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

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

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

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

UNIT V:

UNIT VI:
Components: Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

UNIT VII:

UNIT VIII:
Interaction Devices: Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

TEXTBOOKS:
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamTech.

REFERENCE BOOKS:
2. Designing the User Interface. 4/e, Ben Shneidermann, PEA.
3. User Interface Design, Soren Eauesen, PEA.
ADVANCED OPERATING SYSTEMS

UNIT-I:


UNIT-II:

Introduction to Distributed systems: Goals of distributed system, hardware and software concepts, design issues.

Communication in Distributed systems: Layered protocols, AIM networks, the Client - Server model, remote procedure call and group communication.

UNIT-III:

Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, E-tech algorithms, the Bully algorithm, a ring algorithm, atomic transactions,

UNIT-IV:

Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection.

UNIT-V:

Processes: Processes and Processors in distributed systems: Threads, system models, Processor allocation, Scheduling in distributed system, Fault tolerance and real time distributed systems.

UNIT-VI:

Distributed file systems: Distributed file systems design, distributed file system implementation, trends in distributed file systems.

UNIT - VII:

Distributed shared memory: What is shared memory, consistency models, page based distributed shared memory, shared variable distributed shared memory, object based DSM.

UNIT-VIII:

Case study MACH : Introduction to MACII, process management in MACII, memory management in MACH, communication in MACH, UNIX emulation in MACH. Case study DCE: Introduction to DCE threads, RPC's, Time service. Directory service, security service. Distributed file system.

TEXTBOOKS:

1. Distributed Operating System - Andrew. S. Tanenbaum, PHI

REFERENCE BOOKS:

MOBILE AD HOC AND SENSOR NETWORKS

UNIT-I:
Introduction to Ad Hoc Wireless Networks: Cellular and Ad Hoc Wireless Networks. Characteristics of MANETs, Applications of MANETs, Issues and Challenges of MANETs.

UNIT-II:

UNIT-III:
Data Transmission in MANETs: The Broadcast Storm, Multicasting, Geocasting, TCP over Ad Hoc Networks- TCP Protocol overview. TCP and MANETs, Solutions for TCP over Ad Hoc

UNIT-IV:

UNIT-V:

UNIT-VI:
Data Retrieval in Sensor Networks: Classification of WSNs, MAC Layer, Routing Layer, High-Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

UNIT-VII:

UNIT-VIII:

TEXT BOOKS:

REFERENCE BOOKS:
PATTERN RECOGNITION

UNIT-I:
Introduction: Is Pattern Recognition Important; features, feature vectors, and classifiers; supervised, unsupervised and semi supervised learning; Matlab programs.

UNIT-II:
Classifiers based on Hayes Decision Theory: Introduction, Bayes Decision Theory; discriminant functions and decision surfaces; Bayesian classification for normal distributions- the Gaussian probability density function, the Bayesian classifier for normally distributed classes;

UNIT-III:
Linear & Non linear Classifiers: Introduction; linear discriminant functions and decision hyper planes, the perceptron algorithm, Nonlinear Classifiers: introduction, the xor problem, the two-layer perception-classification capabilities of the two-layer perceptron; three-layer perception.

UNIT-IV:
Feature Selection: Introduction, Preprocessing- outlier removal, data normalization, missing data; the peaking phenomenon; class separability measures- divergence, chernoff bound and Bhattacharya distance, scatter matrices.

UNIT-V:
Supervised Learning: introduction, error-counting approach, exploiting the finite size of the data set; a case study from medical imaging; semi supervised learning- generative models, graph-based methods, transductive support vector machines.

UNIT-VI:
Skin based Pattern Extraction And Recognition -Introduction, Neural color Constancy based skin detection. Image segmentation, Local region graph Pattern, Skin region Synthesis pattern, Matching multiple regions with Local Global Graph Method.

UNIT-VII:

UNIT-VIII:
Graph-based methods Introduction, Hyper graph matching and Algorithms, Parquet graphs-similarity function, Local Feature Detectors.

