



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering

Level: Diploma

Branch: Diploma Computer Engineering / Computer Science and Engineering

Subject Code : DI04000051

Subject Name : Multimedia Technologies

W.E. F. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	Professional Elective - I

Prerequisite:	
Rationale:	Multimedia Technologies refers to the incorporation of multiple forms of media into digital environments and has purposes in education, entertainment, and communication. Open-source software, such as GIMP and OpenShot, have grown in popularity due to their availability, affordability, and flexibility. These are generally free, community developed software, which gives users greater control of their tools. GIMP is a popular open-source application used among graphic designers, photographers, and visual artists, whereas OpenShot Video Editor software provides a more affordable solution with features such as timeline editing and video effects. Also, Web 2.0 technologies such as YouTube, Facebook, and Twitter have transformed both the creation and sharing of content. In addition to coding algorithms and hardware, it is now possible to produce virtual and augmented environments to create sensory experiences beyond in 3D. Open source software provides powerful and flexible tools for creating, modifying, and sharing multimedia content.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Identify basic multimedia features and applications.	Understand
02	Demonstrate various photo editing techniques to enhance visual effects of the image.	Apply
03	Create, edit videos and animate geometrical objects by applying different animation principles.	Apply
04	Examine the unique characteristics of social media sharing with their impact and cloud-assisted multimedia computing with content sharing	Apply
05	Describe working of augmented reality and virtual reality system.	Understand

**Revised Bloom's Taxonomy (RBT)*



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Teaching and Examination Scheme:

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

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<p>Fundamentals of Multimedia:</p> <p>What is multimedia? Components of multimedia, Multimedia: past and present: early history of multimedia, hypermedia, www, and internet, multimedia in the new millennium, where to use multimedia? delivering multimedia</p> <p>Multimedia software tools: music sequencing and notation, digital audio, graphics and image editing, video editing, animation, multimedia authoring, multimedia broadcasting, Augmented reality and virtual reality, Multimedia skills required in a team.</p>	6	18
2.	<p>Image Editing:</p> <p>Graphics and image data types: 1-bit images, 8-bit gray-level images, image data types, 24-bit color images, higher bit-depth images, 8-bit color images</p> <p>File formats: gif, jpeg, png, tiff, windows bmp, Windows WMF, Netpbm Format, EXIF, HEIF, PS and PDF PTM</p> <p>Image editing tool: Image editing tool interface, various tools, Image straightening, cropping, scaling, framing an image, Image enhancement technique -correcting with brightness, correcting a dull image, oversaturated image, noisy image, removing red eye, repair images, adding text to an image, Layers, Working on part of an image</p>	14	25



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	<p>AI Plugins for Image Editing: Introduction to plugin architecture in image editing software, Overview of AI in digital image processing, Capabilities of AI Plugins: AI-based image upscaling (e.g., super-resolution models), Background/foreground removal, Image inpainting and object removal.</p>		
3.	<p>Video and Animation:</p> <p>Video basic terminology: codec, resolution, bit rate, frame rate, aspect ratio, how video works? Analog video, digital video.</p> <p>Video editing: clips - split clip, export clips, add to timeline, trimming & slicing, transform, effects: video effects, audio effects, export video in different mode, give titles.</p> <p>AI Features in Video Editing Tools: Motion Tracking, Object Detection, Video Stabilization.</p> <p>Animation: power of motion, 12 principals of animation, Animation fundamentals, animation techniques and file formats.</p> <p>Making animation that works: rolling ball, a bouncing ball, create an animated scene.</p>	13	23
4.	<p>Multimedia Information Sharing:</p> <p>Online social media sharing: Representatives of social media services: user-generated content (UGC), online social networking (OSN), User-generated media content sharing.</p> <p>Case study: YouTube with unique features - video format and meta-data, characteristics of YouTube video, small-world in YouTube videos, YouTube from a partner's view.</p> <p>Cloud computing for multimedia services: cloud computing overview, multimedia cloud computing, cloud assisted media sharing, case study: Netflix.</p>	06	17
5.	<p>Augmented Reality and Virtual Reality:</p> <p>Augmented Reality: Defining augmented reality, virtual reality and mix reality, Workflow of augmented reality its component - sensory data collection,</p>	06	17



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localization and alignment, world generation and emission. Virtual Reality: Workflow of virtual reality and its component - virtual world, immersion, sensory feedback, and interactivity Applications of augment and virtual reality			
	Total	45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
21	44	35	0	0	0

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. Li, Z.-N., Drew, M. S., & Liu, J. (2021). Fundamentals of multimedia (3rd ed.). Springer, Nature Switzerland AG. ISBN: 978-3-030-62123-0
2. Vaughan, T. (2011). Multimedia: Making it work (8th ed.). McGraw-Hill. ISBN: 978-0-07-174850-6
3. Parekh, R. (2013). Principles of multimedia (2nd ed.). Tata McGraw-Hill, New Delhi. ISBN: 978-1-25-900650-0
4. Smith, J., & Joost, R. (2012). GIMP for absolute beginners. APress. ISBN: 978-1-4302-3168-4
5. Lecarme, O., & Delvare, K. (2013). The book of GIMP: A complete guide to nearly everything. No Starch Press. ISBN: 978-1593273835
6. Russell, J., & Cohn, R. (n.d.). OpenShot video editor. Book on Demand Ltd. ISBN: 978-5-5122-8281-6



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(b) Open source software and website:

1. GIMP open-source software (<https://www.gimp.org/downloads/>)
2. OpenShot open-source software(<https://www.openshot.org/download/>)
3. <https://www.gimp.org/tutorials/>
4. <https://docs.gimp.org/>
5. <https://cdn.openshot.org/static/files/user-guide/index.html>
6. <https://cdn.openshot.org/static/files/user-guide/OpenShotVideoEditor.pdf>

Suggested Course Practical List:

1. Browse the internet to explore various webpages and identify the multimedia elements that make up their structure.
2. Install and set up an open-source image editing tool such as GIMP. Open the application, import an image file, and explore various menus and tools to practice different image editing features.
3. Import images from your browser or picture folder and place it on the workspace. Then apply editing operations such as straightening, cropping, scaling, adding a border, and framing. After that, combine multiple images using layers to create a single final composition.
4. Open a photo of yourself with a natural background and evaluate it for issues such as brightness, contrast, and sharpness. Use various editing tools to enhance the image, including adjustments for brightness–contrast, levels, curves, and hue–saturation. Apply filters like NL Filter and Unsharp Mask, and use corrective tools such as Red Eye Reduction, Dodge Brush, Burn Brush, Smudge Brush, and Healing Brush to improve the overall quality of the image.
5. Enhance a low-resolution image using AI to improve its clarity and share the enhanced version online.
6. Remove the background from an image using AI and place the subject on a new background for a social media post.
7. Remove unwanted objects from a photo using AI and save the corrected image for a presentation or online sharing.
8. Install and setup any open-source tool for video Editing like OpenShot. Create a video of simple slideshow with images and background music.
9. Apply various audio and video effect on imported video. Also give a title in a video using appropriate tool.
10. Track a moving object in a video using AI and attach text or graphics to follow the motion throughout the clip.
11. Detect specific objects in a video using AI and highlight or isolate them.
12. Reduce shaky footage using AI stabilization and produce a smooth video.
13. Create a short inspirational story and present it using animation. Use characters, background scenes, and movements to effectively convey the message of the story.
14. Upload video on YouTube and explore its meta data. Also discuss the key differences between YouTube videos and the traditional movies / TV shows. How would they affect content distribution? Prepare comparison chart for that.



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15. Explore software/hardware required for AR/VR technology and make a list of it with specifications. Also explore limitations and challenges affect the development of AR/VR applications.

List of Laboratory/Learning Resources Required:

1. Computer System with 64-bit Operating System (Linux, OS X, Chrome OS, Windows 7/8/10/11), Multi-core processor with 64-bit support, 4GB of RAM
2. Multimedia Projector

Suggested Activities for Students:

1. Software Seminar: Survey various image and video editing software and give a seminar on any one of them.
2. Group Video Project: Create a short video using GIMP and OpenShot as a team.
3. Logo & Video: Design a logo for a new brand and create a short video showcasing the logo and brand name.
4. Video Slideshow: Make a slideshow video using images or clips.
5. Photo Editing: Edit and enhance photos before importing them into a video project.
6. Social Media Graphic: Design a social media post with text animations and effects.
7. Animated GIF / Video Bumper: Create a short animated GIF or a video bumper.
8. YouTube Thumbnail: Design a YouTube thumbnail with text and visual elements to attract viewers.
9. Recruitment Ad: Create an advertisement for new employee recruitment.
10. 5-Minute Video: Compile a 5-minute video using at least 5 different video clips.
11. College Brochure: Design a brochure for your college.
12. Invitation Card: Create an invitation card for a college reunion.
13. Social Media Case Study: Analyze content sharing on platforms like Facebook or Twitter.
14. Animated Algorithm: Animate a sorting algorithm to demonstrate its process.
15. Online Tools Exploration: Explore online image/video editing tools and note any new features.
16. Social Issue Flyer: Design a flyer or advertisement for a social cause.
17. Animated Balls: Create colorful balls and animate them falling from a table and rolling in different directions.
18. Flower Animation: Animate the blossoming of a flower.
19. Scenery Creation: Design a scenery with mirror reflection and proper lighting effects.
