Multimedia Technologies

Course Code: **MCA-233**   **L T C**
Course Name: **Multimedia Technologies**   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:-
1. Identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications.
2. Identify the current and future issues related to multimedia technology.
3. Identify both theoretical and practical aspects in designing multimedia systems surrounding the emergence of multimedia technologies using contemporary hardware and software technologies.

PRE-REQUISITES:
Basic knowledge of Information Technology

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Explain the technical aspects of multimedia systems.	BTL2	PO1, PO2
CO2	Apply various file formats of audio, video and text media in different applications.	BTL3	PO1, PO2, PO3
CO3	Analyze the QoS parameters of various multimedia applications through internet.	BTL4	PO1, PO2, PO3, PO4, PO5, PO6, PO10
CO4	Evaluate different types of multimedia compression methods.	BTL5	PO1, PO2, PO3, PO4, PO5, PO6, PO10
CO5	Design interactive multimedia software applications using animations.	BTL6	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO10
CO6	Develop real-time multimedia applications	BTL6	PO1, PO2, PO3, PO4,

	using different multimedia components.		PO5, PO6, PO7, PO8, PO9, PO10, PO11

UNIT – I
No. of Hours: 10   **Chapter/Book Reference: TB1 [Chapter 1];**
TB3 [Chapters 1-4, 7, 8]

Introductory Concepts: Multimedia – Definitions, CD-ROM Technology and the Multimedia Highway, Applications of Multimedia, Introduction to Multimedia Projects – The Stages of Project, Requirements to make Good Multimedia, Multimedia Skills and Training, Introduction to Virtual Reality, Challenges in Multimedia Technologies.
Multimedia-Hardware and Software: Multimedia Hardware – Macintosh and Windows Production Platforms, Memory and Storage Devices, Multimedia Software – Basic Tools, Making Instant Multimedia.
Multimedia Building Blocks: Text, Sound, Images, Animation and Video, Image Color Schemes, Digitization of Audio and Video objects.
Assembling and Delivering a Project: Planning and Costing, Designing and Producing, Content and Talent, Delivering.

UNIT – II
No. of Hours: 10   **Chapter/Book Reference: TB1 [Chapter 7]; TB3 [Chapters 5, 6]**
Animation: Introduction, Basic Animation Techniques, Motion Graphics-2D & 3D Animation - Cell Animation, Computer Animation, Tweening & Morphing, Dynamics, Kinematics, Reverse Kinematics.
Video and Animation: Video Basics, How Video works, Analog Video, Digital Video, Video Recording and Tape Formats, Shooting and Editing Videos.
Exposure of Multimedia Tools: Authoring Tools, Modelling, Rendering, Texture Shading, Different File Formats.

UNIT – III
No. of Hours: 10   **Chapter/Book Reference: TB2 [Chapters 3, 4]; TB3 [Chapter 4]**
Compression Fundamentals: Need for Compression, Lossless and Lossy Compression, Taxonomy of Compression Algorithms, Basics of Information Theory.
Text Compression: Huffman Coding, Dynamic Huffman Coding, Arithmetic Technique.
Entropy Encoding: Run Length Coding, Lempel-Ziv-Welch (LZW) Algorithm.
Source Coding: Transform Coding- JPEG, MPEG, Audio Compression-MP3, Statistical Coding-Pattern Substitution.

UNIT – IV
No. of Hours: 10   **Chapter/Book Reference: TB2 [Chapters 1,2,5,7,8]**
Multimedia Communication and Applications: Multimedia Information Representation, Multimedia Networks, Integrated Services, RSVP- Differentiated Services, Multimedia on 4G/5G Networks, Standards for Multimedia Communications - Interpersonal Communication, Multimedia Conferencing, Interactive Application over Internet, Entertainment Applications and Interactive Television.
Multimedia and Internet: IP Datagram, Fragmentation and Reassembly, QoS Support, IPv4/IPv6 Interoperability, Designing for WWW- Audio, Video.
Digital Communication: Transmission Mode, Asynchronous, Synchronous and

Isochronous Transmission Modes.

Streaming: Stored Audio and Video, Best-Effort Service, Protocols for Real-Time Interactive Applications, Scheduling and Policing Mechanism.

TEXT BOOKS:

TB1. John Vince, "Virtual Reality Systems", Pearson Education, 8th Edition, 2014.
TB2. Fred Halsall, "Multimedia Communications: Applications, Networks, Protocols and Standards", Pearson, 1st Edition, 2013.
TB3. Tay Vaughan, "Multimedia-Making it Works", McGraw-Hill, 9th Edition, 2014.

REFERENCE BOOKS:

RB1. Ze-Nian Li, Mark S. Drew, Jiangchuan Liu, "Fundamentals of Multimedia", Springer, 2nd Edition, 2014.
RB2. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications & Applications", Pearson, 1st Edition, 2014.
RB3. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI, 1st Edition, 2015.
RB4. Keyes, "Multimedia Handbook", TMH, 2nd Edition, 2000.
RB5. Khalid Sayood, "Introduction to Data Compression", Elsevier, 5th Edition, 2017.