PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

I. To prepare students to excel in research and to succeed in Information Technology profession through global, rigorous post graduate education.

II. To provide students with a solid foundation in computing, communication and information technologies that is required to become a successful IT professional or a researcher in the field of computer science and information technology.

III. To train students with good computing and communication knowledge so as to comprehend, analyze, design, and create novel software products and communication protocols for the real-life problems.

IV. To inculcate students in professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate information technology issues to broader social context.

V. To provide student with an academic environment provides aware of excellence, leadership, and write ethical codes to follow guidelines, needed for a successful professional career

PROGRAMME OUTCOMES (POs):

On successful completion of the Programme,

1. Graduates will demonstrate knowledge of information technology, computer science and communication engineering.

2. Graduates will demonstrate an ability to identify, formulate and solve computing and communication problems.

3. Graduate will demonstrate an ability to design effective and useful software and carry out research in the fields of computing and communication.

4. Graduates will demonstrate an ability to implement a system, component or process as per needs and specifications.

5. Graduates will demonstrate an ability to implement the projects that require knowledge from any of the related fields.

6. Graduates will demonstrate an ability to design a system, component or process as per needs and specifications of the customers and society needs.

7. Graduates will acquire knowledge of mathematics, science and engineering.

8. Graduates will demonstrate an ability to identify, formulate and exhibit problem solving skills.

9. Graduates will demonstrate creative abilities to make applications exhibit more user friendliness by incorporating multimedia capabilities.

10. Graduates will demonstrate an ability to do research by designing and conducting experiments, analyze and interpret multimedia data individually as well as part of multimedia disciplinary teams.
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## PROFESSIONAL ELECTIVES (PE)

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## MULTIMEDIA ELECTIVES

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*Note: A minimum of 2 of 4 electives must necessarily be chosen from the list of “Multimedia Electives”*

**EMPLOYABILITY ENHANCEMENT COURSES (EEC)**

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IF 7101 ADVANCED COMPUTER ARCHITECTURE

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

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 INTERCONNECT AND STORAGE 9
Interconnection Networks – Buses, Crossbar and Multi-Stage Switches – Multi-Core Processor Architectures - Case Study. Warehouse- Scale Computers - Programming Models and Workloads – Storage Architectures – Physical Infrastructure – Case Study

TOTAL : 45 PERIODS

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:
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 Mobile Databases.
- 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  MOBILE DATABASES  9
Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols

UNIT V  EMERGING TECHNOLOGIES  9

TOTAL: 45 PERIODS

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 discuss 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:
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 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

UNIT II HIERARCHICAL DATA STRUCTURES

UNIT III GRAPHS

UNIT IV ALGORITHM DESIGN TECHNIQUES

UNIT V NP COMPLETE AND NP HARD

OUTCOMES:
Upon the completion of the course the student should be able to
- Design data structures and algorithms to solve computing problems.
- Design algorithms using graph structure and various string matching algorithms to solve real-life problems.
- Apply suitable design strategy for problem solving

REFERENCES:
OBJECTIVES:

- 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 principle 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

OUTCOMES:

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

REFERENCES:

OBJECTIVES:

- To understand the basics of geometry processing.
- To understand the fundamentals of pipelined rasterization rendering of meshed objects and curved surfaces.
- To understand and work with advanced rendering methods such as radiosity.
- To design programs for advanced animation methods.
- To become proficient at graphics programming using OpenGL.

UNIT I INTRODUCTION

UNIT II TRANSFORMATIONS
Affine Transformations (2D & 3D): Translation, Rotation, Scaling, Reflection and Shearing; Hierarchical Modeling & viewing: The Camera Transformation – Perspective, orthographic and Stereographic views;

UNIT III FRACTALS
Fractals and Self similarity – Peano curves – Creating image by iterated functions – Mandelbrot sets – Julia Sets – Random Fractals – Overview of Ray Tracing – Intersecting rays with other primitives – Reflections and Transparency – Boolean operations on Objects - its applications

UNIT IV ADVANCED RENDERING TECHNIQUE
Curves and Surfaces: Bezier, B-Splines and NURBS; Color models; Photorealistic rendering; Global Illumination; Ray tracing; Monte Carlo algorithm; Adding Surface texture- Texture Synthesis – Bump Mapping, Environmental mapping; Advanced Lighting and Shading,

UNIT V ANIMATION

OUTCOMES:
Upon completion of this course, the student will:

- Analyze the fundamentals of 2D and 3D computer graphics.
- Discuss the basic algorithms commonly used in 3D computer graphics.
- Describe advanced computer graphics techniques and applications.
- Analyze computer graphics and solid modelling techniques for various applications.

TEXT BOOKS:
IF 7111  DATA STRUCTURES LABORATORY  L T P C  0 0 4 2

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.

EXPERIMENTS:
1. Implementation of Merge Sort and Quick Sort-Analysis
2. Implementation of a Binary Search Tree
3. Red-Black Tree Implementation
4. Heap Implementation
5. Fibonacci Heap Implementation
6. Graph Traversals
7. Spanning Tree Implementation
8. Shortest Path Algorithms (Dijkstra's algorithm, Bellmann Ford Algorithm)
9. Implementation of Matrix Chain Multiplication
10. Activity Selection and Huffman Coding Implementation.

TOTAL: 60 PERIODS

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 structures
- Design and develop efficient algorithms with minimum complexity using design techniques.

IF 7201  ADVANCED JAVA AND INTERNET  L T P C  3 2 0 4

OBJECTIVES:
- To understand the Java environment
- To learn Java application development using Swings and Middleware technology
- To explore advanced Java concepts
- To learn the Internet Programming

UNIT I  JAVA BASICS AND ADVANCED FEATURES  9

UNIT II  AWT, SWING AND MIDDLEWARES  9

UNIT III  ADVANCED JAVA CONCEPTS  9
Java management Extensions (JMX) – Java Native Interface (JNI) - JConsole - Java Mission Control (JMC) – Java Flight Recorder (JFR) – Java Platform Debugger Architecture (JPDA) – Java2D -
UNIT IV      MARKUP LANGUAGES AND INTERNET PROGRAMMING  9

UNIT V      INTERNET PROGRAMMING FRAMEWORKS  9

TOTAL: 75 PERIODS

OUTCOMES:
Upon the completion of the course the student should be able
• To become familiar with the Java environment
• To develop Java application using Swings and Middleware technology
• To practice advanced Java concepts
• To work in the Internet frameworks

