CMR Institute of Technology, Bangalore		
Department(s): ECE		
Semester: 02	Section(s): Mtech DE	
MULTIMEDIA COMMUNICATIONS		Lectures/week: 05
Course Instructor(s): Dr. Ramesh		
Course duration: Feb 1st – May 16th		

Lecture #	Book & Sections	Topic	Portions coverage %	
			Individual	Cumulative
1.	TB1: 1.1 to 1.5	PREREQUSITES - Nyquist Theorm, PCM, ENTROPY, Definitions of Transformation techniques, Modulation Techniques, review of encoding techniques	13	13
2.		History of Multimedia Multimedia and Hypermedia		
3.		Multimedia Information representations		
4.		Multimedia networks		
5.		Multimedia applications		
6.		Media types		
7.		Communication modes		
8.		Network types and Qos and applications		
9.	TB1: 2.1 to 2.6	**Multimedia Information Representation** Introduction	10	23
10.		Types of information		
11.		Digital principles		
12.		Text and its types		
13.		Images and its types		
14.		video		
15.	TB1 : 3.1 to 3.4	**Text and Image Compression** Introduction	12	35
16.		Compression principles		
17.		Lossless and lossy compression		
18.		Types of encoding		
19.		Text compression		
20.		Static and dynamic Huffman coding		
21.		Image compression		
22.	TB1: 4.1 to 4.3	**AUDIO and VIDEO Compression** Introduction	17	52
23.		Audio compression		
24.		DPCM		
25.		ADPCM		
26.		APC and LPC		
27.		Video compression		
28.		Video compression principles		
29.		H.261 ,H.263		
30.		MPEG , MPEG-1		
31.		MPEG-2 , MPEG-4		
32.	TB1: 8.1 to8.8	**Multimedia information networks** INTRODUCTION	13	65
33.		LANS		
34.		ETHERNETS		
35.		Token Rings		
36.		Bridges		
37.		FDDI High speed LANS		

38.		High speed LANS		
39.		LAN Protocols		
40.	TB1: 9.1 to9.11	**THE INTERNET** Introduction	13	78
41.		IP Datagrams		
42.		Fragmentation		
43.		IP Address		
44.		ARP		
45.		RARP		
46.		Qos Support		
47.		IPV8		
48.	TB1: 10:1 to 10.5	**Broad Band ATM Networks** Introduction	7	85
49.		Cell format		
50.		Switch and protocol Architecture		
51.		ATM LANS		
52.	TB1: 12.1 TO12.5	**TRANSPORT PROTOCOL** Introduction	15`	100
53.		TCP/IP		
54.		continued		
55.		TCP		
56.		UDP		
57.		continued		
58.		RTP		
59.		continued		
60.		RTCP		

Syllabus for Sectionals:

Sessional #	Syllabus
T1	Class # 01 – 14
T2	Class # 15 - 39
T3	Class # 40 -60

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB1	Fred Halsall, “Multimedia communications: Applications, Networks, protocols and standards”	Pearson Education 2002	978-81-317-0994-8
Text Book	RB1	Nalin K.Sharda, “ Multimedia Information Networking”	PHI, 2003	
References	RB2	Ralf steinmetz, “Multimedia fundamentals – media coding and content processing”	Pearson Education 2004	

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CMR INSTITUTE OF TECHNOLOGY

Session wise – Course Plan

Department of Telecommunication

SEMESTER : 2nd Sem M.Tech
BRANCH : ECE
SUBJECT : Codint Theory
SUB CODE : 14ELD22
No of HRS/WK : 6

NAME OF THE FACULTY : Rahul Nyamangoudar
DATE OF COMMENCEMENT : 05/02/2016
DATE OF CLOSING : 25/05/2016
CLASS STRENGTH : 15
TOTAL HRS : 70

Session No	Chapter no (No of hrs planed for chapter)	Date	Topics planned for the session	Teaching Aids	Assignments / Tests planned for the chapter	Topics covered As per plan
1	**1/0**		Introduction to Digital Communication Systems	Board, chalk, duster		
2	**2/0**		Basics of Modulation and Why Coding is required?	,,		
3	**1/1**		Sources of Information	,,		
4	**2/1**		Zero Memory Source or Discrete Memory Source	,,		
5	**3/1**		Entropy and its properties	,,		
6	**4/1**		Lower and upper bound on entropy	,,		
7	**5/1**		Extension of DMS	,,		
8	**6/1**		Basics of Probability	,,		
9	**7/1**		Markov information Sources and Problems	,,		

