Shri G. S. Institute of Technology and Science, Indore

Department of Electronics and Telecommunication Engineering

Date: 13-01-2025

Minutes of the Board of Studies

The Board of Studies Meeting of Electronics and Telecommunication Engineering was held in hybrid mode on 9th Jan. 2025 at 11:30 PM. Following members attended the meeting.

1.	Prof. Dr. S. K. Jain	Chairman & Head of the Dept.
2.	Prof. Sanjeev Narayan Sharma (IIITDM, Jabalpur)	Expert
3.	Prof. Saptarishi Ghosh (IIT, Indore)	Expert
4.	Dr. Akhilesh Jain (RRCAT)	Expert
5.	Mr. Sandeeep Pagey (AxoSpark Technologies Pvt. Ltd.)	Expert
6.	Prof. Suneel Yadav (IIIT, Allahabad)	(Industry/Corporate) Expert
7.	Prof. (Mrs.) Anjana Jain	Member
8.	Prof. Shekhar Sharma	Member
9.	Dr. L. D. Malviya	Member
10.	Dr. (Mrs.) Anjulata Yadav	Member
11.	Dr. (Mrs.) Preeti Trivedi	Member
12.	Mr. Manish Panchal	Member
13.	Mr. Amit Naik	Member
14.	Mrs. Rekha Jain	Member
15.	Dr. (Mrs.) Jaya Dipti Lal	Member
16.	Mr. Ashwin Shrivastava	Member
17.	Mr. Ajay Parmar	Member
18.	Dr. (Ms) Vaishali Naik	Invitee
19.	Mr. Shubham Shrivastava	Invitee
20.	Ms. Deepali Kothari	Invitee
21.	Mr. Mohit Khamele	Invitee
22.	Mr. Neeraj Malviya	Invitee
23.	Mrs. Ritika Nair	Invitee
24.	Mrs. Neeta Sharma	Invitee
25.	Mrs. Harshita Kushwah	Invitee
26.	Mr. Nitin Chauhan	Invitee
27.	Mr. Ravi Yadav	Invitee
28.	Mrs. Swati Tiwari	Invitee

The following points are discussed and resolved in the meeting:

1. The new and uniform structure of the schemes of examination of 2nd year, 3rd year and 4th year **B. Tech. (Electronics and Telecommunication Engg.)** as per NEP-2020 was discussed. Experts did not object the structure of the schemes of 2nd year, 3rd year and 4th year. However, it was suggested by them that:
   (i) The revision of the schemes and syllabi of 2nd year, 3rd year and 4th year is required and
   (ii) The internship duration should be at least 4 weeks after 2nd year and 3rd year, so as to meet the requirements of the awarding **Diploma** after 2nd year and **Vocational** degree after 3rd year.

2. New syllabus of **"Digital and Data communication"** of IT branch was proposed and passed in the meeting. Since this syllabus is to be applied for the first time, it will be applicable from the current **academic session 2024-2025 in the semester B,** for the 2nd **year IT branch** students. The old and new syllabi of the subject are attached herewith.

3. The subject **"Electronics measurements and Sensors and Automation"** as was approved in the last Academic Council, is now **changed as "Electronics measurements and Sensors".**

15/01/25

Chairman,
Board of Studies
Electronics and Telecom. Engg. Dept.

OLD

B.tech. II year
EC 28xxx : Digital and Data Communication

Course Outcomes:

At the end of this course students will demonstrate the ability to:-

1. Investigate Pulse Modulation with different data representation and detection schemes.
2. Analyze different digital modulation and demodulation schemes with comparison of error performance.
3. Apply Information Theory and channel coding techniques with the understanding of trade off using Shannon's theorem.
4. Develop basics of various data communication systems and its components.
5. Analyze different multiple access techniques and different digital system hierarchies.

Hours / Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
03	-	-	70	30	-	-	100	3	-	3

Course Content

Unit 1: Digital Baseband Modulation: Sampling, Nyquist Sampling theorem, PAM, quantization noise, PCM, DPCM, Line coding, Optimum detection of signals in noise, Optimum receivers using coherent detection for AWGN channels, Inter Symbol Interference, Eye patterns.

Unit 2: Pass band Digital Modulation: Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK), Frequency Shift Keying (FSK), Quadrature Amplitude Modulation (QAM), their generation, detection, PSD and Probability of Error. Comparison of Digital Modulation schemes using a single carrier.

Unit 3: Information Theory & Channel coding : Concept of amount of information, entropy & its types, source encoding, Information rate, Channel capacity, Shannon's theorem, Bandwidth and S/N trade off. Linear Block codes (Systematic codes, Parity check matrix, Syndrome testing), Cyclic codes, Hamming codes.

Unit 4: Data transmission: Networks for data communication (LAN, MAN, WAN), Network models: OSI reference model and TCP/IP model, Transmission terminology, Transmission impairments, Data rate limits, Performance parameters, Modes of digital data flow (simplex, duplex, full duplex), Transmission modes and media, Scrambling.

Unit 5: Multiplexing, Synchronization, Spread Spectrum and Multiple Access: Review of FDM, TDM, WDM, Synchronization, Digital transmission system hierarchy and their frame structure DS0, DS1, T1, E1 etc. Spread Spectrum: Frequency hop spread spectrum (FHSS), Direct sequence spread spectrum (DSSS), Multiple Access Techniques.

Assessment : - Mid-Term test, Assignment, Tutorial, Quiz and End Semester Exam.