REFERENCES
2. http://docs.oracle.com/javase/7/docs/

IF 7202       DATA SCIENCE AND ANALYTICS  L T P C  3 2 0 4

OBJECTIVES:
• To know the fundamental concepts of data science and analytics
• To learn various techniques for mining data streams
• To learn Event Modelling for different applications.
• To know about Hadoop and Map Reduce procedure

UNIT I      INTRODUCTION TO DATA SCIENCE AND BIG DATA  9

UNIT II      DATA ANALYSIS  9

UNIT III      DATA MINING TECHNIQUES  9

15
UNIT IV MINING DATA STREAMS

UNIT V FRAMEWORKS AND VISUALIZATION

TOTAL: 75 PERIODS

OUTCOMES:
Upon the completion of the course the student 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
- Development with cloud databases

REFERENCES

IF 7204 NETWORK ENGINEERING

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

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Explain the principles of network engineering.
- Knowledge of network engineering concepts and techniques.
- Recent development in network engineering

REFERENCES:
UNIT I MATHEMATICS FOR MODELING 9

UNIT II CHARACTER MODELING AND SHADING 9

UNIT III GAME DESIGN PRINCIPLES 9
Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding, Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics

UNIT IV GAMING PLATFORMS AND FRAMEWORKS 9
Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity

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

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student will:
- Analyze the fundamentals of 2D and 3D animation
- Model a character with suitable actions.
- Analyze the game design principle.
- Discuss about gaming platforms and frame works.
- Design a interactive game.

REFERENCES:
LEARNING OBJECTIVES:
The student should be able to
- Learn about the basic concepts of digital image processing and various image transforms.
- Familiarize the student with the image enhancement techniques
- Expose the student to a broad range of image processing techniques and their applications.
- Appreciate the use of current technologies those are specific to image processing systems.
- Expose the students to real-world applications of image processing.

UNIT I: FUNDAMENTALS OF IMAGE PROCESSING 9
Introduction - Applications of Image Processing - Steps in image processing Applications - Digital imaging system- Sampling and Quantization - Pixel connectivity - Distance measures - Colour fundamentals and models - File Formats, Image operations.

UNIT II: IMAGE ENHANCEMENT AND IMAGE RESTORATION 9

UNIT III: MULTI RESOLUTION ANALYSIS AND COMPRESSION 9

UNIT IV: IMAGE SEGMENTATION AND FEATURE EXTRACTION 9
Image Segmentation - Detection of discontinuities - Edge operators - Edge linking and boundary Detection - Thresholding - Region based segmentation. Image Features and Extraction - Image Features - Types of Features - Feature extraction - Texture - Feature reduction algorithms - PCA - Feature Description.

UNIT V: IMAGE CLASSIFICATION AND APPLICATIONS OF IMAGE PROCESSING 9

TOTAL: 45 PERIODS

LEARNING OUTCOMES:
Upon completion of this course, the student will be able to:
- Describe and explain basic principles of digital image processing.
- Assess the performance of image processing algorithms and systems.
- Design an application that uses different concepts of image processing.
- Apply and develop new techniques in the areas of image enhancement- restoration-segmentation-compression-wavelet processing and image morphology.
- Analyse the constraints in image processing when dealing with larger data sets.
- Apply the knowledge primarily obtained by studying examples and cases in other engineering disciplines.
REFERENCES:

MM7212 MULTIMEDIA TOOLS LABORATORY

LEARNING OBJECTIVES:
The student should be able to
- Explore the various multimedia editing tools like Photoshop/EQV, Audacity, Garageband, imovie and Unity.
- Outline the structure of media processing tools.

EXPERIMENTS:
1. Image color/contrast balancing and Enhancement using Photoshop
2. Image compositing using Photoshop
3. Applying special effects using Photoshop
4. Music composing using Garage Band/Audacity
5. Audio editing using Garage Band/Audacity
6. Video Preproduction works
   A. Storyboarding Concepts
   B. Animatics
7. Creation of 2D Animation using Flash/Director
8. Creation of 3D Animation using 3dsmax/Maya/Unity
9. Video Editing using iMovie/Final cut Pro/Adobe Premiere
10. Mini Project

TOTAL: 60 PERIODS

LEARNING OUTCOMES:
Upon completion of this course, the student will be able to:
- Manipulate the images and audio files using Photoshop and Audacity
- Implement small projects using Photoshop and Audacity
- Model and animate the small projects and give special effects using Unity
- Handle video editing works using Adobe Premiere.
- Create a motion video by using the tools learned.
- Create, edit advertisements using various relevant tools.
OBJECTIVES

- To become familiar with the prevailing wireless environment
- To understand 3G and 4G cellular networks
- To study about WiFi and WiMax standards
- To learn about the two types of ad hoc networks in practice
- To explore mobile computing architecture and mobile application development

UNIT I  WIRELESS SCENARIO


UNIT II  3G AND 4G CELLULAR NETWORKS


UNIT III  WIRELESS DATA NETWORKS


UNIT IV  WIRELESS AD HOC NETWORKS


UNIT V  MOBILE COMPUTING ARCHITECTURE

Three tier Architecture - Presentation Tier - Application Tier - Middleware, ICAP, Web Services - Data Tier - Database Middleware, Sync ML - Content Aware System - Client Context Manager - Composite Capabilities / Preferences Profile (CC/PP) - Policy and Security Managers - Pervasive Application Architecture with MVC Pattern - Secure Pervasive Access Architecture

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, the students should be able
- To have awareness of the existing wireless scenario
- To deploy 3G networks
- To design and implement wireless ad hoc networks
- To design and implement mobile applications efficiently

REFERENCES:

LEARNING OBJECTIVES:
The student should be able to
- Introduce the fundamental principles of Audio processing.
- Provide an overview of Audio enhancement and Audio compression techniques
- Review latest trends and future technologies in Audio processing.
- Introduce the fundamental concepts of Video processing.
- Cover the basics of Video Coding

UNIT I  DIGITAL AUDIO

UNIT II  MUSICAL SOUND SYNTHESIS AND MIDI

UNIT III  STEREO AND SURROUND SOUND
Two-Channel Stereo - Principles of Loudspeaker and Microphone, Stereo and Loudspeaker Stereo, Two-Channel Signal Formats and Microphone techniques, Binaural Recording and Dummy Head Techniques, Surround Sound - Three Channel Stereo, Four Channel Surround, 5.1 Channel Surround, and other Multichannel Configurations. Surround Sound Systems, Matrix Surround Sound Systems, Dolby Digital, DTS, Ambisonics.