10	**8/1**		Problems on Markov Source	Board, chalk, duster		
11	**9/1**		Previous QP solving	,,		
12	**1/2**		Block Codes, Uniquely Decodable Codes, Instantaneous Codes	,,		
13	**2/2**		Construction of Instantaneous Codes, Kraft's Inequality	,,		
14	**3/2**		Average Length of Code	,,		
15	**4/2**		Shannon's First Theorem and Its Importance	,,	Assignment 1	
16	**5/2**		Shannon-Fano encoding algorithm	,,		
17	**6/2**		Type-1 Problem on Shannon Fano Algorithm	,,		
18	**7/2**		Type-2 Problem on Shannon Fano Algorithm	,,		
19	**8/2**		Type-3 Problem on Shannon Fano Algorithm	,,		
20	**9/2**		Coding Efficiency and Redundancy	,,		
21	**10/2**		Huffman Coding and Problems on Huffman Coding	,,		
22	**11/2**		r-ary Coding	,,		
23	**12/2**		Shannon Algorithm and Problems, Previous Year QP Discussion	,,		
24	**1/3**		Information Channels	,,		
25	**2/3**		Probability relations in a Channel	,,		
26	**3/3**		A Priori Entropies	,,		
27	**4/3**		A-posteriori Entropies	,,		
28	**5/3**		Equivocation	,,	Assignment 2	
29	**6/3**		Mutual Information	,,		
30	**7/3**		Problems on Mutual Information	,,		
31	**8/3**		Capacity of BSC	,,		
32	**9/3**		BEC	,,		

33	**10/3**		Noise Less and Deterministic Channels	Board, chalk, duster		
34	**1/4**		Introduction to Algebra - Groups	,,		
35	**2/4**		Groups – Continued, Rings	,,		
36	**3/4**		Fields and Binary Field Arithmetic	,,		
37	**4/4**		Irreducible and Primitive Polynomials	,,		
38	**5/4**		Construction of Galois Field GF(2^m)	,,		
39	**6/4**		Basic Properties of Galois Field GF(2^m)	,,		
40	**7/4**		Minimal Polynomial, Computations using Galois Field GF(2^m) Arithmetic.	,,	Assignment 3	
41	**8/4**		Vector Spaces – subspace, span, Matrices – Generator and Parity Check	,,		
42	**9/4**		Previous QP Discussion.	,,		
43	**1/5**		Introduction to Linear Block Codes – Generator and Parity check Matrices	,,		
44	**2/5**		Encoding Circuit and Problem	,,		
45	**3/5**		Syndrome and Error Detection	,,		
46	**4/5**		Minimum Distance of Block Code	,,		
47	**5/5**		Error detection and correction capabilities of linear block code	,,		
48	**6/5**		Hamming Codes	,,	Assignment 4	
49	**7/5**		Performance of Codes	,,		
50	**1/6**		Cyclic Codes – Introduction and generator polynomial properties	,,		
51	**2/6**		Construction of Cyclic Codes	,,		
52	**3/6**		Generator and Parity Check Matrices and Encoding Circuit	,,		
53	**4/6**		Encoding Circuit using Parity Check Matrix	,,		

54	**5/6**		Syndrome Computation and Error Detection	Board, chalk, duster		
55	**6/6**		Decoding of Cyclic Codes – Meggitt Decoder	,,	Assignment 5	
56	**7/6**		(23,12) Golay Code	,,		
57	**1/7**		Binary BCH Codes – Introduction, Construction and Generator Polynomial	,,		
58	**2/7**		Parity Check Matrix, Decoding of BCH Codes.	,,		
59	**3/7**		Reed Solomon Codes	,,		
60	**4/7**		Decoding of Non-Binary BCH and RS Codes – Berlekamp Algorithm	,,	Assignment 6	
61	**1/8**		Convolution codes: Encoding of convolutional codes	,,		
62	**2/8**		Encoding of convolutional codes(Contd.)	,,		
63	**3/8**		Encoding of convolutional codes(Contd.)	,,		
64	**4/8**		Structural properties, Distance properties	,,		
65	**5/8**		Viterbi decoding algorithm for decoding	,,		
66	**6/8**		Soft output Viterbi algorithm	,,	Assignment 7	
67	**7/8**		LDPC Codes	,,		
68	**8/8**		Problems	,,		
69	**9/8**		Problems	,,		
70	**10/8**		Previous QP Discussion	,,		

