GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Engineering

Level: UG

Branch: Computer Engineering

Course / Subject Code : 3164903

CC Course / Subject Name : Multimedia Techniques and Tools

w. e. f. Academic Year:	2024-2025
Semester:	6th
Category of the Course:	Professional Elective Course

Prerequisite:	NA
Rationale:	To introduce the various aspects of multimedia components like Images, audio, sound and computer graphics. It prepares students for activities involving the design and development of graphics and animations found in media, entertainment, sciences and engineering.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	Identify basics of multimedia and multimedia system architecture.	R
02	Solve and analyze different algorithms for text and image compression.	AP
03	Classify different audio and video file formats of Multimedia.	U
04	Apply open-source authoring tools of animation and list various devices used in virtual reality and its use in daily life.	A
05	Recognize emerging trends in Multimedia	U
06	Identify application areas and tools used.	U

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	30	20	30	150

GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Engineering

Level: UG

Branch: Computer Engineering

Course / Subject Code : 3164903

CC Course / Subject Name : Multimedia Techniques and Tools

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	**Introduction to multimedia** Goals, objectives, and characteristics of multimedia, what is Multimedia, Objects and Elements of Multimedia, Multimedia and Hypermedia.Multimedia building blocks: text, image, audio, video, animation, Multimedia architecture, Evolving Technologies for Multimedia Systems, Some useful editing and Authoring tools.	07	15
2	**Image and Text Processing** Text: Text file formats: TXT, DOC; RTF, PDF, PS, EPS, OXPS Text compression: Huffman coding, LZ & LZW Image: Image Data Representation, Image File formats - BMP, TIFF, JPEG, GIF, PNG Image processing: Acquisition, Storage, Communication, Display, Enhancement Types of Compression: Lossless: RLE, Shannon - Fano algorithm,Arithmetic coding. Lossy: Vector quantization, Fractal Compression Technique	08	18
3	**Audio and Video Processing** Audio: Nature of sound waves, characteristics of sound waves, Use of audio in computer applications, psycho-acoustic, MIDI, Digital audio file formats: AIFF, VOC, AVI, WMA, OGG, PCM,MP3,AAC Audio compression techniques: DM, ADPCM and MPEG. Video: video signals formats, Video transmission standards: EDTV, CCIR, CIF, SIF, HDTV, Video file formats: AVI, MOV,RM,WAV,FLV,3GP,Video editing, Video Compression: H-261,H-263, MPEG	08	17
4	**Animation and Virtual Reality** Animation: Historical Background, Uses of Animation, Traditional Animation, Principal of Animation, Techniques of animation, Computer based Animation, Animation on the Web,3D Animation, Rendering Algorithms, Animation File formats Virtual Reality: Architecture of VR, Concept and History of VR, Human Physiology and Perception, Forms of VR, VR applications, VR devices	10	20
5	**Trends in Multimedia** Multimedia networking, Quality of data transmission, Multimedia over IP, Media on Demand, Multimedia in Android: Android Multimedia Framework Architecture, Multimedia Databases: storage, retrieval, organization, Multimedia application development: software life cycle overview,Mobile Gaming, Cloud Gaming On-Demand Gaming.	08	15

6	**Applications and tools** Multimedia Applications, Overview of Multimedia Software Tools, Painting and Drawing Tools, 3D Modeling and Animation Tools,Image Editing Tools, Sound Editing Tools, Animation ,Video and digital movies tools.	07	15
	Total		**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**35**	**35**	**05**	**05**	**00**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Multimedia Computing Communications & Applications, Ralf Steinmetz &Klara Nahrstedt, Pearson.
2. Digital Image processing, Rafael C. Gonzalez, Richard E. Woods, Pearson.
3.Multimedia Applications, Ralf Steinmetz & Klara Nahrstedt, Springer International Edition

(b) Open source software and website:

List of e-Learning Resources:

1. https://nptel.ac.in/courses/117/105/117105081/
2. https://nptel.ac.in/courses/117/105/117105081/
3. http://www.cse.unsw.edu.au/~cs9519/lecture_notes_06/L1_COMP9519_4in1.pdf
4. https://users.dimi.uniud.it/~antonio.dangelo/MMS/materials/Fundamentals_of_Multimedia.pdf
5. https://mu.ac.in/wp-content/uploads/2021/04/Multimedia.pdf
6. https://www.baschools.org/pages/uploaded_files/chap13.pdf

MOOCs Courses link:

https://nptel.ac.in/courses/117105083

Suggested Course Practical List: If any

1. To study and install open-source multimedia tools and perform editing operations:
2. Use different selection and transform tools to modify or improve an image

3. Perform audio compression by choosing a proper codec..
4. Edit and mix video content, remove noise, create special effects, add captions.
5. Design simple Home page with banners, logos, tables quick links etc
6. Provide a search interface and simple navigation from the home page to the inside pages of the website.
7. Perform a simple 2D animation with sprites
8. Create a simple E-Learning module for a topic of your choice.
9. Multimedia Storytelling Project: Produce a multimedia narrative using various media elements, such as text, images, audio, and video, to tell a compelling story or explore a specific
10. theme.
11. Design and develop a Traffic Monitoring System.
12. Interactive Web Application: Design and develop an interactive web application incorporating multimedia elements, such as animations, videos, and dynamic content, to provide an engaging user experience.

* * * * * * *