Course: Multimedia Communication			
Type: Elective		Course Code: 18EC743	

No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total hours/Week	Total teaching hours
3	1	4	40

Marks			
Internal Assessment	Examination	Total	Credits
40	60	100	3

Aim/Objectives of the Course

1. To have a knowledge of various communication terminologies, networks and media, and applications.
2. To understand how various types of media are generated and represented in communications systems.
3. To gain a working understanding of various media compression principles and their implementation in the real world.
4. To understand the concepts of Distributed Multimedia Systems, and their implementations.
5. To appreciate the technologies involved in the communication of multimedia across various communication networks

Course Learning Outcomes
After completing the course, the students will be able to

CO1	List and **Describe** various kinds of Multimedia networks, applications and terminologies used in communications. Also, **Calculate** the time taken to transfer the data using different networks.	Applying (K3)
CO2	**Make Use of** the principles behind representation of media of different forms, for different applications	Applying (K3)
CO3	**Utilize** the concepts used in the compression of text, image, and **implement** the algorithms used.	Applying (K3)
CO4	**Analyze** the concepts used in the compression of audio and video, and describe the algorithms used.	Applying (K3)
CO5	**Illustrate** the concepts of Distributed Multimedia Systems, their implementations, and**Describe** how various types of media are transferred across various types of communication networks.	Applying (K3)

Syllabus Content	
Module 1: Multimedia Communications: Introduction, Multimedia informationrepresentation, multimedia networks – Telephone, Data, Broadcast Television, ISDN, Broadband Multiservice network, multimedia applications – Interpersonal applications, Interactive Applications over the Internet, Entertainment Applications, Application and networking terminology - Media Types, Communication modes, network types, multipoint conferencing, Network QoS, ApplicaionQoS, Problems. **LO:** At the end of this session the student will be able to 1. List and Explain various multimedia networks. 2. Describe multimedia applications and their operating principles. 3. Explain the various QoS parameters related to different types of networks.	CO1 8hrs PO1-3 PO2-1 PO6-1 PO12-1 PSO1-3

Module 2: Information Representation: Introduction, Digitization principles – Analog Signals, Encoder and Decoder Design, Text – Unformatted, Formatted and Hypertexts, Images – Graphics, Digitized Documents, Digitized Pictures, Audio – PCM Speech, CD-quality Audio, Synthesized Audio, Video – Broadcast Television, Digital Video, PC Video, Video Content	**CO2** 8 hrs.
LO: At the end of this session the student will be able to 1. Explain the basic principles used in the digitization of analog signals of various types. 2. Describe how multimedia content of various types are represented in digital form 3. Explain the operating principles of various standards used in the representation of audio and video signals, for different applications.	PO1-3 PO2-2 PO6-1 PO12-1 PSO1-3
Module 3: **Text and image compression:** Introduction, Compression principles – Source and Destination Encoders, Lossless and Lossy Compression, Entropy and Source Encoding, Text Compression – Static and Dynamic Huffman coding, Arithmetic Coding, Lempel-Ziv and Lempel-Ziv-Welsh coding, Image Compression – GIF, TIFF formats, Digitized Documents and Pictures, JPG Encoding and Decoding. **Distributed multimedia systems:** Introduction, Main Features of a DMS, Resource management of DMS, Networking – IP Networking, Integrated Management Architecture for IP-Based Networks, ATM, Integration of IP and ATM, Real Time Multimedia over ATM, Multimedia Operating Systems – CPU, Memory, I/O and File System Management **LO:** At the end of this session the student will be able to 1. Describe the principles used in compression of text and images, and the algorithms used. 2. Design algorithms and derive Huffman codes and Arithmetic codes for a given set of information. 3. Explain the design and working of a JPEG encoder and decoder. 4. Describe a Distributed Multimedia System and its design and operation. 5. Explain how the DMS is integrated with different computer networks.	**CO3** **CO5** 8hrs PO1-3 PO2-2 PO3-2 PO6-1 PO12-1 PSO1-3
Module 4: **Audio and video compression:** Introduction, Audio Compression – Differential PCM, Adaptive Differential PCM, Linear and Adaptive Predictive Coding, Code-excited LPC, Perceptual coding, MPEG and Dolby audio coders, Video Compression, video compression principles – H.261, H.263, MPEG, MPEG-1, MPEG-2, MPEG-4 **LO:** At the end of this session the student will be able to 1. Describe various Audio compression technologies and their working principles. 2. Describe various Video compression techniques, the algorithms used, and their applications.	**CO4** 8 hrs PO1-3 PO6-1 PO12-1 PSO1-3
Module 5: Multimedia Communication Across Networks: Packet Audio/Video in the Network Environment – Packet Voice, Integrated Packet Networks, Packet Video, Video Transport Across Generic Networks – Layered Video Coding, Error-Resilient Video Coding Techniques, Scalable Rate Control, Streaming Video Across the Internet, Multimedia Transport across ATM Networks – Multiplexing, Video Delay, Errors and Losses in ATM Networks, MPEG Video Error Concealment, Loss Concealment, Video across WATM Networks, Heterogeneous Networking	**CO5** 8 hrs PO1-3 PO6-1 PO12-1 PSO1-3