UNIT IV  VIDEO FUNDAMENTALS

UNIT V  MPEG VIDEO CODING
Basic Video coding and Audio Compression Techniques- Motion Detection- MPEG Video and audio Compression – Real-time video compression.

TOTAL: 45 PERIODS

LEARNING OUTCOMES
Upon completion of this course, the student will be able to:
- Implement basic algorithms related to Audio acquiring and processing
- Analyse audio formats and analysis.
- Understand and implement algorithms for MIDI Processing
- Acquiring and analysis of Video
- Understand the concept of motion detection.
- Evaluate the performance of different Video Processing Algorithms
REFERENCES:

LEARNING OBJECTIVES:
The student should be able to
- Explore MATLAB, opencv and Processing Programming Language
- Explore Image Processing
- Explore audio processing and Analysis
- Explore Video Processing and analysis
- Explore Image and Audio Retrieval

EXERCISES:
1. Image Enhancement operations like manipulating Brightness and Contrast
2. To explore Image noise and Filters
3. To explore Image Transforms such as FFT and Wavelet
4. Designing MATLAB and OpenCV programs for Feature Extraction and Classification
5. Reading and Writing of Video
6. Video noise and Editing
7. Extraction and Frames and manipulation
8. Video Object Tracking
9. MATLAB audio Processing
10. Filter and Mask effects in audio
11. Music composition in MATLAB
12. Learning Processing for Visual Arts and animation

TOTAL: 60 PERIODS

LEARNING OUTCOMES
Upon completion of this course, the student will be able to:
- Implement small projects using MATLAB for Image Processing.
- Know opencv and manipulate Images.
- Handle Video Processing using MATLAB and opencv.
- Know the basics of audio and music processing.
- Know the "Processing" Language for animation and visual effects.
- Develop a small project by using the languages and techniques learned.
OBJECTIVES:

- To learn various generations of wireless and cellular networks.
- To study about fundamentals of 3G Services, its protocols and applications.
- To study about evolution of 4G Networks, its architecture and applications.
- To study about Wi MAX networks, protocol stack and standards.
- To understand about the emerging trends of smart phones and evolution of latest standards like DLNA, NFC and femtocells

UNIT I INTRODUCTION
Introduction: History of Mobile Cellular Systems - First Generation - Second Generation - Generation 2.5 - Overview of 3G & 4G. 3GPP and 3GPP2 standards

UNIT II 3G NETWORKS
Evolution from GSM, 3G Services and Applications - UMTS network structure - Core network - UMTS Radio access - HSPA – HSUPA- HSDPA- CDMA 1X – WCDMA

UNIT III 4G LTE

UNIT IV WIMAX NETWORKS

UNIT V DLNA & NFC REVOLUTION

OUTCOMES:
Upon the completion of the course the student should be able
- To appreciate the evolution of cellular networks.
- To deploy 3G Services.
- To explore the developments in 4G Networks.
- To implement Wi MAX networks, protocol stack and standards.

REFERENCES:
OBJECTIVES:
- To learn about the issues in the design of ad hoc and wireless sensor networks
- To understand the working of protocols in different layers of ad hoc and sensor networks
- To expose the students to different aspects in ad hoc and sensor networks
- To understand various standards and applications in ad hoc and sensor networks

UNIT I  FUNDAMENTALS
Introduction to ad hoc networks - Differences between cellular and ad hoc wireless networks - Challenges and issues in ad hoc networks - Introduction to WSN - Single node architecture - Network architecture - Localization and positioning - Operating systems for WSN.

UNIT II  MAC AND LINK MANAGEMENT
Fundamentals of wireless MAC protocols - Classification of MAC protocols for ad hoc networks - MAC for WSN - Low duty cycle protocols and wakeup concepts - Contention and schedule based protocols - WSN link layer - Error control - Framing - Link management.

UNIT III  ROUTING
Design issues of routing protocols for ad hoc networks - Classification of routing protocols - Proactive, Reactive and Hybrid routing protocols - Routing in WSN - Naming and addressing - Gossiping and agent-based unicast forwarding - Energy efficient unicast - Broadcast and multicast - Geographic routing - Data-centric and content-based networking.

UNIT IV  TRANSPORT LAYER AND QoS

UNIT V  STANDARDS AND APPLICATIONS
Wireless sensor network standards - Standards on wireless mesh networks - Applications of ad hoc and WSNs - Case study: Building military border area surveillance system, Forest fire detection system and tsunami early warning system with wireless sensor networks.

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course students should be able to
- Identify different issues in wireless ad hoc and sensor networks
- To analyze the protocols developed for ad hoc and sensor networks
- To identify and discuss the standards and applications of ad hoc and sensor networks

REFERENCES:
OBJECTIVES:
- To provide a strong foundation of fundamental concepts in Artificial Intelligence.
- To enable Problem-solving through various searching techniques.
- To enable the student to apply these techniques in applications which involve perception, reasoning and learning.
- To apply AI techniques primarily for machine learning, vision, and robotics.

UNIT I  INTRODUCTION

UNIT II  SEARCHING TECHNIQUES

UNIT III  KNOWLEDGE AND REASONING

UNIT IV  LEARNING

UNIT V  AI PLANNING AND APPLICATIONS

OUTCOMES:
Upon completion of the course, the students will be able to
- Provides a basic exposition to the goals and methods of Artificial Intelligence.
- Study of the design of intelligent computational agents.
- The knowledge acquired through learning can be used both for problem solving and for reasoning
- Improves problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming and machine learning.
REFERENCES:

REFERENCES:
IF 7005  COMPILER DESIGN  L T P C  3 0 0 3

OBJECTIVES:
- To learn the fundamentals of a translator
- To study about intermediate code generation
- To understand the memory handling
- To explore code optimization techniques

UNIT I  FRONT END ANALYSIS  9
- Modules and interfaces - Tools and software - Data structures for tree languages - Lexical Analysis - Parsing - Abstract Syntax - Semantic Analysis - Overview

