No:-   Date:

CSXX2822   Multimedia Systems

L-T-P-Cr: 3-0-0-3

Pre-requisites: Computer Networks, Operating Systems, Data Structure, Java Programming, Linear Algebra, Web Technology (Those who are simultaneously registered in some of these courses can also take this course.)

Objectives/Overview:
Multimedia has become an important part of our daily life. The aim of the course is to introduce the student to understand the principles and current technologies of multimedia systems. Student will familiar with of multimedia, fundamental techniques and concepts about the signal processing exploited in the field of multimedia applications. Some basic tools, such as Fourier, Cosine transforms, Singular value decomposition, 2D Wavelet transform are presented but also the Nyquist's theorem and a short introduction to digital filter design and usage. Different color models are also discussed and the concepts of Chrominance, Luma and Luminance are introduced within the general mechanism of human vision system. The student learns about the basic of most popular data compression algorithms. Further, students will be familiar with the ways in which multimedia data is transmitted across networks, and to discuss Quality of Service, synchronization, privacy and copyright issues in the context of multimedia. The student will be exposed to dealing with multimedia data through programming assignments using C++/Java/Matlab.

Course Outcomes:
At the end of the course, a student should:

Sl. No.	Outcome	Mapping to POs
1.	To understand the concepts of multimedia systems and processing	PO1
2.	To understand the multimedia compression techniques/algorithms	PO1
3.	To understand the concepts audio and video processing	PO2
4.	To understand the concepts of media server & networks	PO2
5.	You will increase your proficiency in Quality of Service & Multimedia Operating System	PO4
6.	To understand the multimedia synchronization	PO2
7.	You shall be exposed to various recent multimedia technologies and applications	PO4

UNIT I: Introduction to Multimedia System and Processing   **Lectures: 5**

Introduction to Multimedia, Application Areas, Interdisciplinary Aspects of Multimedia, Multimedia Data representations, Multimedia Data Encoding (Audio, Image, Video and Animation.

UNIT II: Multimedia Compression Basics   **Lectures: 12**

Concept of data compression in multimedia field, lossless techniques (Huffman Coding, Arithmetic and Lempel-Ziv Coding, Other Coding Techniques) and lossy compression techniques (Transform Coding & K-L Transforms, Discrete Cosine Transforms, and BTC), Multi-Resolution Analysis, and Still Image Compression Standards (JBIG and JPEG), Color image processing.

UNIT III: Audio and Video Processing   **Lectures: 5**

Basics of digital audio, quantization and transmission of Audio. Audio compression, Audio MPEG, Video Coding Standards (MPEG video coding, MPEG4, 7, and beyond)

UNIT IV: Media Server & Networks   **Lectures: 5**

Media Server Architecture, Storage Management, Services, Protocols, Layers, Requirements to Services and Protocols, Layers of the ISO-OSI Model, ATM Networks, Traditional network protocols and their support for Multimedia, Traditional transport protocols and their support for Multimedia, New protocols for transport of multimedia

UNIT V: Quality of Service & Multimedia Operating System   **Lectures: 5**

Requirements and Constraints, Quality of Services Concept, Resource Management, Establishment Phase (QoS Translation, QoS Scaling, QoS Routing, Admission Control), Run-time Phase of Multimedia Call, Process Management, Inter process Communication and Synchronization, Memory Management, Device Management.

UNIT VI Multimedia Synchronization   **Lectures: 5**

Basic definitions and requirements, References Model and Specification, Time stamping and pack architecture, Time-dependent Presentation Units, Special Methods for Multimedia Synchronization.

UNIT VII: Case studies

Text/Reference Books

1. Ralf Steinmetz, Klara Nahrstedt. Multimedia Systems, Springer, Springer International Edition, (Textbook)
2. Fundamentals of Multimedia: Ze-Nian Li & Mark S. Drew, Pearson Prentice Hall, 2004
3. John. F. Koegel Buford. Multimedia Systems. Pearson Education.
4. Robert Reinhardt and Joey Lott. Flash MX Action Script Programming. Wiley.
5. James E. Shuman. Multimedia in Action. Cengage Learning.
6. Khalid Shayood, Data Compression.