PROGRAM EDUCATIONAL OBJECTIVES (PEO)
Graduates of this M. E. Multimedia will be able to

- Apply the necessary mathematical tools and fundamental & advanced knowledge of multimedia related applications.
- Develop computer/software/network systems understanding the importance of social, business, technical, environmental, and human context in which the systems would work.
- Articulate fundamental concepts, design underpinnings of computer/software/network systems, and research findings to train professionals or to educate engineering students.
- To mould the students to be ethically committed towards teamwork for producing quality output with the aim of developing our nation.
- Contribute effectively as a team member/leader, using common tools and environment, in multimedia projects, research, or education
- To engage in sustained learning for the career opportunities in industries, research divisions, and academics so that they can adapt to ever-changing technological and societal requirements.
- Pursue life-long learning and research in selected fields of Multimedia with animation and contribute to the growth of those fields and society at large.
- To be competent in the Multimedia segments and to bring out novel ideas by exploring the multiple solutions for the given problem

PROGRAM OUTCOMES
1. Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the conceptualization of engineering models.
2. Identify, formulate, research literature and solve complex engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
3. An ability to design a Multimedia system with components and processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. Conduct investigations of complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
5. Create, select and apply appropriate techniques, resources, and modern engineering tools, including animation, web based techniques, prediction and modeling, to complex engineering activities, with an understanding of the limitations.
6. An ability to apply Multimedia Engineering principles, techniques and tools in web based multimedia development.
7. Apply a systematic, disciplined, quantifiable approach to the cost-effective development, operation and maintenance of software systems to the satisfaction of their beneficiaries.
8. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
9. Understand and commit to professional ethics and responsibilities and norms of engineering practice.
10. Understand the impact of engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development.
11. An ability to identify, formulates, and solves engineering problems.
# M.E. MULTIMEDIA TECHNOLOGY

## I TO IV SEMESTERS CURRICULA AND SYLLABI (FULL TIME)

### SEMESTER I

<table>
<thead>
<tr>
<th>SL. NO</th>
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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 9+3
Random variables - Probability function – Moments – Moment generating functions and their properties – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions – Functions of a Random Variable.

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 9+3
Joint distributions – Marginal and Conditional distributions – Functions of two dimensional random variables – Regression Curve – Correlation.

UNIT III ESTIMATION THEORY 9+3

UNIT IV TESTING OF HYPOTHESES 9+3
Sampling distributions - Type I and Type II errors - Tests based on Normal, t, Chi-Square and F distributions for testing of mean, variance and proportions – Tests for Independence of attributes and Goodness of fit.

UNIT V MULTIVARIATE ANALYSIS 9+3
Random Vectors and Matrices - Mean vectors and Covariance matrices - Multivariate Normal density and its properties - Principal components Population principal components - Principal components from standardized variables.

TOTAL 45+15=60 PERIODS

OUTCOME:
- The student will able to acquire the basic concepts of Probability and Statistical techniques for solving mathematical problems which will be useful in solving Engineering problems

REFERENCES:
OBJECTIVES:
- To understand the principles of iterative and recursive algorithms.
- To learn the graph search algorithms.
- To study network flow and linear programming problems.
- To learn the hill climbing and dynamic programming design techniques.
- To develop recursive backtracking algorithms.
- To get an awareness of NP completeness and randomized algorithms.
- To learn the principles of shared and concurrent objects.
- To learn concurrent data structures.

UNIT I  ITERATIVE AND RECURSIVE ALGORITHMS

UNIT II  OPTIMISATION ALGORITHMS

UNIT III  DYNAMIC PROGRAMMING ALGORITHMS

UNIT IV  SHARED OBJECTS AND CONCURRENT OBJECTS

UNIT V  CONCURRENT DATA STRUCTURES
Practice-Linked Lists-The Role of Locking-List-Based Sets- Concurrent Reasoning- Coarse-Grained Synchronization-Fine-Grained Synchronization-Optimistic Synchronization- Lazy Synchronization-Non-Blocking Synchronization-Concurrent Queues and the ABA Problem-Queues-A Bounded Partial Queue-An Unbounded Total Queue-An Unbounded Lock-Free Queue-Memory Reclamation and the ABA Problem- Dual Data Structures- Concurrent Stacks and Elimination- An Unbounded Lock-Free Stack- Elimination-The Elimination Backoff Stack

TOTAL: 45PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to
1. Implement and apply concurrent linked lists, stacks, and queues
2. Implement advanced concurrent structures
3. Design and implement concurrent algorithms.
4. Design and implement algorithms using different techniques

REFERENCES:

CP7103 MULTICORE ARCHITECTURES

OBJECTIVES:
- To understand the recent trends in the field of Computer Architecture and identify performance related parameters
- To appreciate the need for parallel processing
- To expose the students to the problems related to multiprocessing
- To understand the different types of multicore architectures
- To expose the students to warehouse-scale and embedded architectures

UNIT I FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS

UNIT II DLP IN VECTOR, SIMD AND GPU ARCHITECTURES
- Vector Architecture - SIMD Instruction Set Extensions for Multimedia – Graphics Processing Units - Detecting and Enhancing Loop Level Parallelism - Case Studies.

UNIT III TLP AND MULTIPROCESSORS
- Symmetric and Distributed Shared Memory Architectures – Cache Coherence Issues - Performance Issues – Synchronization Issues – Models of Memory Consistency - Interconnection Networks – Buses, Crossbar and Multi-stage Interconnection Networks.