UNIT II  INTERMEDIATE CODE AND INSTRUCTION SELECTION  9

UNIT III  LIVENESS ANALYSIS AND REGISTER ALLOCATION  9
- Liveness Analysis - Solution of dataflow equations - Register Allocation - Coloring by simplification - Coalescing - Precolored nodes - Graph coloring implementation - Register allocation for trees

UNIT IV  DATAFLOW ANALYSIS AND LOOP OPTIMIZATIONS  9
- Dataflow Analysis - Intermediate representation for flow analysis - Various dataflow analyses - Transformations using dataflow analysis - Speeding up dataflow analysis - Alias analysis - Loop Optimizations - Dominators - Loop-invariant computations - Induction variables - Array-bounds checks - Loop unrolling - Static Single Assignment Form

UNIT V  PIPELINING AND SCHEDULING  9
- Converting to SSA form - Efficient computation of the dominator tree - Optimization algorithms using SSA - Arrays, pointers, and memory - The control-dependence graph - Converting back from SSA form - A functional intermediate form - Pipelining and Scheduling - Loop scheduling without resource bounds - Resource-bounded loop pipelining - Branch prediction

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course, students will be able
- To explain the fundamentals of a translator
- To implement intermediate code generation
- To devise the memory handling techniques
- To design code optimization techniques

REFERENCES:
OBJECTIVES:
- To study the fundamentals of computer forensics.
- To have an overview of techniques for Data Recovery and Evidence Collection.
- To study various threats associated with security and information warfare.
- To study the tools and tactics associated with cyber forensics.

UNIT I INTRODUCTION 7

UNIT II COMPUTER FORENSICS EVIDENCE AND CAPTURE 8

UNIT III COMPUTER FORENSIC ANALYSIS 10

UNIT IV INFORMATION WARFARE 10

UNIT V COMPUTER FORENSIC CASES 10

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to
- To apply the concepts of computer forensics.
- To handle threats associated with security and information warfare.
- To design tools and tactics associated with cyber forensics.

REFERENCES:
OBJECTIVES:
- To understand data mining principles and techniques and introduce DM as a cutting edge business intelligence.
- To expose the students to the concepts of data warehousing architecture and implementation.
- To study the overview of developing areas—Web mining, text mining, and ethical aspects of data mining.
- To identify business applications and trends of data mining.

UNIT I DATA WAREHOUSE
Data warehousing - operational database systems vs data warehouses - multidimensional data model - schemas for multidimensional databases – OLAP operations – data warehouse architecture – indexing – OLAP queries & tools.

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

UNIT IV CLASSIFICATION & PREDICTION

UNIT V CLUSTERING

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

REFERENCES:
OBJECTIVES:
To understand:
- The background of an agent
- The reasoning aspect of agents
- The communication and cooperation of agents
- The application of agent and decision making of multi-agent

UNIT I  INTRODUCTION AND INTELLIGENT AGENTS  9

UNIT II  REASONING  9
Deduction reasoning agent - Agents as theorem provers - Agent oriented programming - Practical reasoning agent - Means end reasoning - Implementation - Procedural reasoning system - Reactive agent - Hybrid agent

UNIT III  COMMUNICATION AND COOPERATION  9

UNIT IV  METHODOLOGIES AND APPLICATIONS  9

UNIT V  MULTIAGENT DECISION MAKING  9
Multiagent Interactions - Making Group decisions - Forming coalitions - Allocating Scarce Resources - Bargaining - Arguing - Logical Foundations

OUTCOMES:
At the end of the course, the student will be able
- To analyze agent based computing
- To design the reasoning aspects of agents
- To implement communication and cooperation of agents
- To implement multi-agent systems.

REFERENCES:
OBJECTIVES:
- To learn the basics of e-learning
- To understand the design issues in E-Learning
- To study about interactive E-Learning
- To learn managing E-Content

UNIT I INTRODUCTION
Developing e-learning-E-learning approaches- E-learning components-Synchronous and asynchronous e-learning-Quality of e-learning-Blended learning- Need to develop an e-learning course-The activities, The team, The technology-work flow to produce and deliver e-learning content

UNIT II DESIGNING AN E-LEARNING CONTENT/COURSE
Identifying and organizing course content-Needs analysis-Analysing the target audience-Identifying course content-Defining learning objectives-Defining the course sequence-Defining instructional, media, evaluation and delivery strategies-Defining instructional methods, Defining the delivery strategy, Defining the evaluation strategy

UNIT III CREATING INTERACTIVE CONTENT
Preparing content-Creating storyboards-Structure of an interactive e-lesson-Techniques for presenting content-Integrating media elements-Courseware development-Authoring tools-Types of authoring tools-Selecting an authoring tool

UNIT IV MANAGING AND EVALUATING LEARNING ACTIVITIES
Course delivery and evaluation-Components of an instructor led or facilitated course-Planning and documenting activities-Facilitating learners’ activities-Using communication tools for e-learning-Learning platforms-Proprietary vs. open-source LMS

UNIT V MANAGEMENT AND IMPLEMENTATION OF E-LEARNING
Collaborative learning-Moodle and other open-source solutions-E-learning methods and delivery formats-Evaluating the impacts of e-learning

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student will be able
- To appreciate the basics of e-learning
- To create the E-Content
- To implement interactive E-Learning
- To manage E-Content

REFERENCES:
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

UNIT II FRAMEWORK

UNIT III DATA AND KNOWLEDGE GRID

UNIT IV GRID MIDDLEWARE

UNIT V APPLICATIONS

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
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

TOTAL : 45 PERIODS

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:
OBJECTIVES:
- To understand knowledge representation and reasoning techniques.
- To understand the application of knowledge representation and reasoning in actions and planning.

UNIT I            INTRODUCTION
Data, information and knowledge. Model of an intelligent system. Models of knowledge representations.

UNIT II            REPRESENTATION
Semantic representations: semantic networks, frames; Frame/script systems; Conceptual dependency and conceptual graphs. Ontologies.

UNIT III            COMPUTATIONAL LOGIC
Proposition and predicate logic - reasoning about knowledge - Temporal reasoning.

UNIT IV            DEFAULTS, UNCERTAINTY
Default Logic - Inference under uncertainty - Bayesian techniques, Fuzzy reasoning, Case-based reasoning, Description logic.

UNIT V            ACTIONS
Actions - Situational calculus - Frame problem - Complex actions - Planning - STRIPS - Planning as reasoning - Hierarchical and Conditional Planning.