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CMR INSTITUTE OF TECHNOLOGY

Session wise – Course Plan

Department of Telecommunication

SEMESTER : II
BRANCH : DC
SUBJECT : Modern DSP
SUBJECT CODE : 14ECS23
NO OF HRS/WK :6

NAME OF THE FACULT :Dr. Binish Fatimah
DATE OF COMMENCEMENT :02.01.2016
DATE OF CLOSING :11.05.2016
CLASS STRENGTH :24
TOTAL HRS :63

Session No	Chapter no (No of hrs planed for the chapter)	DATE	Topics planned for the session	Teaching Aids	Assignments/ Tests planned for the chapter	Topics covered As per plan
1	1/1	01 Feb. 2016	Introduction to the Subject	Board, chalk, duster	A1	
2	2/1	02 Feb. 2016	Classification of Signals	,,		
3	3/1	05Feb. 2016	Elementary Signals	,,		
4	4/1	09 Feb. 2016	Properties of Systems	,,		
5	5/1	10 Feb. 2016	LTI system, Convolution Sum, convolution Integral	,,	A2	
6	6/1	11 Feb. 2016	The concept of frequency in continuous time and discrete time signals	,,		
7	7/1	13 Feb. 2016	Analog to digital and digital to analog conversion	,,		
8	8/1	16 Feb. 2016	Frequency-domain sampling	,,		

9	9/1	17 Feb. 2016	The discrete Fourier transform	,,		
10	10/1	18 Feb. 2016	The discrete Fourier transform	,,		
11	11/1	23 Feb. 2016	Properties of the DFT	,,		
12	12/1	25 Feb. 2016	Properties of the DFT	,,		
13	13/1	26 Feb. 2016	Properties of the DFT	,,		
14	14/1	29 Feb. 2016	Circular Convolution	,,	A3	
15	15/1	02Mar. 2016	Circular Convolution	,,		
16	16/1	02Mar. 2016	Linear filtering methods based on the DFT	,,		
17	17/1	04Mar. 2016	Linear filtering methods based on the DFT	,,		
18	1/2	05Mar. 2016	Design of digital filters: General considerations	,,		
19	2/2	05Mar. 2016	Design of FIR filters	,,		
20	3/2	08Mar. 2016	Design of FIR filters	,,		
21	4/2	10Mar. 2016	Design of FIR filters	,,	A4	
22	5/2	10Mar. 2016	Design of IIR filters from analog filters	,,		
23	6/2	17Mar. 2016	Design of IIR filters from analog filters	,,		
24	7/2	18Mar. 2016	Design of IIR filters from analog filters	,,		

25	8/2	18Mar. 2016	Frequency transformations.			
26	9/2	19Mar. 2016	Frequency transformations.	,,		
27	1/3	22Mar. 2016	Multirate digital signal processing: Introduction	,,		
28	2/3	22Mar. 2016	Decimation by a factor 'D'	,,		
29	3/3	24Mar. 2016	Interpolation by a factor ‘I’	,,		
30	4/3	28Mar. 2016	Sampling rate conversion by a factor 'I/D'	,,	A5	
31	5/3	28Mar. 2016	Implementation of sampling rate conversion	,,		
32	6/3	29Mar. 2016	Multistage implementation of sampling rate conversion	,,		
33	7/3	28Mar. 2016	Sampling rate conversion of band pass signals	,,		
34	8/3	31Mar. 2016	Sampling rate conversion by an arbitrary factor	,,		
35	9/3	31Mar. 2016	Applications of multirate signal processing	,,		
36	10/3	02 Apr. 2016	Digital filter banks, two channel	,,		
37	11/3	04 Apr. 2016	Digital filter banks, two channel	,,		
38	12/3	05 Apr. 2016	Quadrature mirror filter banks,	,,		
39	13/3	07 Apr. 2016	M-channel QMF bank.	,,		
40	14/3	12 Apr. 2016	M-channel QMF bank.	,,		

41	1/4	13 Apr. 2016	Adaptive filter: Introduction	,,	A6	
42	2/4	18 Apr. 2016	Applications of adaptive filters,	,,		
43	3/4	21 Apr. 2016	Applications of adaptive filters,	,,		
44	4/4	22 Apr. 2016	Applications of adaptive filters,	,,		
45	5/4	23 Apr. 2016	Adaptive direct form FIR filters	,,		
46	6/4	29 Apr. 2016	Adaptive direct form FIR filters	,,		
47	7/4	29 Apr. 2016	The LMS algorithm	,,		
48	8/4	02 May 2016	The LMS algorithm	,,		
49	9/4	03 May 2016	Adaptive direct form filters	,,	A7	
50	10/4	03 May 2016	Adaptive direct form filters	,,		
51	11/4	04May 2016	RLS algorithm	,,		
52	12/4	06 May 2016	RLS algorithm	,,		
53	1/5	06 May 2016	REVISION: PROBLEMS DISCUSSION	,,		
54	2/5	10 May 2016	REVISION: PROBLEMS DISCUSSION	,,		
55	3/5	11 May 2016	REVISION: PROBLEMS DISCUSSION	,,		