UNIT IV RLP AND DLP IN WAREHOUSE-SCALE ARCHITECTURES
UNIT V ARCHITECTURES FOR EMBEDDED SYSTEMS


OUTCOMES:
Upon completion of the course, the students will be able to
• Identify the limitations of ILP and the need for multicore architectures
• Discuss the issues related to multiprocessing and suggest solutions
• Point out the salient features of different multicore architectures and how they exploit parallelism
• Critically analyze the different types of inter connection networks
• Discuss the architecture of GPUs, warehouse-scale computers and embedded processors

TOTAL: 45 PERIODS

REFERENCES:

MU7101 MULTIMEDIA CODING TECHNIQUES L T P C
3 0 0 3

COURSE OBJECTIVES:
• Understand the importance of multimedia in today’s online and offline information sources and repositories.
• Understand how Text, Audio, Image and Video information can be represented digitally in a computer, so that it can be processed, transmitted and stored efficiently.
• Understand the possibility and limitations of multimedia data compression.
• Understand the basic audio coding techniques including predictive coding and more advanced techniques based around LPC and sub-band coding.
• Understand bi-level Image lossless coding techniques and how these can be extended to code grayscale images, and colour images.
• Understand GIF and JPEG lossless coding techniques.
• Understand lossy Image, video Coding techniques

UNIT I INTRODUCTION
Multimedia Representation - Text, Audio, Image and Video Representation - Input and Output Transducers - Human Vision and Audio Systems and their Limitations - Sampling, Quantization, Coding, Companding.

UNIT II BASIC CODING TECHNIQUES
Introduction to Data Compression - Information Theory - Statistical Coding - Dictionary Based Coding – Audio Coding.

UNIT III LOSSLESS IMAGE CODING
Bi-Level -Reflected Gray Codes - Predictive Coding –GIF-Lossless JPEG

UNIT IV LOSSY IMAGE CODING
UNIT V  VIDEO CODING (LOSSY)  9
Video Coding Concepts - The Hybrid DPCM/DCT algorithm - Motion Compensated Prediction - Motion Estimation - Standards: H.261, MPEG-1,2,4,7.

TOTAL : 45 PERIODS

REFERENCES:

MU7102  MULTIMEDIA COMMUNICATION NETWORKS  L T P C
3 0 0 3

OBJECTIVES:
• To understand the Multimedia Communication Models
• To analyze the Guaranteed Service Model
• To study the Multimedia Transport in Wireless Networks
• To solve the Security issues in multimedia networks
• To explore real-time multimedia network applications

UNIT I  MULTIMEDIA COMMUNICATION MODELS  9

UNIT II  GUARANTEED SERVICE MODEL  9

UNIT III  MULTIMEDIA TRANSPORT  9

UNIT IV  MULTIMEDIA OVER WIRELESS NETWORKS  9

UNIT V  MULTIMEDIA NETWORK SECURITY AND APPLICATIONS  9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the students will be able to
• deploy the right multimedia communication models
• apply QoS to multimedia network applications with efficient routing techniques
• solve the security threats in the multimedia networks
• develop the real-time multimedia network applications
REFERENCES:

MU7103 CRYPTOGRAPHY AND MULTIMEDIA DATA HIDING L T P C 3 0 0 3

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.
- To bring the knowledge about the data hiding for image and video with countermeasures for attacks.

UNIT I CLASSICAL TECHNIQUES AND ENCRYPTION STANDARDS 9
Classical Cryptography-The Shift Cipher, The Substitution Cipher, The Affine Cipher
Cryptanalysis-Cryptanalysis of the Affine Cipher, Cryptanalysis of the Substitution Cipher,
Cryptanalysis of the Vigenere Cipher, Shannon’s Theory- Block Cipher and the Advanced
Encryption Standard-Substitution –Permutation Networks, Linear Cryptanalysis, Differential

UNIT II AUTHENTICATION 9
The RSA Cryptosystem and Factoring Integer - Introduction to Public –key Cryptography, Number
theory, The RSA Cryptosystem, Other Attacks on RSA, The ELGamal Cryptosystem, Shanks’
Algorithm, Finite Fields, Elliptic Curves over the Reals, Elliptical Curves Modulo a Prime, Signature
Scheme – Digital Signature Algorithm.

UNIT III MULTIMEDIA DATA HIDING INTRODUCTION 9
Overview of Multimedia Data Hiding – Data hiding framework-Key elements -Basic embedding
mechanisms-Techniques for Embedding multiple bits-Quantitative model for Uneven embedding
Capacity-Constant embedding Rate (CER)-Variable embedding Rate(VER).

UNIT IV DATA HIDING FOR IMAGE AND VIDEO 9
Data Hiding in Binary Image: Proposed Scheme – Applications-Robustness and Security
considerations-Multilevel embedding- Multilevel image data hiding: Spectrum Partition-System
Design-Refined Human visual model- Multilevel video data hiding: Embedding Domain-System
Design.

UNIT V AUTHENTICATION AND ATTACKS WITH COUNTERMEASURES 9
Data Hiding for Image Authentication- Data Hiding for Video Communication-Attacks on known
Data Hiding Algorithms-Countermeasures against Geometric attacks- Attacks on unknown Data
Hiding Algorithms.

TOTAL: 45 PERIODS
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 may have idea about the data hiding for image and video with supporting algorithms.
- Students may be now aware of developing data hiding algorithms for the specialized applications.