OUTCOMES:
At the end of the course, the student will be able
- To implement knowledge representation and reasoning techniques.
- To apply knowledge engineering for the development of intelligent applications.

REFERENCES:
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  9
Linear Models for Classification - Discriminant Functions - Probabilistic Generative Models -
Probabilistic Discriminative Models - Bayesian Logistic Regression - Decision Trees - Classification
Trees - Regression Trees – Pruning - Neural Networks - Feed-Forward Network Functions - Error
Back-Propagation - Regularization - Mixture Density and Bayesian Neural Networks - Kernel
Methods - Dual Representations - Radial Basis Function Networks - Ensemble methods - Bagging
- Boosting.

UNIT III  UNSUPERVISED LEARNING  9
Clustering - K-means - EM - Mixtures of Gaussians - The EM Algorithm in General - Model Selection
for Latent Variable Models - High-Dimensional Spaces -- The Curse of Dimensionality -
Dimensionality Reduction - Factor Analysis - Principal Component Analysis - Probabilistic PCA
Independent Components Analysis.

UNIT IV  PROBABILISTIC GRAPHICAL MODELS  9
Directed Graphical Models - Bayesian Networks - Exploiting Independence Properties – From
Distributions to Graphs - Examples - Markov Random Fields - Inference in Graphical Models -
Learning- Generalization – Undirected graphical models - Markov Random Fields- Conditional
Independence Properties - Parameterization of MRFs - Examples - Learning – Conditional
Random Fields (CRFs) - Structural SVMs.

UNIT V  ADVANCED LEARNING  9
Sampling – Basic sampling methods – Monte Carlo - Reinforcement Learning - K-Armed Bandit-
Elements - Model-Based Learning - Value Iteration- Policy Iteration - Temporal Difference
Learning- Exploration Strategies- Deterministic and Non-deterministic Rewards and Actions-
Eligibility Traces- Generalization- Partially Observable States- The Setting- Example - Semi-
Supervised Learning - Computational Learning Theory - Mistake Bound Analysis – Sample
Complexity Analysis - VC Dimension - Occam Learning - Accuracy and Confidence Boosting.

TOTAL: 45 PERIODS

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:
OBJECTIVES:
- To introduce open technologies
- To develop applications using python
- To provide an exposure to open hardware

UNIT I         INTRODUCTION
Need for free and open source software – Overview of linux – Distributions Development environment tools and systems - using collaborative version control system - FOSS practices - programming guidelines

UNIT II        SYSTEM ADMINISTRATION
GNU andlinux installation – Boot process, Commands Using bash features, The man pages - files and file systems - Partitions - Processes - Graphical environment - Installing software - git commands

UNIT III       PYTHON
Conditionals/Loops - Functions - List - Strings - Recursion - tuples - Classes - Inheritance

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

UNIT V         OPEN SOURCE HARDWARE
Raspberry pi - Arduino – building embedded applications with raspberry pi and arduino- open source 3-d printing

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student will be able to:
- Explain the internal structure of linux
- Write desktop and web applications using python
- Design for extendibility and code reuse
- To develop applications for open source hardware

REFERENCES:
OBJECTIVES:
- To learn the importance of semantic web.
- To understand various semantic knowledge representation strategies.
- To learn the concepts of ontology.
- To learn the ontology related tools.

UNIT I INTRODUCTION

UNIT II SEMANTIC KNOWLEDGE REPRESENTATION

UNIT III RULE LANGUAGES

UNIT IV ONTOLOGY DEVELOPMENT

UNIT V SOFTWARE TOOLS

OUTCOMES:
Upon completion of the course, the students will be able to
- Compare conventional web with semantic web.
- Analyze and design semantic knowledge representation modes.
- Construct ontology using different tools.
- Use semantic web services with web applications.

TOTAL:45 PERIODS
REFERENCES:
5. John Davis, Dieter Fensal, Frank Van Harmelen, J. Wiley, "Towards the Semantic Web: Ontology Driven Knowledge Management".

IF 7017 SOCIAL NETWORK ANALYSIS

OBJECTIVES:
The student should be made to:
- Understand the concept of semantic web and related applications.
- Learn knowledge representation using ontology.
- Understand human behavior in social web and related communities.
- Learn visualization of social networks.

UNIT I THE SEMANTIC WEB AND SOCIAL NETWORKS

UNIT II SEMANTIC TECHNOLOGY FOR SOCIAL NETWORK ANALYSIS

UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the student should be able to:

- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.
- Visualize social networks.

REFERENCES:

IF 7018  SOFT COMPUTING AND APPLICATION  L  T  P  C
3 0 0 3

OBJECTIVES:
- To understand the concept and applications of fuzzy logic, neural networks, genetic algorithms and hybrid systems.

UNIT I  INTRODUCTION AND FUZZY LOGIC  9

UNIT II  NEURAL NETWORKS  9

UNIT III  GENETIC ALGORITHMS  9
Basic concepts of genetic algorithms - encoding - genetic modeling - Evolutionary Strategies - Optimization techniques

UNIT IV  HYBRID SYSTEMS  9

UNIT V  APPLICATIONS  9
Applications of Fuzzy Logic - Applications of Neural Network - Application of Genetic Algorithm - Applications in Image processing - Applications in Data mining - Applications in other domains.

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the student should be able
- To implement the concept and applications of fuzzy logic, neural networks, genetic algorithms and hybrid systems.

REFERENCES:

IF 7020 VIRTUALIZATION L T P C
3 0 0 3

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

TOTAL:45 PERIODS

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

REFERENCES:

IF7021 MOBILE AND PERVERSIVE COMPUTING

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
Three tier architecture - Model View Controller Architecture - Memory Management – Information Access Devices – PDAs and Smart Phones – Smart cards and Embedded Controls – J2ME – Programming for CLDC – GUI in MIDP – Application Development ON Android and iPhone

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course the student should be able
- 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.

REFERENCES:

IF7022 WIRELESS AND SENSOR NETWORKS L T P C 3 0 0 3

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 II  

UNIT III  

UNIT IV  

UNIT V  

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:  

IF 7071 BIOINFORMATICS  
OBJECTIVES:  
- To learn bio-informatics algorithms  

UNIT I  
UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

OUTCOMES:
Upon the completion of this course the student should be able
- To design and implement bio-informatics algorithms

REFERENCES
OBJECTIVES:
- To understand the architecture of GPUs in order to program them effectively.
- To program using GPU programming frameworks.
- To optimize multimedia applications to run on GPUs.

