze HCI theories, as they relate to collaborative or social software.
- To establish target users, functional requirements, and interface requirements for a given computer application.
- To understand user interface design principles, and apply them to designing an interface.
- To learn user interface designs through usability inspection and user models.
- To know the applications of multimedia on HCI.

UNIT I  DESIGN PROCESS  9

UNIT II  DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS  9

UNIT III  MODELS  9

UNIT IV  EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI  9

UNIT V  THEORIES  9

TOTAL:45 PERIODS

COURSE OUTCOMES:
Upon completion of the course, the students will be able to
- Interpret the contributions of human factors and technical constraints on human-computer interaction.
- Evaluate the role of current HCI theories in the design of software.
- Apply HCI techniques and methods to the design of software.
- Categorize and carefully differentiate various aspects of multimedia interfaces.
- Design and develop issues related to HCI for real application.
REFERENCES:

COURSE OBJECTIVES:
- To gain knowledge about medical informatics and healthcare informatics.
- To understand the case study of computerized patient record.
- To study and use different tools for clinical information system.
- To apply the knowledge of Bio informatics for systems.

UNIT I   MEDICAL INFORMATICS

UNIT II   HEALTHCARE INFORMATICS
Strategic Planning - Selecting a Health Care Information System - Systems Integration and Maintenance - Systems Integration - Regulatory and Accreditation Issues - Contingency Planning and Disaster Recovery.

UNIT III   COMPUTERISED PATIENT RECORD

UNIT IV   MEDICAL IMAGING

UNIT V   BIO-INFORMATICS

TOTAL:45 PERIODS

COURSE OUTCOMES:
Upon completion of the course, the students will be able to
- To design and develop clinical and hospital management system on his own.
- To work with different medical imaging techniques.
- To apply the knowledge of bio informatics for biological databases.
REFERENCES:

IF8005 DESIGN OF SOFTWARE AGENTS L T P C