LO: At the end of this session the student will be able to

1. Describe the communication models used to transmit various types of multimedia in networks.
2. Explain the various techniques used to ensure reliable transmission of media across various networks.
3. Explain the techniques used to minimize losses in data during transfer of multimedia over networks.

Text Books

1. Fred Halsall, "**Multimedia Communications**", Pearson education, 2001.

2. K. R. Rao, Zoran S. Bojkovic, Dragorad A. Milovanovic, "**Multimedia Communication Systems**", Pearson education, 2004.

Reference Books

1. Jerry D. Gibson, "**Multimedia Communications: Directions and Innovations (Communications, Networking & Multimedia)**", Academic Press Inc, 1st Ed, 2000.

2. Franklin F. Kuo, Joaquin Garcia Luna-Aceves, Wolfgang Effelsberg, "**Multimedia Communications: Protocols and Applications**", Prentice Hall; 1st Ed, 1997.

3. Prabhat K. Andleigh, KiranThakrar, "**Multimedia Systems Design**", PHI, 2004

Useful Websites
- **W1:**https://www.cs.cf.ac.uk/Dave/Multimedia/node200.html
- **W2:**http://dvd-hq.info/data_compression_1.php#Introduction
- **W3:**http://www.cse.wustl.edu/~jain/cis788-97/ftp/ip_multimedia/
- **W4:**http://multimedia.cx/network.html

Useful Journals
- International Journal of Multimedia Communications (www.oldcitypublishing.com/journals/ijmc-home/)
- The International Journal of Mobile Computing and Multimedia Communications (www.igi-global.com/journal/international-journal...multimedia)
- ACM Transactions on Multimedia Computing, Communications, and Applications (http://tomm.acm.org/)
- International Journal of Computer Communications (www.journals.elsevier.com/computer-communications/)

Teaching and Learning Methods

1. Lecture class: 40 hours

2. Tutorial Classes: 10 hours

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) : 400 marks (30 marks -Average of three tests + 10 marks Assignments)

Semester End Exam(SEE): 100 marks (students have to answer all main questions) which will be reduced to 60 Marks.

Test duration: 1 :30 hours

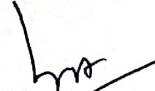**Examination duration:** 3 hours

CO to PO Mapping

PO1: Science and engineering Knowledge	**PO7:** Environment and Sustainability
PO2: Problem Analysis	**PO8:** Ethics
PO3: Design & Development	**PO9:** Individual & Team Work
PO4: Investigations of Complex Problems	**PO10:** Communication
PO5: Modern Tool Usage	**PO11:** Project Management& Finance
PO6: Engineer & Society	**PO12:** Life long Learning

At the end of the Program, the students should:

PSO1: Be able to acquire knowledge and apply concepts in the field of engineering and interdisciplinary subjects.

PSO2: Be able to identify the existing problems, effectively utilize tools to provide solution, and disseminate the information.

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO 2
18 EC743	K-level														
CO1	K3	3	1	-	-	-	1	-	-	-	-	-	1	3	-
CO2	K3	3	2	-	-	-	1	-	-	-	-	-	1	3	-
CO3	K3	3	2	2	-	-	1	-	-	-	-	-	2	3	-
CO4	K3	3	2	2	-	-	1	-	-	-	-	-	2	3	-
CO5	K3	3	-	-	-	-	1	-	-	-	-	-	2	3	-

Course In charge

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