REFERENCES:


MU7111 ADVANCED DATA STRUCTURES LABORATORY

OBJECTIVES:

- To learn to implement iterative and recursive algorithms.
- To learn to design and implement algorithms using hill climbing and dynamic programming techniques.
- To learn to implement shared and concurrent objects.
- To learn to implement concurrent data structures.

LAB EXERCISES:

Each student has to work individually on assigned lab exercises. Lab sessions could be scheduled as one contiguous four-hour session per week or two two-hour sessions per week. There will be about 15 exercises in a semester. It is recommended that all implementations are carried out in Java. If C or C++ has to be used, then the threads library will be required for concurrency. Exercises should be designed to cover the following topics:

- Implementation of graph search algorithms.
- Implementation and application of network flow and linear programming problems.
- Implementation of algorithms using the hill climbing and dynamic programming design techniques.
- Implementation of recursive backtracking algorithms.
- Implementation of randomized algorithms.
- Implementation of various locking and synchronization mechanisms for concurrent linked lists, concurrent queues, and concurrent stacks.
- Developing applications involving concurrency.

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to
1. Design and apply iterative and recursive algorithms.
2. Design and implement algorithms using the hill climbing and dynamic programming and recursive backtracking techniques.
3. Design and implement optimisation algorithms for specific applications.
4. Design and implement randomized algorithms.
5. Design appropriate shared objects and concurrent objects for applications.
6. Implement and apply concurrent linked lists, stacks, and queues.

REFERENCES:

MU7112 MULTIMEDIA TOOLS LABORATORY L T P C
0 0 3 2

OBJECTIVES:
- To explore the various multimedia editing tools like Photoshop/EQV/MATLAB, audacity, Garageband, iMovie and Open CV.
- To explore media processing tools.

The following experiments should be practiced
1. Audio and video editing
2. Image editing
3. 2D and 3D animation

(Tools such as HTML/Frontpage/Dreamweaver, Multimedia application enabling software, System software support for multimedia, Performance measurement tools for multimedia, Multimedia authoring tools, Web tools and applications). The case studies are:
- Video on-demand
- Interactive TV
- Home shopping
- Remote home care
- Electronic album
- Personalized electronic journals

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to
- Process media elements using various multimedia tools
- Create 2D and 3D animations
- Build multimedia applications
The Mini project on multimedia network application software development

- Must use multimedia coding techniques.
- Must provide security
- Must prepare a Document in the form of report

TOTAL :30 PERIODS

OBJECTIVES:

- To develop skills in 2D and 3D Graphics concepts and Multimedia presentation with their applications.
- To learn and implement 2D and 3D Transformation drawing lines, circle, curve etc.,
- To learn about various color models with their features.
- To study about concepts of Multimedia and its applications.

UNIT I
INTRODUCTION
I/O devices – I/O primitives – Attributes of output primitives – DDA – Bresenham technique – Circle drawing algorithms – Interactive input methods.

UNIT II
2D GRAPHICS

UNIT III
3D GRAPHICS

UNIT IV
OVERVIEW OF MULTIMEDIA
Introduction to Multimedia - Multimedia Hardware & Software – Components of multimedia – Multimedia Authoring and tools – Multimedia Project development.

UNIT V
MULTIMEDIA SYSTEMS AND APPLICATIONS

OUTCOMES:

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

- Implement Transformations in 2Dimensional and 3Dimensional.
- Develop algorithms for drawing Line, polygon clipping, projection etc.,
- Apply and explore new techniques in the areas of Multimedia applications.
- Critically analyze different approaches to implement mini projects related with Multimedia applications.
- Explore the possibility of applying Multimedia concepts in various domains

TOTAL: 45 PERIODS
REFERENCES:

MU7202 IMAGE PROCESSING AND PATTERN RECOGNITION

OBJECTIVES:
To introduce the student to various Image processing and Pattern recognition techniques.
- To study the Image fundamentals.
- To study the mathematical morphology necessary for Image processing and Image segmentation.
- To study the Image Representation and description and feature extraction.
- To study the principles of Pattern Recognition.
- To know the various applications of Image processing.

UNIT I INTRODUCTION

UNIT II MATHEMATICAL MORPHOLOGY and IMAGE SEGMENTATION

UNIT III IMAGE REPRESENTATION AND DESCRIPTION AND FEATURE EXTRACTION.

UNIT IV PATTERN RECOGNITION
UNIT V APPLICATIONS:
Face and Facial Feature Extraction-Extraction of Head and Face Boundaries and Facial Features-
Recognizing Facial Action Units-Facial Expression Recognition in JAFFE Database-Image
Steganography- Types of Steganography- Applications of Steganography- Embedding Security
and Imperceptibility- Examples of Steganography Software- Genetic Algorithm Based
Steganography.