Text Books:

1. Behrouz A Forouzan, "Data Communication and Networking", Tata Mc Graw Hill, 4th edition, 2007.
2. Simon Haykins, "Communication Systems", John Wiley Publications, 4th edition, 2000.
3. B.P.Lathi, "Modern Analog and Digital Communication Systems", 4th edition Oxford University Press.

Reference Books:

1. Glover I.A. and Grant, P.M., "Digital communications", 3rd ed. Prentice Hall, Harlow, United Kingdom.
2. Bernard Sklar, "Digital Communication Fundamentals and Applications", Pearson Education, 2nd Edition 2001.

B.tech. II year NEW

EC 28xxx : Digital and Data Communication

Course Outcomes:

At the end of this course students will demonstrate the ability to:-

1. Represent signals and systems, analog modulation and demodulation in time and frequency domain.
2. Analyze different pulse modulation and demodulation schemes with channel distortion.
3. Analyze different digital modulation and demodulation schemes with comparison of error performance.
4. Apply Information Theory and channel coding techniques with the understanding of trade off using Shannon's theorem.
5. Develop basics of various data communication systems and its components and analyze different multiple access techniques.

Hours / Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
03	-	-	70	30	-	-	100	3	-	3

Course Content

UNIT 1: Fundamentals of Signals and Systems:

Type of signals, Elementary signals, signal analysis using Fourier series, Fourier transform, Filters and concept of bandwidth, Signal transmission through LTI systems, power spectral density, Signal Power and dB measurements, Random variables and Random processes, Electrical noise and its PDF, Signal-to-noise ratio, modulation and demodulation of analog signals. Gram-Schmidt Procedure.

Unit 2: Digital Baseband Modulation:

Analog and Digital data, Sampling, Nyquist Sampling theorem, PAM, quantization noise, PCM, DPCM, Line coding, Optimum detection of signals in noise, Optimum receivers using coherent detection for AWGN channels, Inter Symbol Interference, Pulse shaping.

Unit 3: Pass band Digital Modulation:

Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK), Frequency Shift Keying (FSK), Quadrature Amplitude Modulation (QAM), their generation, detection, PSD and Probability of Error. Comparison of Digital Modulation schemes.

Unit 4: Information Theory & Channel coding :

Concept of amount of information, entropy & its types, source encoding, Information rate, Channel capacity, Shannon's theorem, Bandwidth and S/N trade off. Linear Block codes, Cyclic codes and Convolutional codes.

Unit 5: Data transmission, Multiplexing and Multiple Access :

Transmission media – Guided, unguided; Transmission impairments, Latency, Jitter; Multiplexing and its types – FDM, TDM and WDM; Spread Spectrum: Frequency hop spread spectrum (FHSS), Direct sequence spread spectrum (DSSS); Multiple Access Techniques – FDMA, TDMA, CDMA, WDMA, Pulse stuffing.

Assessment : - Mid-Term test, Assignment, Tutorial, Quiz and End Semester Exam.

Text Books:

4. Simon Haykins, "Communication Systems", John Wiley Publications, 4th edition, 2000.
5. B.P.Lathi, "Modern Analog and Digital Communication Systems", Oxford University Press, 4th edition.
6. William Stallings, "Data and Computer Communications", PHI, 7th ed., 2009

Reference Books:

1. Glover I.A. and Grant, P.M., "Digital communications", 3rd ed. Prentice Hall, Harlow, United Kingdom.
2. Bernard Sklar, "Digital Communication Fundamentals and Applications", Pearson Education, 2nd Edition 2001.
3. Behrouz A Forouzan, "Data Communication and Networking", Tata Mc Graw Hill, 4th edition, 2007

SHRI G.S. INSTITUTE OF TECHNOLOGY AND SCIENCE, INDORE -3
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION
Board of Studies meeting

Date- 09/01/2025

Attendance Sheet

S.No.	Name of Expert/ Faculty Members	Signature
1.	Prof. S.K. Jain, Chairman & Head of Dept.	
2	Prof. Sanjeev Narayan Sharma (IITDM, Jabalpur) Expert	online
3	Prof. S. Ghosh (IIT, Indore) Expert	online
4	Prof. (Dr.) Akhilesh Jain (RR CAT, INDORE) Expert	online
5	Prof. (Dr.) Sandeep Pagey (Industry/ Corporate) Expert	online
6.	Prof. Suneel Yadav (IIIT, Allahabad)Expert	online
7.	Prof.(Mrs.) Anjana Jain	
7	Prof. Shekhar Sharma	
8	Prof. L.D. Malviya	
9	Prof.(Mrs.) Anjulata Yadav	
10	Prof. (Mrs.) Preeti Trivedi	
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13	Mrs. Rekha Jain	
14	Prof. (Mrs.) Jaya Dipti Lal	
15	Mr. Ashwin Shrivastava	
16	Mr. Ajay Parmar	
17	(Ms.) Vaishali Naik	
18	Mr. Shubham Shrivastava	
19	Ms. Deepali Kothari	
20	Mr. Mohit Khamele	
21	Mr. Neeraj Malviya	
22	Mrs. Ritika Nair,	
23	Mrs. Neeta Sharma	
25.	Mrs. Harshita Kushwah	
26.	Mrs. Swati Tiwari	
27.	Mr. Ravi Yadav	
28.	Mr. Nitin chouhan	

HOD
Elx. & TC Deptt.