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CMR INSTITUTE OF TECHNOLOGY

Session wise – Course Plan

Department of Electronics and Communication

SEMESTER : II (MTECH)
SECTIONS :
SUBJECT : Real Time Operating Systems
SUBJECT CODE : 14ELD24
NO OF HRS/WK : 5

NAME OF THE FACULTY : Sudatta Mohanty
DATE OF COMMENCEMENT : 01.02.2016
DATE OF CLOSING : 15.05.2016
CLASS STRENGTH : 36
TOTAL HRS : 45

Session No	Chapter no (No of hrs planed for the chapter)	DATE	Topics planned for the session	Teaching Aids	Assignments/ Tests planned for the chapter	Topics covered As per plan
1	**1/1**	01/02	Brief history of Real Time Systems,	Board, chalk, duster		
2	**2/1**	03/02	A brief history of Embedded Systems, Resource Analysis	,,		
3	**3/1**	04/02	Real-Time Service Utility, Scheduling Classes	,,		
4	**4/1**	05/02	The Cyclic Executive	,,		
5	**5/1**	09/02	Scheduler Concepts,	,,		
6	**6/1**	10/02	Preemptive Fixed Priority	,,		
7	**7/1**	12/02	Scheduling Policies, Real-Time OS	,,		
8	**8/1**	13/02	Thread Safe Reentrant Functions.	Board, chalk, duster		
9	**9/1**	16/02	Fixed-Priority Policy,	,,		
10	**1/2**	17/02	Rate Monotonic least upper bound	,,		

11	**2/2**	22/02	Feasibility, Necessary and Sufficient feasibility	,,		
12	**3/2**	23/02	Deadline – Monotonic Policy, Dynamic priority policies.			
13	**4/2**	25/02	Intermediate I/O, , I/O Architecture	,,		
14	**5/2**	26/02	Execution efficiency, Worst-case Execution time,	,,		
15	**6/2**	01/03	Physical hierarchy	,,		
16	**1/3**	02/03	Capacity and allocation, Shared Memory			
17	**2/3**	04/03	ECC Memory, Flash file systems.		Assignment 1	
18	**3/3**	05/03	Blocking, Deadlock and livestock			
19	**4/3**	09/03	Critical sections to protect shared resources,	,,		
20	**5/3**	10/03	priority inversion, Problems,	,,		
21	**1/4**	17/03	Missed Deadlines, QoS	,,		
22	**2/4**	18/03	Alternatives to rate monotonic policy	,,	Assignment 2	
23	**3/4**	21/03	Mixed hard and soft real-time services.	,,		
24	**4/4**	22/03	Firmware components			
25	**5/4**	24/03	RTOS system software mechanisms			
26	**1/5**	28/03	Software application components.	Board, chalk, duster		
27	**2/5**	30/03	Execptions assert, Checking return codes	,,		
28	**3/5**	31/03	Single-step debugging, kernel scheduler traces	,,		
29	**4/5**	04/04	Test access ports, Trace ports	,,	Assignment 3	
30	**5/5**	06/04	Power-On self test and diagnostics	,,		
31	**6/5**	07/04	External test equipment, Application-level debugging	,,		

32	**7/5**	12/04	Basic concepts of drill-down tuning,	,,		
33	**8/5**	13/04	hardware – supported profiling and tracing	,,		
34	**1/6**	16/04	Building performance monitoring into software,	,,	Assignment 4	
35	**2/6**	18/04	Path length,	Board, chalk, duster		
36	**3/6**	21/04	Path length, (contd)	,,		
37	**4/6**	22/04	Efficiency, and Call frequency	,,		
38	**5/6**	28/04	Call frequency(contd)	,,		
39	**1/7**	29/04	Fundamental optimizations,	,,		
40	**2/7**	02/05	Reliability and Availability, Similarities and differences	,,		
41	**3/7**	03/05	Reliability, Reliable software, Available software,	,,		
42	**4/7**	05/05	PIC microcontroller	,,	Assignment 5	
43		07/05	Revision of unit1-4			
44		10/05	Revision of unit4-8			
45		11/05	Revision of unit8-12			