TOTAL : 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able
• To know the basic concepts in Image Processing.
• To segment the various types of Images.
• To represent the images in different forms
• To develop algorithms for Pattern Recognition
• To implement the features of Image processing in applications

REFERENCES:

IF7203 DATA WAREHOUSING AND DATA MINING

OBJECTIVES:
• To expose the students to the concepts of Data warehousing Architecture and Implementation
• To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
• To learn to use association rule mining for handling large data
• To understand the concept of classification for the retrieval purposes
• To know the clustering techniques in details for better organization and retrieval of data
• 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 8
Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV CLASSIFICATION & PREDICTION 10

UNIT V CLUSTERING 10

OUTCOMES: Upon Completion of the course, the students will be able to
- Store voluminous data for online processing
- Preprocess the data for mining applications
- Apply the association rules for mining the data
- Design and deploy appropriate classification techniques
- Cluster the high dimensional data for better organization of the data
- Discover the knowledge imbibed in the high dimensional system
- Evolve Multidimensional Intelligent model from typical system
- Evaluate various mining techniques on complex data objects

REFERENCES:
4. BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub. Co. Ltd, New Delhi, 2012
6. PRABHU Data Warehousing, PHI Learning Private Limited, New Delhi, 2012,
7. PONNIAH, PAULRAJ, Data Warehousing Fundamentals, John Wiley & Sons, New Delhi, 2011
8. MARAKAS, GEORGE M, Modern Data Warehousing, Mining, and Visualization, Pearson Education, 2011

MU7203 MULTIMEDIA DATABASES L T P C 3 0 0 3
OBJECTIVES:
- To study issues concerning both the traditional and modern database systems and technologies for multimedia data management.
- To understand the basic concepts and techniques pertinent to multimedia databases.
- To learn about Image databases and Text/Document databases, Audio and Video databases.
- To study and use advanced technologies to develop web-based multimedia applications.
UNIT I  INTRODUCTION  9
An introduction to Object-oriented Databases; Multidimensional Data Structures k-d Trees, Point Quadtrees, The MX-Quadtree, R-Trees, comparison of Different Data Structures

UNIT II  IMAGE DATABASES AND TEXT/DOCUMENT DATABASES  9

UNIT III  VIDEO DATABASES & AUDIO DATABASES  9
Video Databases Organizing Content of a Single Video, Querying Content of Video Libraries, Video Segmentation, video Standards Audio Databases A General Model of Audio Data, Capturing Audio Content through Discrete Transformation, Indexing Audio Data

UNIT IV  MULTIMEDIA DATABASES  9
Design and Architecture of a Multimedia Database, Organizing Multimedia Data Based on The Principle of Uniformity, Media Abstractions, Query Languages for Retrieving Multimedia Data, Indexing SMDSs with Enhanced Inverted Indices, Query Relaxation/Expansion, Web-based multimedia applications.

UNIT V  OBJECT MODEL & SPATIAL DATABASES  9
Creating Distributed Multimedia Presentations Objects in Multimedia Presentations, Specifying Multimedia Documents with Temporal Constraints, Efficient Solution of Temporal Presentation Constraints, Spatial Constraints. Introduction to Spatial Databases-Spatial Concepts and Data Models - Spatial Query Language - Spatial Storage and Indexing.

TOTAL: 45 PERIODS

OUTCOMES:
- Provides a basic study of the development of fundamental database systems.
- Understand the most fundamental MDBMS concepts and techniques
- Acquire knowledge of Image databases, Text/Document databases, Audio and Video databases.
- Grasp the modern database technologies suitable for multimedia data management, and
- Apply some of the advanced technologies such as spatial databases to develop web-based multimedia applications.

REFERENCES:
MU7211  GRAPHICS AND IMAGING LABORATORY

OBJECTIVES:
- To understand the basics of different 2D and 3D transformations
- To get an understanding of animation and authoring tools
- To understand the concepts of 2D and 3D viewing and clipping
- To gain the knowledge of interactive multimedia applications.

1. Line drawing algorithm, Circle drawing algorithms, Ellipse drawing algorithm
2. 2D transformations
3. Clipping algorithms
4. 3D Graphics using OpenGL, 3D viewing, 3D transformations
5. Developing interactive multimedia applications:
   The case studies are
   - Authoring a 2D presentation: (storyboard, design layout, collect the content, Presentation)
   - Mini project using any of the popular authoring tools (say, flash, director, dreamweaver)
   - Creating simple 3D animations and visualizations
   - Multimedia encyclopaedia
   - Multimedia security systems
   - Multimedia mail and documents
   - Visual Information Systems.

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to
- Implement various transformations on 2D and 3D
- Develop algorithms for viewing, clipping
- Build multimedia interactive applications.

MU7212  MUTIMEDIA DATABASE LABORATORY

OBJECTIVES:
- To study the design of databases for applications.
- To practice DBMS query language SQL and embedded programming.

1. Database Querying – Nested queries, Sub queries and Joins
2. Triggers & Transaction Control
3. Embedded SQL & Database Connectivity with Front End Tools
4. PL/SQL - Procedures and Functions
5. Developing Multimedia Database Applications like case studies such as:
   - Interactive image and Video retrieval system
   - Executive information systems
   - Remote consulting systems
   - Video conferencing
   - Image and Video Indexing
   - Searching Image Documents

TOTAL: 45 PERIODS

OUTCOMES:
- To design databases for various applications such as Image and Video Retrieval, Indexing.
MU7213  TECHNICAL SEMINAR  L T P C
0 0 2 1

Presentation of seminar on any one topic of the following areas from Journals like ACM/Elsevier/IETE/IEEE Transactions.

- Multimedia compression
- Multimedia Data structures and Indexing
- Image segmentation techniques
- Feature Extraction and Classification
- Protocols for routing techniques for multimedia data.
- Techniques for Multimedia security.
- Multimedia Databases – Queries and Transactions.

