DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited with 'A' Grade by NAAC, Accredited by TCS
Accredited by NBA – BME, ECE & EEE
PERAMBALUR - 621 212. Tamil Nadu.
website : www.dsengg.ac.in

COURSE PLAN

Name of the Faculty	Mrs.R.GAYATHRI			
Designation/Department	ASSISTANT PROFESSOR/ECE			
Course Code/Name	U20EC622/MULTIMEDIA COMPRESSION TECHNIQUES			
Year/Section/Department	III/B/ECE/A			
Credits Details	L: 3	T:0	P:0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I/ MULTIMEDIA COMPONENTS	**No. Of Periods: 9**
Introduction- Multimedia skills-Multimedia components and their characteristics-Text, Sound, images, Graphics, Animation, Video, Hardware.	
UNIT II/ TEXT COMPRESSION	**No. Of Periods: 9**
Compression principles-source encoders and destination encoders-Lossless and Lossy compression-entropy encoding- source encoding-text compression-static Huffman coding dynamic coding-arithmetic coding-LZW Compression- Entropy and Quality measures	
UNIT III/ IMAGE COMPRESSION	**No. Of Periods:9**
Approaches to image compression- Predictive Techniques- PCM, DPCM, DM- Progressive based compression- Vector quantization-Binary Tree Predictive-Quad trees-DCT coding-Wavelet methods-Filter banks-EZW, SPIHT- Compression standards	
UNIT IV/ AUDIO COMPRESSION	**No. Of Periods: 9**
Audio compression-Companding laws-frequency domain filtering-Basic sub band coding-application to speech coding- G.722-Application to Audio coding-MPEG Audio-Progressive encoding for Audio-Silence compression-Speech compression techniques-CELP Vocoders-LPC.	
UNIT V/ VIDEO COMPRESSION	**No. Of Periods: 9**
Video compression techniques-Standards-MPEG1, 2, 4, 7 Video coding-Motion estimation and compensation techniques-H.261-H.263.	

Objective:

- To gain knowledge about Multimedia components and characteristics.
- To understand various text and image compression algorithms.
- To know about audio and video compression techniques and standards

Text Book:

T1:Fred Halshall, Multimedia Communication- Applications, Networks, Protocols and Standards, Pearson education, 2007.

T2: Khalid Sayood, Introduction to Data Compression, 3rd Edition, Morgan Kaufmann Series in Multimedia Information and Systems, 2006.

T3:Tay Vaughan, "Multimedia: Making it work", 7th Edition, TMH 2008.

Website:

W1: https://www.cs.ubc.ca/~tmm/courses/cpsc533c-04-spr/slides/0324.timchan.ppt **(Topic. No: 7)**

W2:www.sdsc.edu/~gupta/mmclass6.ppt**(Topic.No:16)**

W3:faculty.kfupm.edu.sa/ICS/jauhar/ics202/Unit32_LZW.ppt**(Topic.No:17)**

W4:www.slideshare.net/tinniamvganesh/signaling-system-7-ss7**(Topic.No:29)**

W5:https://www.slideshare.net/slideshow/video-coding-standards-ppt/76376198**(Topic.No:42)**

W6: https://www.scribd.com/presentation/527385829/Vocoders1**(Topic.No:35)**

W7: https://www.globalspec.com/reference/34817/203279/4-10-progressive-image-compression(Topic.No:22)

W8: https://www.slideshare.net/slideshow/vector-quantization/10198977(Topic.No:23)

W9:https://www.google.co.in/books/edition/JPEG2000_Image_Compression_Fundamentals/y7HeBwAAQBAJ?hl=en&gbpv=1 (Topic.No:27)

W10: https://www.dspguide.com/ch22/5.html

W11: https://blog.demofox.org/2020/11/04/frequency-domain-image-compression-and-filtering/

W12:https://www.tutorialspoint.com/multimedia/multimedia_digital_audio_coding.htm#:~:text=Audio%20coding%20is%20used%20to,signal%20or%20storage%20of%20signal.

W13: https://typeset.io/pdf/dct-with-quad-tree-and-huffman-coding-for-color-images-3gguhc5tkr.pdf

Online Mode of Study:

W1: Introduction to Multimedia – GeeksforGeeks

W2: Multimedia Technology - Tutorialspoint

W3: Huffman Coding - GeeksforGeeks

W4: Introduction to Compression Algorithms - Tutorialspoint

W5: Image Compression Techniques – Tutorialspoint

W6: Wavelet Transform in Image Compression – ScienceDirect

W7: Audio Compression Techniques – Tutorialspoint

W8: MPEG Audio Compression - Electronics Tutorials

W9: MPEG Video Compression Standards – Tutorialspoint

W10: H.264 Video Compression - H.264 Official Website

W11: Video Compression Explained - Videomaker

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I - MULTIMEDIA COMPONENTS						
1	Introduction	T1	23	BB	1	1
2	Multimedia skills	T3	31-46	BB	1	2
3	Multimedia components and their characteristics	T1	79-88	BB	1	3
4	Text	T1	89-96	BB	1	4
5	Sound	T1	110	BB	1	5
6	Images, Graphics	T1	96	BB	1	6
7	Animation	T3 W1	158-171 278-283	BB	1	7
8	Video	T1	118	BB	1	8
9	Hardware	T3	204-229	BB	1	9
Outcome of Unit I: **CO1: Knowledge about multimedia components and characteristics.**						
UNIT II - TEXT COMPRESSION						
10	Compression principles	T1	139	BB	1	10
11	Source encoders and Destination encoders	T1	139	BB	1	11
12	Lossless and Lossy compression	T1	139	BB	1	12
13	Entropy encoding, Source encoding	T1	140-145	BB	1	13
14	Text compression	T1	146	BB	1	14
15	Static Huffman coding dynamic coding	T1	146-155	BB	1	15
16	Arithmetic coding	T1	156	BB	1	16
17	LZW Compression	T1 W3	158-162	BB	1	17

18	Entropy and Quality measures	T1	161	BB	1	18
Outcome of Unit II: **CO2: Exposure to various text compression algorithms.**						
UNIT III- IMAGE COMPRESSION						
19	Approaches to image compression	T1	162-191	BB	1	19
20	Predictive Techniques	T1	195	BB	1	20
21	PCM, DPCM, DM	T1	195-200	BB	1	21
22	Progressive based compression	W7		BB	1	22
23	Vector quantization	W8		BB	1	23
24	Binary Tree Predictive	W13		BB	1	24
25	Quad trees, DCT coding	W13		BB	1	25
26	Wavelet methods, Filter banks	T1	118	BB	1	26
27	EZW, SPIHT, Compression standards	W9		BB	1	27
Outcome of Unit III: **CO3: Exposure to various image compression algorithms.**						
UNIT IV – AUDIO COMPRESSION						
28	Audio compression	T1	195	BB	1	28
29	Companding laws	W10		PPT/BB	1	29
30	Frequency domain filtering	W11		PPT/BB	1	30
31	Basic sub band coding	T1	199	BB	1	31
32	Application to speech coding ,G.722	T1	200	BB	1	32
33	Application to Audio coding, MPEG Audio	W12		BB	1	33

34	Progressive encoding for Audio, Silence compression	T1	207-211	BB	1	34
35	Speech compression techniques	W6		BB	1	35
36	CELP Vocoders, LPC	T1	201-203	BB	1	36
Outcome of Unit IV: **CO4: Exposure to audio compression techniques and standards.**						
UNIT V - VIDEO COMPRESSION						
37	Video compression techniques	T1	215-216	BB	1	37
38	Standards	T1	216	BB	1	38
39	MPEG1, 2	T1	237	BB	1	39
40	MPEG 4	T1	246	BB	1	40
41	MPEG 7	T1	254	BB	1	41
42	Video coding	W5		BB	1	42
43	Motion estimation and compensation techniques	T1	216-221	BB	1	43
44	H.261	T1	225	BB	1	44
45	H.263	T1	229	BB	1	45
Outcome of Unit V: **CO5: Exposure to video compression techniques and standards.** **CO6: Design and implement some basic compression standards**						

Course Outcome:

At the end of course: Students should be able to do:

CO1: Knowledge about multimedia components and characteristics.

CO2: Exposure to various text compression algorithms.

CO3: Exposure to various image compression algorithms.

CO4: Exposure to audio compression techniques and standards.

CO5: Exposure to video compression techniques and standards.

CO6: Design and implement some basic compression standards

Course Outcome Vs Program Outcome Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	2	2	1	1	-	2	2	2	1	3	2
CO2	3	2	-	-	2	1	1	-	2	2	-	1	3	2
CO3	3	2	2	-	2	1	1	-	2	2	-	2	3	2
CO4	3	2	2	-	2	1	-	-	2	2	-	2	3	2
CO5	3	-	-	-	2	1	-	-	2	1	-	2	3	2
CO6	3	2	2	-	2	1	1	-	2	1	-	2	3	2
AVG	**3**	**2**	**2**	**2**	**2**	**1**	**1**	**-**	**2**	**2**	**2**	**2**	**3**	**2**

Content beyond Syllabus:

- Adaptive Streaming
- HEVC and AV1

Internal Evaluation Components:

Webportal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Webportal 1	--	Assessment – I (60)	Unit I and II	CO 1 & CO2
	1	Assignment – Handwritten (20)	Multimedia components	CO1
	2	Assignment – Poster Presentation / PPT (20)	LZW Compression	CO2
Webportal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	SPIHT	CO3
	4	Case Study Report (20)	G.722	CO4
Webportal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1(Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Model)
Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5

Google Class Code Details:

Class Name:

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
AT-1	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-2	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
MODEL	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6

Prepared By **Verified By**

Approved By