TEXTBOOKS:
2. Horst Bunke, Abrahamkadel, MarksLast, "Applied Pattern Recognition" 2008 Springer - Verlag Berlin Heidelberg.(Unit VI-VIII)

REFERENCE BOOKS:
2. "Pattern Recognition and Image Analysis", Gose, Johnsonbaugh, Jost. PHI
4. Pattern Classification, 2nd ed, Richard O Duda
DIGITAL IMAGE PROCESSING

UNIT-I:

DIGITAL IMAGE FUNDAMENTALS: Image Sensing and Acquisition, Image Sampling & quantization, some basic Relationships between pixels. Mathematical tools used in digital image processing array Vs matrix operations, linear Vs non linear operations, arithmetic operations, set and logical operations, spatial operations, vector and matrix operations. Probabilistic methods.

UNIT-II:

IMAGE TRANSFORMS: 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete cosine Transform, Haar-Transform, Slant Transform, KL transform, comparison of different image transforms.

UNIT-III:

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Basic Intensity transformations functions, histogram Processing, fundamentals of Spatial Filtering, Smoothing Spatial filters. Sharpening spatial fillers. Combining spatial enhancement methods.

UNIT-IV:

IMAGE ENHANCEMENT IN FREQUENCY DOMAIN: Basics of filtering in frequency domain, additional characteristics of the frequency domain, correspondence between filtering in the spatial and frequency domains. Image smoothing using frequency domain filters, image sharpening using frequency domain filters - Gaussian High pass filters, Laplacian in the frequency domain, Homomorphic filtering.

UNIT-V:

IMAGE DEGRADATION/RESTORATION:


UNIT-VI:

IMAGE SEGMENTATION:

Point, line and edge Detection, Thresholding, Region based segmentation, the use of motion in segmentation.

UNIT-VII:


UNIT-VIII:

COLOR IMAGE PROCESSING: Color models, pseudo color image processing, color transformations, Smoothing and sharpening, image segmentation based on color.

TEXTBOOKS:


REFERENCES:

EMBEDDED AND REAL TIME SYSTEMS

UNIT- I:

Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT-II:

8—bit microcontrollers architecture: Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT-III:

Interrupt, timers and serial ports of 8051: 8051 interrupts, interfacing ADC 0801, Timers, serial port, reset circuit, power saving modes.

UNIT-IV:


UNIT-V:

RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT- VI:

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT-VII:

The producer-consumer problem. Reader writers problem, Priority Inversion. Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and firmware.

UNIT-VIII:


TEXTBOOK:


REFERENCE BOOKS:

2. Embedded Software Primer, David Simon, Pearson.
SIMULATION AND MODELLING

UNIT-I:
System models: Concepts, continuous and discrete systems, System modeling, types of models, subsystems, corporate model, and system study.

UNIT-II:
System Simulation: Techniques, comparison of simulation and analytical methods, types of simulation. Distributed log models, cobweb models.

UNIT- III:
Continuous system Simulation: Numerical solution of differential equations, Analog Computers, Hybrid Computers, continuous system simulation languages CSMP, system dynamic growth models, logistic curves.

UNIT- IV:
Probability concepts in simulation: Monte Carlo techniques, stochastic variables, probability functions, Random Number generation algorithms.

UNIT- V:
Queuing Theory: Arrival pattern distributions, servicing times, queuing disciplines, measure of queues, mathematical solutions to queuing problems.

UNIT- VI:
Discrete System Simulation: Events, generation of arrival patterns, simulation programming tasks, analysis of simulation output.

UNIT-VII:
GPSS & SIMSCRIPT: general description of GPSS and SIMSCRIPT, programming in GPSS.

UNIT- VIII:
Simulation Programming Techniques: Data structures. Implementation of activities, events and queues. Event scanning, simulation algorithms in GPSS and SIMSCRIPT.

TEXTBOOK:
1. Geoffrey Gordon: System Simulation, PHI.
COMPUTER FORENSICS

UNIT- I:

UNIT- II:
**Investor's Office and Laboratory**: Understanding Forensics Lab Certification Requirements, Determining the Physical Requirements for a Computer Forensics Lab, Selecting a Basic Forensic Workstation

UNIT- III:
**Data Acquisition**: Understanding Storage Formats for Digital Evidence. Determining the Best Acquisition Method. Contingency Planning for Image Acquisitions, Using Acquisition Tools, Validating Data Acquisition, Performing RAID Data Acquisition, Using Remote Network Acquisition Tools, Using Other Forensics Acquisition Tools

UNIT- IV:
**Processing Crime and Incident Scenes**: Identifying Digital Evidence, Collecting the Evidence in Private-Sector Incident Scenes, Processing law Enforcement Crime Scenes, Preparing for a Search. Securing a Computer Incident or Crime Scene, Sizing Digital evidence at the Scene, Storing Digital evidence, obtaining a Digital Hash.

UNIT- V:

UNIT- VI:
**Computer Forensics Analysis and Validation**: Determining What Data to Collect and Analyze. Validating Forensic Data, Addressing Data-Hiding Techniques, Performing Remote Acquisition

UNIT- VII:

UNIT- VIII:
**E-mail Investigations Cell Phone and Mobile Device Forensics**: Exploring the Role of E-mail in Investigations, Exploring the Role of Client and Server in E-mail, Investigating E-mail Crimes and Violations, Understanding E-mail Servers, Using Specialized E-mail Forensics Tools, Understanding Mobile Device Forensics, Understanding Acquisition Procedure for Cell Phones and Mobile Devoices

TEXTBOOKS:
MACHINE LEARNING

UNIT -I:

Introduction: Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning.

UNIT- II:


Inductive bias,

UNIT -III:


UNIT-IV:

Bayesian learning: Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Bayes optimal classifier, Naive bayes classifier, An example learning to classify text, Bayesian belief networks.

UNIT-V:

Computational learning theory-1: Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning - Instance-Based Learning- Introduction.

UNIT-VI:

Computational learning theory-2: k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning


UNIT-VIII:

Analytical Learning: Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge

TEXTBOOK:

1. Machine Learning, Tom M. Mitchell, MGII
MULTIMEDIA AND APPLICATION DEVELOPMENT

UNIT-I:

**Fundamental concepts in Text and Image**: Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT-II:

**Fundamental concepts in video and digital audio**: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT-III:

**Action Script I**: ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authoring an ActionScript Class.

UNIT-IV:

**Action Script II**: Inheritance, Authoring an Action Script 2.0 Subclass, Interfaces, Packages, Exceptions.

UNIT-V:

**Application Development**: An OOP Application Frame work. Using Components with ActionScript MovieClip Subclasses.

UNIT-VI:


UNIT-VII:

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT-VIII:


TEXTBOOKS:

2. Essentials ActionScript 2.0, Colin Moock, SPD O.REILLY.

REFERENCE BOOKS:

1. Digital Multimedia, Nigel Chapman and Jenny Chapman, Wiley-Dreamtech
5. Multimedia Basics by Weixel Thomson
SOFTWARE TESTING METHODOLOGIES

UNIT-I:
Introduction: - Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

UNIT-II:
Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-III:
Transaction Flow Testing:- transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT-IV:
Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-V:
Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & How anomaly detection.

UNIT-VI:
Logic Based Testing: - overview, decision tables, path expressions, kv charts, specifications.

UNIT-VII:
State, State Graphs and Transition testing: slate graphs, good & bad state graphs, state testing. Testability tips.

UNIT-VIII:
Graph Matrices and Application:- Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.

TEXT BOOKS:
2. Software Testing- Yogesh Singh, CAMBRIDGE

REFERENCE BOOKS:
1. Introduction to Software Testing, Paul Amman, Jeff Offutt, CAMBRIDGE
2. Effective Software Testing, 50 Specific ways to improve your testing, Eltriede Dustin, PEA
NEURAL NETWORKS & SOFT COMPUTING

UNIT-I:


UNIT-II:


UNIT-III:

Classical & Fuzzy Sets: Introduction to classical sets - properties, operations and relations; Fuzzy sets - memberships, uncertainty, operations, properties, fuzzy relations, cardinalities, membership functions (Chapter-6 from Neural Networks, Fuzzy Logic, Genetic Algorithms: Synthesis and Applications by Rajasekharan and Pai, PHI Publications).