UNIT I  GPU ARCHITECTURES

UNIT II  GPU COMPUTING AND CUDA
Introduction – Parallel Programming Languages and models – Evolution of Graphic pipelines – GPGPUs - CUDA Program Structure – Device memories – Data Transfer – Kernel Functions

UNIT III  CUDA DETAILS
CUDA Threads – Thread Organization – Synchronization & Scalability – CUDA memories – Performance – Imaging Case study

UNIT IV  OPENCL BASICS

UNIT V  OPENCL CONCURRENCY & EXECUTION MODEL
OpenCL Synchronization – Kernels – Fences – Barriers – Queueing – Global Synchronization – Memory Consistency – Events – Host side memory model – Device Side memory Model – Case study

TOTAL:45 PERIODS

OUTCOMES:
At the end of the course, the student will be able to
- Design multimedia applications using GPUs.
- Write Programs for GPUs using CUDA / OpenCL.
- Optimize programs to run on massively parallel architectures.

REFERENCES:
OBJECTIVES:
- To learn SOA fundamentals
- To understand SOAD
- To study about service composition
- To explore RESTful services and SOA security

UNIT I  SOA FUNDAMENTALS  9

UNIT II  SERVICE-ORIENTED ANALYSIS AND DESIGN  9

UNIT III  SERVICE COMPOSITION  9
Service Composition with REST - Fundamental Service Composition with REST - Advanced Service Composition with REST - Service Composition with REST Case Study - Design Patterns for SOA with REST - Service Versioning with REST - Uniform Contract Profiles

UNIT IV  RESTFUL SERVICES AND THE RESOURCE-ORIENTED ARCHITECTURE  9

UNIT V  SOA TRANSACTION AND SECURITY  9
SOA and performance - SOA and security – Service Management - Model driven service deployment – Establishing SOA and SOA governance

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course, the student will be able
- To appreciate SOA fundamentals
- To implement SOAD
- To compose the web services
- To deploy RESTful services and SOA security

REFERENCES
1. Nicolai M.Josuttis, SOA in design - The art of distributed system design, O’REILLY publication, 2007.
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


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

OUTCOMES:

Upon completion of the course, the student should be able

- To analyze the internals of the unix operating system.
- To make use of the various data structures
- To implement various low-level algorithms used in UNIX.

REFERENCES:

OBJECTIVES:

- To provide knowledge about computer vision algorithms
- To understand the basic concepts of camera calibration, stereoscopic imaging and higher level image processing operations
- To familiarize the student with the image processing facilities in Matlab and its equivalent open source tools like OpenCV
- To appreciate the use of computer vision in Industrial applications and to understand the role of computer vision
- To understand and implement more advanced topics in current research literature

UNIT I FUNDAMENTALS OF VISION

- Image Formation and Representation, Intensity and Range Images – Camera models – Camera parameters – Camera models – Light and colour – Image Noise – Image Filtering (spatial domain)
- Mask-based filtering - Image Smoothing , Sharpening.

UNIT II IMAGE FEATURES


UNIT III CAMERA CALIBRATION AND STEREO GEOMETRY

- Camera Parameters – Intrinsic and Extrinsic parameters – Direct Parameter Calibration – Extraction from Projection matrix, Stereopsis – Correspondence Problem – RANSAC and Alignment - Epipolar Geometry

UNIT IV MOTION DETECTION AND SHAPE FROM CUES


UNIT V HIGH LEVEL VISION


TOTAL: 45 PERIODS

OUTCOMES:

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

- Implement basic computer vision algorithms
- Familiar with the use of MATLAB and OpenCV environment
- Design and implement industrial applications that incorporates different concepts of medical Image Processing
- Critically analyze different approaches to implement mini projects in industrial environment.

REFERENCES:

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

UNIT II  DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS

UNIT III  MODELS

UNIT IV  EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI

UNIT V  THEORIES

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.

TOTAL: 45 PERIODS
REFERENCES:

MM7001 BIG DATA ANALYTICS

OBJECTIVES:
- To understand the applications using Map Reduce Concepts.
- To learn to use various techniques for mining data stream.
- To understand the various search methods and visualization techniques.
- To learn to analyze the big data using intelligent techniques.

UNIT I INTRODUCTION TO BIG DATA

UNIT II MINING DATA STREAMS

UNIT III HADOOP
History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

UNIT IV HADOOP ENVIRONMENT

UNIT V FRAMEWORKS
Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

TOTAL : 45 PERIODS
OUTCOMES:

Work with big data platform
- The students will be able to Analyze the HADOOP and Map Reduce technologies associated with big data analytics
- Design efficient algorithms for mining the data from large volumes.
- Analyze the big data analytic techniques for useful business applications.
- Explore on Big Data applications Using Pig and Hive
- Discuss the fundamentals of various big data analysis techniques

REFERENCES:
11. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author) , Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today’s Businesses,Wiley Publications,2013

MM7002 BIOMETRICS  L T P C  3 0 0 3

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
UNIT II  FINGER AND FACIAL SCAN  
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  
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  

UNIT V  BIOMETRICS APPLICATION DEVELOPMENT  

TOTAL: 45 PERIODS

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 incorporates different concepts of biometrics
- Critically analyze different approaches to implement mini projects in industrial environment and in security related projects

TEXT BOOKS:

MM7003  CLOUD COMPUTING  

OBJECTIVES:
- To understand the concept of cloud and utility computing
- To understand the various issues in cloud computing
- To familiarise 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
Parallel and Distributed programming Paradigms – MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments - Eucalyptus, Open nebula, OpenStack.

UNIT V SECURITY IN THE CLOUD

TOTAL = 45 PERIODS

OUTCOMES:
- 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

TEXT BOOKS:

REFERENCES:
2. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice (O'Reilly)) by George Reese: O'Reilly

MM7005 MEDIA SECURITY

OBJECTIVES:
- To understand the standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand security issues those arise in communication systems and web services.
UNIT I  BASICS OF CRYPTOGRAPHY  8

UNIT II  DIGITAL WATERMARKING  12

UNIT III  DIGITAL WATERMARKING TECHNIQUES  8

UNIT IV  INTRODUCTION TO DIGITAL STEGANOGRAPHY  7
Types of Steganography - Applications of Steganography - Embedding Security and Imperceptibility - Examples of Steganographic Software

UNIT V  STEG ANALYSIS  10

OUTCOMES:
- The students would have understood the basic security algorithms required by any computing system.
- The students may be now aware of the security challenges and issues that may arise in any system.
- The students will now be able to design any secure system.

