



Department of Information Technology		LP:
B.E/B.Tech/M.E/M.Tech : B.Tech Information Technology Regulation: 2016		Rev. No: 00
Sub. Code / Sub. Name : <b>IT16006 Multimedia Compression Techniques</b>		Date: 24-06-2019
Unit	: I	

Unit Syllabus:

**INTRODUCTION**

9

Introduction to Compression Techniques – Lossless Compression, Lossy Compression, Measure of Performance, Mathematical preliminaries for lossless compression- Models- Physical model, Probability model, Markov model, Composite source model.

Objective:

. To provide in-depth knowledge about Data Compression

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction to Compression Techniques	T1-Ch 1;Pg 1-4	BB/LCD
2	Lossless Compression	T1-Ch 1;Pg 4-5	BB/LCD
3	Lossy Compression	T1-Ch 2;Pg 5	BB/LCD
4	Measures of Performance –Modeling and Coding	T1-Ch 2;Pg 5-10	BB/LCD
5	Mathematical preliminaries for lossless compression- Introduction to Information Theory, Derivatives of average information	T1-Ch 2;Pg 13-22	BB/LCD
6	Models- Physical model	T1-Ch 2;Pg 23	BB/LCD
7	Probability model	T1-Ch 2;Pg 23-24	BB/LCD
8	Markov Model-Markov models for text compression	T1-Ch 2;Pg 24-27	BB/LCD
9	Composite source model –Coding, Uniquely decodable codes, prefix codes, Algorithmic information theory	T1-Ch 2;Pg 27-37	BB/LCD
<b>Content beyond syllabus covered (if any):</b>			

\* Session duration: 50 minutes



Sub. Code / Sub. Name: IT16006 Multimedia Compression Techniques

Unit : II

Unit Syllabus:

### DATA COMPRESSION

9

Huffman coding- Minimum Variance Huffman codes, Extended Huffman codes, Non binary Huffman Codes, Applications of Huffman coding, Context Based Compression- prediction with partial match, burrows-Wheeler Transform, Associative Coder of Buyanovsky.

Objective:

To provide in-depth knowledge about Data Compression

Session No *	Topics to be covered	Ref	Teaching Aids
10	Huffman coding-Design of Huffman code Minimum Variance Huffman codes	T1-Ch 3;Pg 41-51	BB/LCD
11	Extended Huffman codes -Examples	T1-Ch 3;Pg 51-54	BB/LCD
12	Non binary Huffman Codes -Examples	T1-Ch 3;Pg 55-57	BB/LCD
13	<b>Adaptive Huffman coding –Update procedure ,Encoding procedure</b>	T1-Ch 3;Pg 58-65	BB/LCD
14	Applications of Huffman coding –Lossless image compression,Text compression,,Audio compression	T1-Ch 3;Pg 72-77	BB/LCD
15	Context Based Compression-Introduction	T1-Ch 6;Pg 141-143	BB/LCD
16	Prediction with partial match –Basic Algorithm,Escape symbol,length of context,Exclusion principle	T1-Ch 6;Pg 143-152	BB/LCD
17	Burrows Wheeler Transform –move to front encoding	T1-Ch 6;Pg 152-157	BB/LCD
18	Associative Coder of Buyanovsky.	T1-Ch 6;Pg 157-158	BB/LCD

Content beyond syllabus covered (if any):

**Adaptive Huffman coding –Update procedure ,Encoding procedure**

\* Session duration: 50 mins

**Sub. Code / Sub. Name: IT16006 Multimedia Compression Techniques**

Unit : III

**Unit Syllabus****AUDIO COMPRESSION**

9

Digital audio - audio compression techniques -  $\mu$  Law and A Law companding, ADPCM. Speech compression- waveform codecs-source codecs- hybrid codecs-Shorten compressor MPEG-1 audio layers.

Objective:

. To provide in-depth knowledge about Audio Compression

Session No *	Topics to be covered	Ref	Teaching Aids
19,20	Digital audio - audio compression techniques Laplace distribution, human auditory system, conventional models, lossy sound compression	T2-Ch 7;Pg 720-736	BB/LCD
21	$\mu$ Law and A Law companding	T2-Ch 7;Pg 737-742	BB/LCD
22	ADPCM Audio compression	T2-Ch 7;Pg 742-744	BB/LCD
23	Speech compression –properties of speech, waveform codecs	T2-Ch 7;Pg 750-753	BB/LCD
24	Source codecs	T2-Ch 7;Pg 753-756	BB/LCD
25	Hybrid codecs	T2-Ch 7;Pg 756-757	BB/LCD
26	Shorten compressor	T2-Ch 7;Pg 757-762	BB/LCD
27	MPEG-1 audio layers-Audio lossless coding, Long term prediction, joint channel coding, multichannel coding	T2-Ch 7;Pg 784-795	BB/LCD

Content beyond syllabus covered (if any):

\* Session duration: 50 mins





**Sub. Code / Sub. Name:** IT16006 Multimedia Compression Techniques

Unit : IV

Unit Syllabus:

**IMAGE COMPRESSION**

9

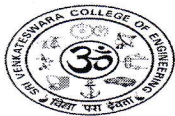
Image Transforms – orthogonal transforms- DCT, JPEG , progressive image compression- JBIG, JBIG2 standards , Vector quantization, Differential lossless compression –DPCM Wavelet based compression- Filter banks, DWT, Multiresolution decomposition, SPIHT and EZW Coders, JPEG 2000 standard.