UNIT-IV:

Fuzzy Logic System Components: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods (Chapter-7 from Neural Networks, Fuzzy Logic, Genetic Algorithms: Synthesis and Applications by Rajasekharan and Pai, PHI Publications).

UNIT-V:


UNIT-VI:

Decision Tree learning: Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning (Chapter-3 of Machine Learning, Tom M. Mitchell, MGH).

UNIT-VII:


UNIT-VIII:


TEXT BOOKS:

3. Machine Learning ,Tom M. Mitchell, MGH
SOCIAL NETWORKS AND THE SEMANTIC WEB

UNIT-I:

UNIT-II:
**Social Network Analysis**: What is network analysis?. Development of Social Network Analysis, Key concepts and measures in network analysis.

UNIT-III:
**Electronic sources for network analysis**: Electronic discussion networks, Blogs and online communities, Web-based networks.

UNIT-IV:
**Knowledge Representation on the Semantic Web**: Ontologies and their role in the Semantic Web, Ontology languages for the semantic Web.

UNIT-V:
**Modeling and Aggregating Social Network** Data: State of the art in network data representation, Ontologic representation of Social individuals, Ontological representation of social relationships', Aggregating and reasoning with social network data.

UNIT-VI:
**Developing social semantic applications**: Building Semantic Web applications with social network features, Flink- the social networks of the Semantic Web community. Open academia: distributed, semantic-based publication management.

UNIT-VII:
**Evaluation of Web-Based Social Network Extraction**: Differences between survey methods and electronic data extraction, context of the empirical study, Data collection, Preparing the data, Optimizing goodness of fit, Comparison across methods and networks, Predicting the goodness of fit, Evaluation through analysis.

UNIT-VIII:
**The Perfect Storm**: Looking back-the story of Katrina People Finder. Looking ahead -a Second Life.

TEXTBOOKS:
CLOUD COMPUTING

UNIT -I:
Introduction to visualization and virtual machine, Virtualization in Cluster / grid context Virtual network, Information model & data model for virtual machine. Software as a Service (SaaS), SOA, On Demand Computing.

UNIT-II:
Cloud computing: Introduction, What it is and what it isn't, from Collaborations to Cloud, Cloud application architectures. Value of cloud computing, Cloud Infrastructure models. Scaling a Cloud Infrastructure, Capacity Planning, Cloud Scale.

UNIT-III:
Data Center to Cloud: Move into the Cloud, Know Your Software Licenses, The Shift to a Cloud Cost Model, Service Levels for Cloud Applications

UNIT- IV:

UNIT-V:

UNIT- VI:

UNIT-VII:
Disaster Recovery, Disaster Recovery, Planning, Cloud Disaster Management

UNIT-VIII:
Case study: Types of Clouds, Cloudcentres in detail, Comparing approaches, Xen OpenNEbula, Eucalyptus, Amazon, Nimbus

TEXTBOOKS:

REFERENCETEXTBOOKS:
E – COMMERCE

UNIT-I:
Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT-II:
Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT-III:
Electronic payment systems - Digital Token Based, Smart Cards, Credit Cards. Risks in Electronic Payment systems.

UNIT-IV:
Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT-V:
Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT VI:
Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT-VII:

UNIT-VIII:
Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

TEXTBOOKS:
2. E-Commerce, strategy, Technology, and Implementation,

REFERENCE BOOKS:
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
SOFTWARE PROJECT MANAGEMENT

UNIT- I:

Conventional Software Management: The waterfall model, conventional software Management performance.


UNIT-II:


The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT- III:

Life Cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts. Engineering artifacts, programmatic artifacts.

UNIT-IV:

Model based software architectures: A Management perspective and technical perspective.


UNIT-V:

Checkpoints of the process: Major mile stones. Minor Milestones, Periodic-status assessments.


UNIT-VI:


UNIT-VII:

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

Tailoring the Process: Process discriminants.

UNIT-VIII:

Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.

TEXTBOOKS:


REFERENCE BOOKS:


2. Software Project Management, Joel Henry, Pearson Education.