REFERENCES
OBJECTIVES:

- To introduce the basics of multimedia information storage technology, techniques for analysis, representation and retrieval that is commonly used in industry.
- To compare and contrast information retrieval models and internal mechanisms such as Boolean, Probability, and Vector Space Models.
- To outline the structure of queries and media elements.
- To critically evaluate Multimedia retrieval system effectiveness and improvement techniques.

UNIT I: FUNDAMENTAL MEDIA UNDERSTANDING


UNIT II: TEXT RETRIEVAL AND MUSIC


UNIT III: IMAGE RETRIEVAL

- Content-based image retrieval; techniques; feature extraction; integration; similarity; feature in INDEXING; interactive retrieval; MPEG-7 standard

UNIT IV: VIDEO RETRIEVAL

- Content Based Video Retrieval - Video Parsing – Video abstraction and Summarization– Video Content Representation, Indexing and retrieval –Video Browsing Schemes–Example of Video Retrieval Systems

UNIT V: RETRIEVAL METRICS AND MODERN IR


OUTCOMES:

Upon the completion of the course the student can able to

- Learn the basics of multimedia information storage technology, techniques for analysis, representation and retrieval that is commonly used in industry.
- Compare and contrast information retrieval models and internal mechanisms such as Boolean, Probability, and Vector Space Models.
- Outline the structure of queries and media elements.
- Critically evaluate Multimedia retrieval system effectiveness and improvement techniques.

REFERENCES:

OBJECTIVES:
- Students will be guided by the faculty, in a step by step procedure in making a
  Documentary of their topic.
- At the end of the course, students will produce a documentary as part of their assessment.

UNIT I  GRAMMAR OF DOCUMENTARIES
Origins and History of Documentary Films – Introduction to Narrative and Non-narrative
Filmmaking – Elements of documentaries – Aesthetics & Authorship – Documentary theory & Issue
of representation, types of documentaries – Approaches in Science – Nature filmmaking –
Ethnographic Documentary filmmaking – Creative approaches – Case Studies.

UNIT II  DEVELOPING THE STORY – PREPRODUCTION
Understanding story, story basics, finding the story – Developing story ideas, story structure, time
on screen, researching for documentaries, kinds of information, finding people as sources,
information management, choosing a subject – Visual scope and visual evidence, permissions,
funding, pitching your ideas – Proposals, elements of proposals, resources for writing proposals,
attracting funding – Ethics in documentary filmmaking.

UNIT III  SHOOTING THE STORY – PRODUCTION
Treatment, unscripted and scripted documentaries, planning, and collecting the material – adapting
the script, ways to tell a story – Interviews, recce, use of talents, re-enactments, reconstruction &
docudrama. Choosing the team, bringing together right people, working together, getting the right
camera & equipments, camerawork, producing, directing, directing the crew. Shooting, lighting,
location sound, problems & issues.

UNIT IV  BUILDING THE STORY – POST PRODUCTION
Building the story in the editing table, working with an editor – Crafting the story, Finding your style
– The paper edit, reviewing the footage, assembling of rushes, editing the footages, applying
effects, transition – Adding sound effects and music, special effects dubbing, rerecording –
Narration – Voiceover, using Music, titles and graphics – Colour exposure and colour correction –
Credits & acknowledgements.

UNIT V  PROJECT – PRACTICE & SCREENING
Project involving the production and direction of an individually or group authored documentary
film, accompanied by a research dossier, a proposal and a treatment. The students will also
ensure the exhibition of their films for reviews

TOTAL: 45 PERIODS

OUTCOMES:
- At the end of the course, students will be able to gain adequate skills to produce a
documentary for broadcast.
- Students will be able to apply principles of factual program production in their future
  productions

TEXTBOOKS:
1. Genevieve Jolliffe and Andrew Zinnes. The Documentary Film Makers Handbook: A Guerilla
2. Louise Spence and Vinicius Navarro. Crafting Truth: Documentary Form and Meaning, Rutgers
REFERENCES:

REFERENCES:

MM7008 SOUN D ENGINEERING

OBJECTIVES:
Implement the Standards in the real world service creations.
To know about new generation set-top boxes, hand-held devices, and PC add-in cards.
Understand MPEG-2 System Standards.

UNIT I INTRODUCTION TO BROADCASTING 9

UNIT II DATA BROADCASTING 9

UNIT III DESIGN AND INSTALLATION OF VIDEO AND AUDIO SYSTEMS 9

UNIT IV AUDIO VIDEO STREAMING 9

UNIT V ALGORITHMS AND INTERFACES 9

TOTAL : 45 PERIODS

OUTCOMES:
Upon successful completion of this course, students will be able to:
- Work with big data platform and its analysis techniques.
- Design efficient algorithms for mining the data from large volumes.
- Work with surveillance videos for analytics.
- Design optimization algorithms for better analysis and recognition of objects in a scene.
- Model a framework for Human Activity Recognition.
TEXT BOOKS:
1. The technology of video and audio streaming 2nd edition David Austerberry 2005 ELSEVIER
2. Data Broadcasting – Understanding the ATCS Data Broadcasting Standerds – Richards.S
3. Digital Video And HDTV Algorithm and Interfaces – Charles Poynton – Morgan Kaufman
   Publishers – 2007

REFERENCES:
1 standard Handbook of Broadcast Engineering – Jerry C. Whitaker – Mcgraw Hill Publications
   2005
2.Digital Television Fundamentals - Design and Installtion of Video and Audio Systems - Mcgraw

MM7009 VIRTUAL REALITY  L T P C
3 0 0 3

OBJECTIVES:
- To impart the fundamental aspects, principles of virtual reality technology
- To gain knowledge about applications of virtual reality

UNIT I  INTRODUCTION 9
Introduction to Virtual Reality – Definition – Three I's of Virtual Reality – Virtual Reality Vs 3D
Position Trackers -Performance Parameters – Types of Trackers - Navigation and Manipulation
Displays – Human Auditory System.