Objective:

- . To provide in-depth knowledge about Image Compression

Session No *	Topics to be covered	Ref	Teaching Aids
28	Image Transforms – orthogonal transforms-Haar transform Karhunen-Loeve Transform	T2-Ch 4;Pg 284- 297	BB/LCD
29	DCT-Discrete Cosine Transform-Introduction,DCT as a Basis,DCT as a Roration ,Types,practical DCT,LLM method,Hardware implementation.	T2-Ch 4;Pg 298-330	BB/LCD
30	JPEG-Joint Photographic Expert Group-Luminance,Quantization,,Coding,Lossless mode,JFIF	T2-Ch 4;Pg 337-354	BB/LCD
31	Progressive Image Compression-Growth geometry coding, JBIG –Progressive compression JBIG2 standards-Generic Region decoding,Symbol region	T2-Ch 4;Pg 360-388	BB/LCD
32	Vector quantization –Adaptive vector quantization	T2-Ch 4;Pg 390-402	BB/LCD
33	Differential lossless compression DPCM Wavelet based compression- Filter banks-Deriving filter coefficients	T2-Ch 4;Pg 442-448 T2-Ch 5;Pg 566-576	BB/LCD
34	DWT, Multiresolution decomposition	T2-Ch 5;Pg 576-589	BB/LCD
35	SPIHT-Set partioning algorithm,spatial orientation trees,coding and EZW Coders	T2-Ch 5;Pg 614-630	BB/LCD
36	JPEG 2000 standard.	T2-Ch 5;Pg 639-652	BB/LCD
<b>Content beyond syllabus covered (if any): Nil</b>			

\* Session duration: 50 mins



**Sub. Code / Sub. Name:** IT16006 Multimedia Compression Techniques

Unit : V

Unit Syllabus:

**VIDEO COMPRESSION**

Motion Compensation, Video Signal Representation – MPEG Video Coding– H.261, H.263, H.264 Standards, Compression issues in ATM Networks, Compression algorithm for Packet Video.

**Objective:** . To provide in-depth knowledge about video Compression

Session No *	Topics to be covered	Ref	Teaching Aids
37	Motion Compensation, Video Signal Representation	T1-Ch 18;Pg 571-580	BB/LCD
38,39	MPEG Video Coding-main components,,video syntax, motion compensation,PEL reconstruction	T2-Ch 6;Pg 676-698	BB/LCD
40	H.261-Motion compensation,the loop filter,the transform,Quantization and coding,Rate control	T1-Ch 18;Pg 576-588 T2-Ch 6;Pg 703-705	BB/LCD
41,42	H.263-Unrestricted vector mode,syntax based arithmetic coding mode,advanced prediction mode ,refrence picture resampling	T1-Ch 18;Pg 597-603	BB/LCD
43	H.264 Standards-The transform,Intra predictions,Quantization,coding	T1-Ch 18;Pg 604-608 T2 -Ch 6; Pg706-718	BB/LCD
44	Compression issues in ATM Networks	T1- Ch 18;Pg 610-612	BB/LCD
45	Compression algorithm for Packet Video.	T1- Ch 18;Pg 612-613	BB/LCD
<b>Content beyond syllabus covered (if any): Nil</b>			

\* Session duration: 50 mins



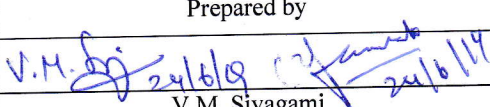
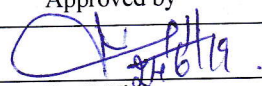
**Sub. Code / Sub. Name:** IT16006 Multimedia Compression Techniques

**TEXT BOOKS:**

1. Khalid Sayood, —Introduction to Data Compression||, Fifth Edition, Elsevier,2017
2. David Salomon, —Data Compression – The Complete Reference|| Fifth Edition, Springer Verlag New York Inc., 2010.

**REFERENCES:**

1. Yun Q. SHI, Huifang Sun,—Image and Video cOMPRESSSION FOR Multimedia Engineering Fundamentals, Algorithms and standards||, CRC Press, Second Edition, 2008.
2. John. W. Woods, —Multidimensional Signal, Image and Video Processing and Coding||, Academic Press, 2011.

	Prepared by	Approved by
Signature	 V.M. Sivagami Dr.C.Yaashuwanth	 Dr.V.Vidhya
Name	V.M. Sivagami Dr.C.Yaashuwanth	Dr.V.Vidhya
Designation	Associate Professor/IT Associate Professor/IT	HOD IT i/c
Date	24/06/2019	24/06/2019
Remarks *:		

\* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD