MULTIMEDIA COMMUNICATION THEORY AND STANDARDS

(Elective Subject)

Course Code:	12M1WEC131	**Semester:**	1st Semester, M. Tech (ECE)
Credits:	3	**Contact Hours:**	L-3, T-0, P-0

Course Objectives

1. To understand multimedia communication systems and applications
2. To understand Image, Text and Video compression methods.
3. To gain knowledge of various multimedia communication standards.
4. To familiarize the students with various approaches, methods and techniques of animation technology.

Course Outcomes

After studying this course the students would gain enough knowledge

1. Identify the switching systems.
2. Discuss architecture and performance of telecom networks.
3. Characterize the types of multimedia contents.
4. Identify different standards for multimedia communication.
5. Choose required networks for multimedia communication.
6. Understand different animation techniques.

Course Contents

Unit	**Topics**	**References (chapter number, page no. etc)**	**Lectures**
1.	**Basic switching systems**. Switching Systems: Evolution of telecommunications, Switching network configurations, Elements of switching system. Signaling tones and DTMF signalling. Stored program control: Centralized, Distributed. Two stage networks and its comparison with single stage network.	Viswanathan	6
2.	**Telephone networks.** Subscriber loop systems. Switching Hierarchy and routing. Signalling techniques and their comparison. Network traffic load and parameters. Grade of service and blocking probability. Power line Carrier communication. EPABX.	Viswanathan	5
3	**Multimedia files**. Types of multimedia content: text, image. audio, video. Properties and usage of various types of document files (rtf, txt, doc, pdf). Properties and usage of various types of audio files (wav, aac, ac-3, mp3, wma, ram). Properties and usage of various types of image files (bmp, jpeg, tiff, eps, png, gif, dicom). Properties and usage of various types of video files (mp4, wmv, rm, avi, flv, mkv, avchd).	Halsall	6

	Basics of media content processing: format conversion, compression, denoising and enhancement.		
4	**3D Animation:** Introduction, Modeling : Polygon and Splines, Animation techniques : Key Frame Animation, Forward Kinematics, Inverse Kinematics, Shape Deformation, Rendered Animation, Morphing, Character Animation, Facial Animation	Michael O'Rourke	6
5	**Multimedia communication techniques and standards**. Multimedia Communications: Multimedia Communication Model, Elements of Multimedia Systems, User Requirements, Network requirements. Multimedia processing in communication: digital media, signal processing elements. Distributed Multimedia Systems:main features and resource management, Multimedia Operating Systems, CPU Management, memory management, I/O Management, file System management, Distributed Multimedia Applications: ITV, VoD. **Multimedia communication standards**: MPEG approach to multimedia standardization, MPEG-1 decoding and encoding, MPEG-4 coding of audiovisual objects, MPEG-4 system architecture diagram, JPEG 2000: features, architecture, ITU-T standardization of audiovisual communication systems, ITU-T standardization process.	Halsall	10
6	**Multimedia Communications across Networks**. Multimedia Across Wireless: Speech transmission in GSM, Video across GSM, Mobile ATM, Mobile IP, Wireless multimedia delivery, SIP in mobile environment, Multicast routing in Cellular, Networks, Broadband Wireless Mobile. Digital video broadcasting: Data transmission using MPEG-2 and DVB , Broadband Multimedia Satellite Systems :Digital television infrastructure for interactive multimedia Services, Interactive broadcast data (IDB) services, Data carousel concept.	Halsall	9
		Total Number of Lectures	42

Evaluation Scheme

1. Test 1 :15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
    - 10 Marks : Class performance, Tutorials & Assignments
    - 10 Marks : Quizzes
    - 5 marks : Attendance

Text Books

1. Thiagarajan Viswanathan: Telecommunication Switching Systems And Networks, PHI Learning.
2. Fred Halsall: Multimedia Communications- Applications, Networks, Protocols & Standard, Pearson Publications
3. Michael O'Rourke: Principles of Three dimensional computer animation, W W Norton & Company.

Reference Books

1. Data Compression: The Complete Reference by David Salomon - Springer International Edition.
2. K.R. Rao, S.B Zoran. & A.M Dragorad: Introduction to Multimedia Communications, Wiley Publications.
3. Jason Osipa : Facial modeling and animation: stop staring, Wiley India Pvt. Ltd.