UNIT II  VR ARCHITECTURE 9
Architectures – Sun Blade 1000 Architecture – SGI Infinite Reality Architecture – Distributed VR
Architectures – Multipipeline Synchronization – Collocated Rendering Pipelines – Distributed
Virtual Environments.

UNIT III  VR MODELING 9
Modeling – Geometric Modeling – Virtual Object Shape – Object Visual Appearance – Kinematics
Hierarchies – Viewing the 3D World – Physical Modeling – Collision Detection – Surface
Management.

UNIT IV  VR PROGRAMMING 9
VR Programming – Toolkits and Scene Graphs – World ToolKit – Java 3D – Comparison of World
ToolKit and Java 3D - GHOST – People Shop – Human Factors in VR – Methodology and

UNIT V  VR APPLICATIONS 9
Medical Applications of VR – Education, Arts and Entertainment – Military VR Applications –
Emerging Applications of VR – VR Applications in Manufacturing – Applications of VR in Robotics
– Information Visualization.

TOTAL: 45 PERIODS
OUTCOMES:

At the end of the course the student should be able to

- To Discuss the basic concepts of Virtual reality
- Develop the Virtual Reality applications in different areas
- Design of various modeling concepts.
- To expose the concept of Virtual Reality Programming with toolkits.

REFERENCES:


MM7072 VISUALISATION TECHNIQUES  L  T  P  C

OBJECTIVES:

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

UNIT I INTRODUCTION 9

UNIT II FOUNDATIONS FOR DATA VISUALIZATION 9
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 9
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 9

UNIT V CASE STUDIES 9
Small interactive calendars – Selecting one from many – Web browsing through a key hole – Communication analysis – Archival analysis

TOTAL: 45 PERIODS

OUTCOMES:

Upon Completion of the course, the students will be able

- To Compare various visualization techniques.
- Design creative visualizations.
- Apply visualization over different types of data.

TEXT BOOKS:

REFERENCE:

MM7203 SPEECH AND AUDIO PROCESSING L T P C 3 0 0 3

OBJECTIVES:
- To provide an introduction to the fundamental principles and techniques in Audio processing.
- To provide an overview of Audio enhancement
- To provide details about Audio compression techniques
- To review latest trends and future technologies in speech processing.

UNIT I DIGITAL AUDIO 9

UNIT II SPEECH PROCESSING 9

UNIT III MUSICAL SOUND SYNTHESIS AND MIDI 9
Acoustic Instruments, Sound Synthesis in Music, MIDI Principles - Hardware aspects, Structure of MIDI Messages, General MIDI, MIDI-to-Wav Conversion, Scalable Polyphonic MIDI (SPMIDI), RMID and XMF Files, SAOL and SASLin MPEG 4 Structured Audio, MIDI over USB, MIDI over IEEE 1394.

UNIT IV STEREO AND SURROUND SOUND 9
Two-Channel Stereo - Principles of Loudspeaker Stereo and Binaural or Headphone Stereo, Loudspeaker Stereo Over Headphones and Vice Versa, Two-Channel Signal Formats and Microphone techniques, Binaural Recording and ‘Dummy Head’ Techniques, Spot microphones and Two-Channel Panning Laws, Surround Sound - Three Channel Stereo, Four Channel Surround, 5.1-Channel Surround, and other Multichannel Configurations, Surround Sound Systems, Matrixed Surround Sound Systems Digital Surround Sound Formats, Dolby Digital, DTS, Ambisonics, Surround Sound Monitoring, Surround Sound Recording Techniques, Multichannel Panning Techniques.

UNIT V MPEG Audio Compression and formats 9
Basic Audio Compression Techniques- ADPCM in Speech Coding, G.726ADPCM, Vocoders; MPEG Audio Compression - Psychoacoustics, MPEG Audio. Digital Audio Formats and Interchange - Audio File Formats for Digital and Disk formats, Interconnecting Digital Audio Devices

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to
- Implement basic algorithms related to Audio Compression.
- Analyze audio compression formats.
- Critically analyze the role of surround sound in modern technologies.
TEXT BOOKS

MM7252  VIDEO PROCESSING AND ANALYTICS  L T P C
3 0 0 3

OBJECTIVES:
- To have a better knowledge about videos
- To enrich students with data analytics
- To understand the video content analysis
- To expose the student to various applications and case studies of Video analytics.

UNIT I  VIDEO FUNDAMENTALS  9

UNIT II  VIDEO SEGMENTATION AND VIDEO FEATURES  9
Fundamentals of Motion Estimation – Optical flow - Pixel Video Features - colour, shape features, Textural features - Feature selection and Dimensionality Reduction.

UNIT III  INTRODUCTION TO ANALYTICS  9
Big-Data - Descriptive data analysis - Analytic Processes and Tools - Regression - Classification - Clustering algorithms - Validation - Multimodal approach to Image and Video data mining - Probabilistic semantic mode - Model based annotation and video mining.

UNIT IV  VIDEO CONTENT ANALYSIS AND ANALYTICS  9
Introduction- Detecting Shot Boundaries in Video – Parsing a Video into Semantic Segments – Video Indexing and Abstraction for Retrievals – Affective Video Content Analysis - Automatic Video Trailer Generation - Video database - Video categorization - Video query categorization

UNIT V  EMERGING TRENDS  9
Object Segmentation and Tracking in the Presence of Complex Background – Video Inpainting – Video Summarization – Forensic video analysis

TOTAL:45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Discuss video processing fundamentals
- Analyze video features
- Formulate various application of video processing

REFERENCES:
OBJECTIVES:
- To understand the basic ideas of compression algorithms related to multimedia components – Text, speech, audio, image and Video.
- To understand the principles and standards and their applications with an emphasis on underlying technologies, algorithms, and performance.
- To appreciate the use of compression in multimedia processing applications
- To understand and implement compression standards in detail

UNIT I  FUNDAMENTALS OF COMPRESSION  9

UNIT II  TEXT COMPRESSION  9

UNIT III  IMAGE COMPRESSION  9

UNIT IV  AUDIO COMPRESSION  9

UNIT V  VIDEO COMPRESSION  9

TOTAL :45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to
- Implement basic compression algorithms familiar with the use of MATLAB and its equivalent open source environments
- Design and implement some basic compression standards
- Critically analyze different approaches of compression algorithms in multimedia related mini projects.

REFERENCES