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CMR Institute of Technology, Bangalore		
Department(s): Electronics and Communication		
Semester: 02	Section(s): M.Tech (Digital Electronics)	
Digital Signal Compression	14ELD23	Lectures/week: 04
Course Instructor(s): Madhusudan		
Course duration: 29 Jan 2016 – 12 May 2016		

LESSON PLAN

Lecture	Books & Sections	Topic	Portion covered %	
			Individual	Cumulative
1-6	**UNIT – 1** (6hours) (TB1-1.1-1.4,8.3-8.5,12.3)	**Introduction:** Compression techniques, Modeling & coding, Distortion criteria, Differential Entropy, Rate Distortion Theory, Vector Spaces, Information theory, Models for sources, Coding – uniquely Decodable codes, Prefix codes, Kraft McMillan Inequality	10	10
7-12	**UNIT -2** (6 Hrs) (TB1- 9-10)	**Quantization:** Quantization problem, Uniform Quantizer, Adaptive Quantization, Non-uniform Quantization; Entropy coded Quantization, Vector Quantization, LBG algorithm, Tree structured VQ, Structured VQ, Variations of VQ-Gain shape VQ, Mean removed VQ, Classified VQ, Multistage VQ, Adaptive VQ, Trellis coded quantization	12	22
13-16	**UNIT – 3** (4 Hrs) (TB1- 11)	**Differential Encoding:** Basic algorithm, Prediction in DPCM, Adaptive DPCM, Delta Modulation, Speech coding – G.726, Image coding.	10	32
17-22	**UNIT – 4** (6 Hrs) (TB1- 13)	**Transform Coding:** Transforms – KLT, DCT, DST, DWHT; Quantization and coding of transform coefficients, Application to Image compression – JPEG, Application to audio compression.	14	46
23-28	**UNIT – 5** (6 Hrs) (TB1-14)	**Sub-band Coding:** Filters, Sub-band coding algorithm, Design of filter banks, Perfect reconstruction using two channel filter banks, M-band QMF filter banks, Poly-phase ELDomposition, Bit allocation, Speech coding – G.722, Audio coding – MPEG audio, Image compression	14	60
29-32	**UNIT – 6** (4 Hrs) (TB1-15)	**Wavelet Based Compression:** Wavelets, Multiresolution analysis & scaling function, Implementation using filters, Image compression –	10	70

33-42	**UNIT-7** (10 Hrs) (TB1-17-18)	**Analysis/Synthesis Schemes:** Speech compression – LPC-10, CELP, MELP, Image Compression – Fractal compression **Video Compression:** Motion compensation, Video signal representation, Algorithms for video conferencing & videophones – H.261, H. 263, Asymmetric applications – MPEG 1, MPEG 2, MPEG 4, MPEG 7, Packet video	18	88
43-50	**UNIT-8** (8 Hrs) (TB1-3.2-3.8,4.1-4.2,5.4,6.3-6.4,7.3-7.6)	**Lossless Coding:** Huffman coding, Adaptive Huffman coding, Golomb codes, Rice codes, Tunstall codes, Applications of Huffman coding, Arithmetic coding, Algorithm implementation, Applications of Arithmetic coding, Dictionary techniques – LZ77, LZ78, Applications of LZ78 – JBIG, JBIG2, Predictive coding – Prediction with partial match, Burrows Wheeler Transform, Applications – CALIC, JPEG-LS, Facsimile coding – T.4, T.6	12	100

Syllabus for Sessionals :

Sessional #	Syllabus
T1	Class # 01 – 20
T2	Class # 21 - 38
T3	Class # 39 - 50

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB1	K. Sayood, "**Introduction to Data Compression**"	Harcourt India Pvt. Ltd. & Morgan Kaufmann Publishers, 1996	
References	RB1	N. Jayant and P. Noll, **"Digital Coding of Waveforms: Principles and Applications to Speech and Video**,"	Prentice Hall, USA, 1984.	
	RB2	D. Salomon, "**Data Compression: The Complete Reference**",	Springer, 2000	
	RB3	Z. Li and M.S. Drew, "**Fundamentals of Multimedia**,"	Pearson Education (Asia) Pte. Ltd., 2004.	

Note: From time to time, assignments will be posted on

https://sites.google.com/a/cmrit.ac.in/veerender/courses