TOTAL :30 PERIODS

MU7301  3D MODELING AND RENDERING  L T P C
3 0 0 3

OBJECTIVES:

- To understand the basics of different geometrical shapes modeling
- To appreciate the different aspects of visibility of an objects
- To get an understanding of rendering real natural scene
- To understand the concepts of radiocity and kinematics in animation

UNIT I  MATHEMATICS FOR MODELING  9

UNIT II  MODELING SHAPES  9

UNIT III  SHADING & ILLUMINATION MODELS  9

UNIT IV  TEXTURE AND RENDERING  9

UNIT V  COMPUTER ANIMATION  9

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to
- Design different polygons and real world objects
- Apply rendering techniques to make objects more realistic
- Apply lighting techniques to objects realism
- Analyze and Design an animation game

REFERENCES:

MU7001 AUDIO VIDEO BROADCASTING SYSTEMS

OBJECTIVES:
- To gain knowledge about 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

UNIT II DATA BROADCASTING

UNIT III DESIGN AND INSTALLATION OF VIDEO AND AUDIO SYSTEMS

UNIT IV AUDIO VIDEO STREAMING

UNIT V ALGORITHMS AND INTERFACES

TOTAL : 45 PERIODS
OUTCOMES:
- To Implement the Standards in the real world service creations.
- To work with new generation set-top boxes, hand-held devices, and PC add-in cards.
- To design various video streaming techniques.

REFERENCES:
5. Publications, 2005

MU7002 WEB PROGRAMMING TECHNIQUES L T P C
3 0 0 3

OBJECTIVES:
- To understand the issues in the design of web application development
- To learn the concepts of client side and server side technologies
- To understand and learn the importance of java based security solutions
- To learn the concept of other framework

UNIT I INTRODUCTION

UNIT II COMMON GATEWAY INTERFACE PROGRAMMING

UNIT III XML

UNIT IV SERVER SIDE PROGRAMMING

UNIT V ONLINE APPLICATIONS

TOTAL: 45 PERIODS
OUTCOMES:
The student should be able to work with
- 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
- Design and development of applications using other frameworks

REFERENCES:

MU7003 CREATIVITY, INNOVATION AND PRODUCT DEVELOPMENT

OBJECTIVES:
- To understand the issues in the need of creativity and innovation.
- To learn the concepts of project selection and its purpose.
- To understand and learn the importance of new product development.
- To learn and design of creative application in different domain.

UNIT I INTRODUCTION
The process of technological innovation – factors contributing to successful technological innovation – the need for creativity and innovation – creativity and problem solving – brain storming different techniques.

UNIT II PROJECT SELECTION AND EVALUATION
Collection of ideas and purpose of project – Selection criteria – screening ideas for new products (evaluation techniques).

UNIT III NEW PRODUCT DEVELOPMENT

UNIT IV NEW PRODUCT PLANNING

UNIT V LABORATORY
Creative design – Model Preparation – Testing – cost evaluation – Patent application

TOTAL :45 PERIODS

OUTCOMES:
Students should be able to work with
- Comparison of different technological innovation
- Analysis and design of Project selection and evaluation.
- Implementation of new product development.
- Design and implementation of creative applications in different domain areas.
REFERENCES:

CP7018 LANGUAGE TECHNOLOGIES

COURSE OBJECTIVES:
- To understand the mathematical foundations needed for language processing
- To understand the representation and processing of Morphology and Part-of-Speech Taggers
- To understand different aspects of natural language syntax and the various methods used for processing syntax
- To understand different methods of disambiguating word senses
- To know about various applications of natural language processing
- To learn the indexing and searching processes of a typical information retrieval system and to study NLP based retrieval systems
- To gain knowledge about typical text categorization and clustering techniques

UNIT I INTRODUCTION

UNIT II WORDS

UNIT III GRAMMAR

UNIT IV INFORMATION RETRIEVAL

UNIT V TEXT MINING

OUTCOMES:
Upon completion of the course, the students will be able to
- Identify the different linguistic components of given sentences
- Design a morphological analyser for a language of your choice using finite state automata concepts

TOTAL: 45 PERIODS
- Implement a parser by providing suitable grammar and words
- Discuss algorithms for word sense disambiguation
- Build a tagger to semantically tag words using WordNet
- Design an application that uses different aspects of language processing.

REFERENCES:

MU7004 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 based integration – integrating existing application – development of web services – Integration - 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
OUTCOMES:
Students should be able to work with
- Comparison of different IT architecture
- Analysis and design of SOA based applications
- Implementation of web service and realization of SOA
- Implementation of RESTful services
- Design and implementation of SOA based Application Integration using BPEL

REFERENCES:

MU7005 NON LINEAR EDITING  L  T  P  C
3  0  0  3

OBJECTIVES:
- To introduce the broad perceptive of linear and nonlinear editing concepts.
- To understand the concept of Storytelling styles.
- To be familiar with the audio and video recording.
- To apply different media tools.
- To learn and understand the concepts of AVID XPRESS DV 4.

UNIT I FUNDAMENTALS
Evolution of filmmaking - linear editing - non-linear digital video - Economy of Expression - risks associated with altering reality through editing.

UNIT II STORYTELLING
Storytelling styles in a digital world through jump cuts, L-cuts, match cuts, cutaways, dissolves, split edits - Consumer and pro NLE systems - digitizing images - managing resolutions - mechanics of digital editing - pointer files - media management.

UNIT III USING AUDIO AND VIDEO
Capturing digital and analog video – importing audio – putting video on – exporting digital video to tape – recording to CDs and VCDs.

UNIT IV WORKING WITH FINAL CUT PRO
Working with clips and the Viewer - working with sequences, the Timeline, and the canvas - Basic Editing - Adding and Editing Testing Effects - Advanced Editing and Training Techniques - Working with Audio - Using Media Tools - Viewing and Setting Preferences.

