LESSON PLAN

Sub Code & Name: **U14ECE09 & INFORMATION THEORY AND CODING TECHNIQUES**

Branch : **ECE** Semester: **VI**

UNIT I INFORMATION THEORY

Session No.	Topics to be covered	Duration in Minutes	Teaching Aid	Ref.
1)	Introduction to information theory, Uncertainty, Information	45m	BB	T1,T2
2)	Average mutual information, Entropy	45m	BB	T1,T2
3)	Source Coding Theorem,codewords,fixed length code	45m	BB	T1,T2
4)	Huffman Coding, algorithm steps, problems	45m	BB	T1,T2
5)	Shannon Fano coding theorem, cumulative distribution function, example problem	45m	BB	T1,T2
6)	The Lempel Ziv Algorithm,phrases,problem	45m	BB	T1,T2
7)	Entropy rate of stochastic process, the state transition graph of a two state markov chain	45m	BB	T1,T2
8)	Optimum quantizer design,optimum quantization	45m	BB	T1,T2
9)	Rate distortion function,squared error distortion,rate distortion function	45m	BB	T1,T2
10)	Channel Capacity, channel models	45m	BB	T1,T2
11)	Channel coding, information capacity theorem	45m	BB	T1,T2
12)	Shannon limit, bandwidth efficiency diagram	45m	BB	T1,T2

UNIT II SOURCE CODING -TEXT AND VIDEO

Session No.	Topics to be covered	Duration in Minutes	Teaching Aid	Ref.
13)	Principles of data compression	45m	BB	T1,T2
14)	Text-Static and dynamic Huffman coding	45m	BB	T1,T2
15)	Text compression	45m	BB	T1,T2
16)	Arithmetic coding, problems	45m	BB	T1,T2
17)	ZIP coding	45m	BB	T1,T2
18)	Audio-Adaptive predictive coding	45m	BB	T1,T2
19)	Example problems	45m	BB	T1,T2
20)	Linear Predictive coding, LPC encoder for speech,	45m	BB	T1,T2
21)	Code excited LPG,CELP standards	45m	BB	T1,T2
22)	Perceptual coding, frequency masking effect	45m	BB	T1,T2
23)	MPEG audio coders, encoder for MPEG audio coding,decoder	45m	BB	T1,T2
24)	Dolby audio Coders, dolby AC-1,dolby AC-2	45m	BB	T1,T2

UNIT III SOURCE CODING-IMAGE AND VIDEO

Session No.	Topics to be covered	Duration in Minutes	Teaching Aid	Ref.
25)	Introduction	45m	BB	T1,T2
26)	Image compression,examples	45m	BB	T1,T2
27)	Graphics interchange format, GIF interlaced mode, spatial frequency	45m	BB	T1,T2
28)	Tagged image file format, lampel-ziv compression	45m	BB	T1,T2
29)	Digitized documents	45m	BB	T1,T2
30)	Error correction protocol, termination code, make-up codes	45m	BB	T1,T2
31)	Digitized pictures, pass mode ,vertical mode	45m	BB	T1,T2

32)	JPEG Video Compression	45m	BB	T1,T2
33)	JPEG encoder,decoder	45m	BB	T1,T2
34)	Principles,H.261,H.263	45m	BB	T1,T2
35)	MPEG 1,2&4	45m	BB	T1,T2
36)	MPEG algorithm	45m	BB	T1,T2

UNIT IV ERROR CONTROL CODING:BLOCK CODES

Session No.	Topics to be covered	Duration in Minutes	Teaching Aid	Ref.
37)	Linear Block codes-introduction	45m	BB	T1,T2
38)	Basic definitions-Equivalent codes, matrix description of linear block codes	45m	BB	T1,T2
39)	Parity check matrix, coefficient matrix	45m	BB	T1,T2
40)	Syndrome decoding, definition syndrome	45m	BB	T1,T2
41)	Perfect codes, hamming found, sphere packing bound	45m	BB	T1,T2
42)	Hamming codes, problems	45m	BB	T1,T2
43)	Maximum distance separable codes	45m	BB	T1,T2
44)	Cyclic codes, polynomials, monic	45m	BB	T1,T2
45)	Matrix description of cyclic codes, parity check polynomial	45m	BB	T1,T2
46)	Quasi cyclic codes,problems	45m	BB	T1,T2
47)	Shortened cyclic codes	45m	BB	T1,T2
48)	Burst error correction, Cyclic redundancy check, rieger bound	45m	BB	T1,T2

UNIT V ERROR CONTROL CODING:CONVOLUTIONAL CODES

Session No.	Topics to be covered	Duration in Minutes	Teaching Aid	Ref.
49)	Introduction about error control coding	45m	BB	T1,T2
50)	Introduction to convolutional codes, information frames	45m	BB	T1,T2
51)	Tree codes, constraint length	45m	BB	T1,T2
52)	Wordlength, sliding block code	45m	BB	T1,T2
53)	Trellis codes, trellis diagram	45m	BB	T1,T2
54)	Polynomial description of convolutional codes	45m	BB	T1,T2
55)	Convolutional encoder,systematic convolutional encoder	45m	BB	T1,T2
56)	Viterbi decoding of convolutional codes,problems	45m	BB	T1,T2
57)	Distance notions for convolutional codes	45m	BB	T1,T2
58)	Turbo codes, interleaver	45m	BB	T1,T2
59)	Turbo decoding, BCJR algorithm	45m	BB	T1,T2
60)	Interleaver design for turbo codes	45m	BB	T1,T2

TEXT BOOKS:

1. Ranjan Bose, “Information Theory, Coding and Crptography”, TMH 2013
2. Fred Halsall, “Multidedia Communications: Applications, Networks, Protocols and Standards”, Perason Education ,2010.

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