UNIT V WORKING WITH AVID XPRESS DV 4
Starting Projects and Working with Project Window - Using Basic Tools and Logging - Preparing to Record and Recording - Importing Files - Organizing with Bins - Viewing and Making Footage - Using Timeline and Working in Trim Mode - Working with Audio - Output Options.

TOTAL: 45 PERIODS

OUTCOMES:
- Compare the strengths and limitations of Nonlinear editing.
- Identify the infrastructure and significance of storytelling.
- Apply suitable methods for recording to CDs and VCDs.
- Address the core issues of advanced editing and training techniques.
- Design and develop projects using AVID XPRESS DV 4
REFERENCES:

NE7071 WEB DESIGN AND MANAGEMENT L T P C 3 0 0 3

COURSE OBJECTIVES:
- To understand the issues and process of Web design.
- To learn the concepts of Web design patterns and page design.
- To understand and learn the scripting languages with design of web applications.
- To learn the maintenance and evaluation of web design management.

UNIT I SITE ORGANIZATION AND NAVIGATION 9

UNIT II ELEMENTS OF PAGE DESIGN 9

UNIT III SCRIPTING LANGUAGES 10

UNIT IV PRE-PRODUCTION MANAGEMENT 8

UNIT V PRODUCTION, MAINTENANCE AND EVALUATION 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Identify the various issues of web design process and evaluation.
- Determine templates for web pages and layout.
- Develop simple web applications using scripting languages.
- Determine the various issues of web project development.
- Address the core issues of web page maintenance and evaluation.
REFERENCES:

OUTCOMES:
The student will be able
- To compare various visualization techniques.
- To design creative visualizations.
- To apply visualization over different types of data.

REFERENCES:
OBJECTIVES

- To understand the mathematical foundations needed for speech processing
- To understand the basic concepts and algorithms of speech processing and synthesis
- To familiarize the students with the various speech signal representation, coding and recognition techniques
- To appreciate the use of speech processing in current technologies and to expose the students to real-world applications of speech processing

UNIT I  FUNDAMENTALS OF SPEECH PROCESSING  9

UNIT II  SPEECH SIGNAL REPRESENTATIONS AND CODING  9

UNIT III  SPEECH RECOGNITION  9

UNIT IV  TEXT ANALYSIS  9

UNIT V  SPEECH SYNTHESIS  9

TOTAL: 45 PERIODS

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

- Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and word
- Determine and apply Mel-frequency cepstral coefficients for processing all types of signals
- Justify the use of formant and concatenative approaches to speech synthesis
- Identify the apt approach of speech synthesis depending on the language to be processed
- Determine the various encoding techniques for representing speech.

REFERENCES:
COURSE OBJECTIVES:
- To introduce the broad perspective of cloud architecture and model
- To understand the concept of Virtualization
- To be familiar with the lead players in cloud.
- To understand the features of cloud simulator
- To apply different cloud programming model as per need.
- To be able to set up a private cloud.
- To understand the design of cloud Services.
- To learn to design the trusted cloud Computing system

UNIT I CLOUD ARCHITECTURE AND MODEL

UNIT II VIRTUALIZATION

UNIT III CLOUD INFRASTRUCTURE

UNIT IV PROGRAMMING MODEL
Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, Open Stack, Aneka, CloudSim

UNIT V SECURITY IN THE CLOUD

TOTAL:45 PERIODS

OUTCOMES:
- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Apply suitable virtualization concept.
- Choose the appropriate cloud player
- Choose the appropriate Programming Models and approach.
- Address the core issues of cloud computing such as security, privacy and interoperability
- Design Cloud Services
- Set a private cloud
REFERENCES:
5. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O’Reilly

MU7007 VIRTUAL REALITY

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

UNIT I INTRODUCTION 9

UNIT II ARCHITECTURE 9

UNIT III MODELING 9
UNIT IV PROGRAMMING 9

UNIT V VR APPLICATIONS 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the student should be able to
- To understand the basic concepts of Virtual reality
- To expose the concept of Virtual Reality Programming with toolkits.
- Design of various modeling concepts.
- Develop the Virtual Reality applications in different areas

REFERENCES:

NE7002 MOBILE AND PERVASIVE COMPUTING L T P C 3 0 0 3

COURSE OBJECTIVES :
- To understand the basics of Mobile Computing and Personal Computing
- To learn the role of cellular networks in Mobile and Pervasive Computing
- To expose to the concept of sensor and mesh networks
- To expose to the context aware and wearable computing
- To learn to develop applications in mobile and pervasive computing environment

UNIT I INTRODUCTION 9

UNIT II 3G AND 4G CELLULAR NETWORKS 9

UNIT III SENSOR AND MESH NETWORKS 9
UNIT IV  CONTEXT AWARE COMPUTING & WEARABLE COMPUTING
Health BAN- Medical and Technological Requirements-Wearable Sensors-Intra-BAN communications

UNIT V  APPLICATION DEVELOPMENT

TOTAL:45 PERIODS

OUTCOMES:
At the end of the course the student should be able to
• Design a basic architecture for a pervasive computing environment
• Design and allocate the resources on the 3G-4G wireless networks
• Analyze the role of sensors in Wireless networks
• Work out the routing in mesh network
• Deploy the location and context information for application development
• Develop mobile computing applications based on the paradigm of context aware computing and wearable computing

REFERENCES:

MU7008 USER INTERFACE DESIGN

OBJECTIVES:
• To understand the basics of User Interface Design.
• To design the user interface, design, menu creation and windows creation
• To understand the concept of menus, windows, interfaces, business functions, various problems in windows design with colour, text, Non-anthropomorphic Design.
• To study the design process and evaluations.
UNIT I  INTERACTIVE SOFTWARE AND INTERACTION DEVICE  9

UNIT II  HUMAN COMPUTER INTERACTION  9

UNIT III  WINDOWS  9

UNIT IV  MULTIMEDIA  9

UNIT V  DESIGN PROCESS AND EVALUATION  9
User Interface Design Process - Usability Testing - Usability Requirements and Specification procedures and techniques- User Interface Design Evaluation

TOTAL:45 PERIODS

OUTCOMES:
• Knowledge on development methodologies, evaluation techniques and user interface building tools
• Explore a representative range of design guidelines
• Gain experience in applying design guidelines to user interface design tasks.
• Ability to design their own Human Computer

REFERENCES:
COURSE OBJECTIVES:

- To provide information about wider engineering issues that form the background to develop complex, evolving (software-intensive) systems
- To gain basic knowledge about object-oriented analysis and to familiarize UML concepts
- To study the requirements of various domain applications
- To design, implement and test the software in object oriented approach
- To discuss the issues in managing the software projects
- To explore the standards related to life cycle process

UNIT I INTRODUCTION
9

UNIT II REQUIREMENT ELICITATION AND ANALYSIS
9
Requirements Elicitation Concepts – Requirements Elicitation Activities – Managing Requirements Elicitation – Analysis Concepts – Analysis Activities – Managing Analysis - Case Study

UNIT III SYSTEM DESIGN
9

UNIT IV OBJECT DESIGN, IMPLEMENTATION AND TESTING
9

UNIT V MANAGING CHANGE
9

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to
- Apply Object Oriented Software Engineering approach in every aspect of software project
- Analyse the requirements from various domains
- Evaluate the relationships between Software Design and Software Engineering
- Adapt appropriate object oriented design aspects in the development process
- Implement and test the software project using object oriented approach
- Manage the issues regarding the decision making and changes in the different stage of software development
- Implement mini projects incorporating the principles of object oriented software engineering
REFERENCES:

MU7009 INTELLIGENT AGENT SYSTEMS

COURSE OBJECTIVES:
- To learn the principles and fundamentals of designing agents
- To analyze architecture design of different agents.
- To understand user interaction with agents.

UNIT I INTRODUCTION

UNIT II ARCHITECTURAL DESIGN

UNIT III MODEL DESIGN CONCEPTS

UNIT IV PATTERN ORIENTED MODELING
Patterns for Model Structure- Steps in POM to Design Model Structure- Theory Development – Theory Development and Strong Interface in the Virtual Lab- Parameterization and Calibration-Parameterization of ABMs is Different- Parameterize Sub models –Calibration Concepts and Strategies

UNIT V AGENTS FOR INTELLIGENT ASSISTANCE

TOTAL:45 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to,
- implement a architecture design for an agent.
- implement communicative actions with agents.
- use a tool to implement typical agents for different types of applications.
REFERENCES:
2. Steven F. RailsBack and Volker Grimm “Agent-Based and Individual Based modeling”,s,Princeton university press, 2012

IF7301 SOFT COMPUTING L T P C 3 0 0 3

OBJECTIVES:
- To learn the key aspects of Soft computing and Neural networks.
- To know about the components and building block hypothesis of Genetic algorithm.
- To understand the features of neural network and its applications
- To study the fuzzy logic components
- To gain insight onto Neuro Fuzzy modeling and control.
- 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
Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem), Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT III NEURAL NETWORKS 9
Machine Learning using Neural Network, Adaptive Networks -- Feed Forward Networks -- Supervised Learning Neural Networks -- Radial Basis Function Networks -- Reinforcement Learning -- Unsupervised Learning Neural Networks -- Adaptive Resonance Architectures -- Advances in Neural Networks.

UNIT IV FUZZY LOGIC 9

UNIT V NEURO-FUZZY MODELING 9

TOTAL: 45 PERIODS

OUTCOMES:
- Implement machine learning through Neural networks.
- Develop a Fuzzy expert system.
- Model Neuro Fuzzy system for clustering and classification.
- Write Genetic Algorithm to solve the optimization problem
REFERENCES:
9. Eiben and Smith “Introduction to Evolutionary Computing” Springer

IF7003 VIDEO ANALYTICS  L T P C  3 0 0 3

OBJECTIVES:
- To know the fundamental concepts of big data and analytics
- To learn various techniques for mining data streams
- To acquire the knowledge of extracting information from surveillance videos.
- To learn Event Modelling for different applications.
- To understand the models used for recognition of objects in videos.

UNIT I  INTRODUCTION TO BIG DATA & DATA ANALYSIS  9

UNIT II  MINING DATA STREAMS  9

UNIT III  VIDEO ANALYTICS  9

UNIT IV  BEHAVIOURAL ANALYSIS & ACTIVITY RECOGNITION  9
Event Modelling- Behavioural Analysis- Human Activity Recognition-Complex Activity Recognition- Activity modelling using 3D shape, Video summarization, shape based activity models- Suspicious Activity Detection
UNIT V  HUMAN FACE RECOGNITION & GAIT ANALYSIS

Introduction: Overview of Recognition algorithms – Human Recognition using Face: Face Recognition from still images, Face Recognition from video, Evaluation of Face Recognition Technologies- Human Recognition using gait: HMM Framework for Gait Recognition, View Invariant Gait Recognition, Role of Shape and Dynamics in Gait Recognition

OUTCOMES:
On successful completion of this course, students will be able to:
1. Work with big data platform and its analysis techniques.
2. Design efficient algorithms for mining the data from large volumes.
3. Work with surveillance videos for analytics.
4. Design of optimization algorithms for better analysis and recognition of objects in a scene.
5. Model a framework for Human Activity Recognition

REFERENCES:

MU7010  CONTENT BASED IMAGE RETRIEVAL

OBJECTIVES
- To learn about Content-Based Image Retrieval with user needs
- To gain knowledge about content-based image and video retrieval system.
- To have knowledge about the survey of Content-Based Image Retrieval

UNIT I  INTRODUCTION
Fundamentals – Definition of CBIR - A typical CBIVR system architecture-User’s perspective-Image use in the community- Users needs for image data.

UNIT II  DESIGN OF CONTENT-BASED IMAGE RETRIEVAL SYSTEM
Feature extraction and representation- Similarity measurements-Dimension Reduction and High dimensional Indexing- Clustering-The Semantic Gap-Learning-Relevance Feedback(RF)-Benchmarking CBIVR solutions.

UNIT III  DESIGN OF CONTENT-BASED VIDEO RETRIEVAL SYSTEM
The problem – Video Parsing-Video Abstraction and Summarization-Video content representation, Indexing and Retrieval-Video browsing schemes-Examples of Video Retrieval systems.

UNIT-IV  SURVEY OF CONTENT-BASED IMAGE RETRIEVAL SYSTEM
UNIT V CASE STUDY: MUSE
Overview of the System-User’s Perspective-The RF mode-RFC mode-Experiments and Results

OUTCOMES:
- To apply knowledge of content-based image retrieval system
- To model and design of Retrieval system.
- To develop Content-Based Image Retrieval system with simple case studies.

REFERENCES:

NE7012 SOCIAL NETWORK ANALYSIS

COURSE OBJECTIVES:
- To understand the concepts of Social networks and Web Social Networks
- To appreciate the modeling and visualizing techniques associated with Social Networks
- To understand the different techniques used to mine communities from Web Social Networks
- To appreciate concepts of evolution and prediction in Social Networks
- To understand the application of text mining techniques for Content and Opinion mining

UNIT I INTRODUCTION

UNIT II MODELING AND VISUALIZATION

UNIT III MINING COMMUNITIES
Aggregating and reasoning with social network data, Advanced Representations - Extracting evolution of Web Community from a Series of Web Archive - Detecting Communities in Social Networks - Evaluating Communities – Core Methods for Community Detection & Mining - Applications of Community Mining Algorithms - Node Classification in Social Networks.
UNIT IV  EVOLUTION

UNIT V  TEXT AND OPINION MINING
Text Mining in Social Networks -Opinion extraction – Sentiment classification and clustering - Temporal sentiment analysis - Irony detection in opinion mining - Wish analysis - Product review mining – Review Classification – Tracking sentiments towards topics over time.

OUTCOMES:
Upon Completion of the course, the students will be able to
• Build a social network data set from existing social networking sites
• Identify the different components of a web social network that can be used for analyzing and mining
• Identify the different data structures and graph algorithms that can be used for web social network mining
• Implement a community detection algorithm
• Process Social Network data using MapReduce paradigm
• Design an application that uses various aspects of Social Network Mining to improve its functionality and to harvest information available on the web to build recommender systems
• Analyze social media data using appropriate data/web mining techniques

REFERENCES:

MU7011  VIDEO COMPRESSION

OBJECTIVES :
• To introduce principles and current technologies of multimedia systems.
• To study the issues in effectively representing, processing and transmitting multimedia data including text, graphics, sound and music, image and video.
• To study the Image, video and audio standards such as JPEG, MPEG, H.26x, Dolby Digital and AAC will be reviewed.
• To study the applications such as video conferencing, multimedia data indexing and retrieval will also be introduced.
UNIT I  INTRODUCTION
Overview of image compression - important information theory concepts - entropy definition and interpretation - Shannon-Fano coding - Huffman coding - Adaptive Huffman coding - Lempel-Ziv codec- QM codec, context-based QM coder - examples of lossless compression

UNIT II  QUANTIZATION
Scalar quantization, optimal scalar quantizer, commander- Vector quantization- Audio and speech compression- JPEG & JPEG-2000 still image compression- Video coding standards (A) MPEG-1, MPEG-2

UNIT III  VIDEO PROCESSING
Video coding standards H.264/AVC and HEVC- Video coding techniques - motion estimation, rate control algorithms, pre & post processing- Video delivery/streaming over wired and wireless networks

UNIT IV  ADVANCED VIDEO CODING TECHNIQUES
Mobile multimedia computing- Multimedia content management and protection- Future directions – Multi-view video coding, depth coding and others

UNIT V  CONTENT MANAGEMENT
Video Compression-Motion Compensation, H.261 standard – FMM-14 Multimedia Applications Content-based retrieval in digital libraries – FMM

OUTCOMES:
Upon Completion of the course, the students will be able
- To know principles and current technologies of multimedia systems
- To know issues in effectively representing, processing, and retrieving multimedia data
- To know the areas by implementing some components of a multimedia streaming system
- To know the latest web technologies and some advanced topics in current multimedia research

REFERENCES: