

**MUZAFFARPUR INSTITUTE OF
TECHNOLOGY, Muzaffarpur**



COURSE FILE

OF

**DIGITAL COMMUNICATION &
TELECOMMUNICATION MANAGEMENT**

(04 1x74)



Faculty Name:
Mr. AJAY KUMAR
ASSISTANT PROFESSOR,
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING

Content

S.No.	Topic	Page No.
1	Vision of department	3
2	Mission of department	4
3	PEO's	5
4	PO's	6
5	Course objectives and course outcomes(CO)	7
6	Mapping of CO's with PO's	9
7	Course syllabus and GATE syllabus	10
8	Time table	11
9	Student list	11
10	Textbook / Reference Books	12
11	Course plan	13
12	Assignments	14
13	Question Bank	16

VISION OF DEPARTMENT

The department is committed for high quality teaching and pursuit of excellence in research. The faculty members of the department are actively involved in research and development in challenging areas of both theory and experiment. We pledge to serve the nation and society by providing skilled and well developed human resource through brilliance in technical education and research.

MISSION OF DEPARTMENT

- To encourage innovation and research through projects and developmental activities with industries, institutions and government.
- To impart quality education as per the requirements of industries and research centers with emphasis on practical exposure aided by well-equipped laboratories.
- To achieve excellence in curricular and co-curricular activities.
- To emerge as an internationally recognized epicenter of excellence in science and applications of electronics and communication engineering.
- To uphold strong industry linkages, with a regular interaction with them, and offer solutions to their problems.
- To tie strong bonds with different research centers working in the area of electronics and communication.
- To inculcate moral and ethical values with a sense of competitiveness, self-confidence and sincerity among the students to make them a good human and a

good citizen.

- To impart knowledge with emphasis on the development of leadership qualities.
- To provide state-of-the-art resources that contribute to a hospitable learning environment.
- To encourage students to pursue higher education and take competitive exams and various career enhancing courses.
- To produce excellent engineers, innovators, entrepreneurs and academicians for the growth of the society.
- To be a role model in the field of Electronics and Communication Engineering.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

After successful completion of program, graduates will be able to

PEO1: Work in the infrastructure development projects.

PEO2: Pursue higher studies.

PEO3: Contribute in teaching, research and other developmental activities of electronics & communication engineering and its allied fields.

PEO4: Work in the multicultural and multidisciplinary groups for the sustainable development and growth of electronics and communication engineering projects and profession.

PROGRAMME OUTCOMES (PO)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE OBJECTIVE AND COURSE OUTCOMES:

Institute / College Name :	MUZAFFARPUR INSTITUTE OF TECHNOLOGY		
Program Name	B.Tech. Electrical Engineering		
Course Code	04 1x74		
Course Name	DIGITAL COMMUNICATION AND TELECOMMUNICATION MANAGEMENT		
Lecture / Tutorial / Practical (per week):	3 - 0 - 3	Course Credits	5
Course Coordinator Name	Mr. AJAY KUMAR		

Course objective:

The objective of this course is to provide the fundamental concepts and skills to understand the subject. The course will analyze, evaluate, design and solve complex engineering problems in digital communication using modern tools. To familiarize the student with the design, analysis operation and management of modern data

communications networks. The course will provide the student with a working knowledge of the types of communications network management systems and their strengths and limitations in solving various information network management problems.

Course outcomes (CO):

CO1: Demonstrate broad knowledge of fundamental principles and technical standards underlying.

CO2: Understand basic of telecommunication, networking and information technologies

CO3: Continuously improve their technology knowledge and communication skills. .

CO4: Anticipate the way technological change and emerging technologies might alter the assumptions underlying architectures and systems.

MAPPING OF COs AND POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												

Correlation level: 1- slight (Low) 2- moderate (Medium) 3-substantial
(High)

COURSE SYLLABUS:

Topics	Number of Lectures	Weightage (%)
Comparison between Digital and Analog system : Numbering systems, Baudet Code and ASII code; Line encoding Formats	3	5
Information Theorem : Information and Entropy, Hartley Shannon Theorem, Discrete channel with discrete noise, channel capacity and BW efficiency; Inter-symbol Interference (ISI) AND Equalizer, Communication through Fading Media.	9	20
Nyquist Sampling Theorem : ADC, PCM, COMPANDING & RECONSTRUCTION; Source Encoding, Channel Encoding.	12	25
Digital Modulation Scheme : Binary Shift Keying and M-ary keying.	6	15
Secure Communication : Spread spectrum communication & Cryptography.	6	15
Special topics : Various Switching System, protocol ISDN, LAN, ARPANET, ALOHA Ethernet, Internet.	6	20

GATE SYLLABUS (COMMUNICATION SYSTEM):

Random processes: autocorrelation and power spectral density, properties of white noise, filtering of random signals through LTI systems; Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, superheterodyne receivers, circuits for analog communications; **Information theory: entropy, mutual information and channel capacity theorem; Digital communications: PCM, DPCM, digital modulation schemes, amplitude, phase and frequency shift keying (ASK, PSK, FSK), QAM, MAP and ML decoding, matched filter receiver, calculation of bandwidth, SNR and BER for digital modulation; Fundamentals of error correction, Hamming codes; Timing and frequency synchronization, inter-symbol interference and its mitigation; Basics of TDMA, FDMA and CDMA.**

* Bold represents the matching part of the Course and Gate Syllabus

EFFECT FROM 10.07.2018

7 TH SEMESTER Electrical Engineering ROOM NO. EB3								
	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 – 1: 00	1:00 – 2:00	2:00- 3:00	3:00 - 4:00	4:00 – 5:00
MON	E-3 (EC)(AK)				R E C E S S			
TUES								
WED		E-3 (EC)(AK)						
THUR		E-3 (EC)(AK)						
FRI				E-3 (T1) (EC) (AK)				
SAT			E-3 (T1) (EC) (AK)					
FACULTY NAME : AK : AJAY KUMAR								

STUDENT LIST:

<p>B. Tech., 7TH Semester, ECE DIGITAL COMMUNICATION AND TELECOMMUNICATION MANAGEMENT</p>

8	15EC10	15104107193	SWEETY KUMARI CHAUDHARY
9	15EC23	15104107196	RANJAN KUMAR
10	15EC24	15104107197	RAUSHAN KUMAR GUPTA
11	15EC27	15104107199	SHIVAM KUMAR
12	15EC28	15104107200	AASHISH KARN
13	15EC32	15104107202	VIKRAM KUMAR
14	15EC36	15104107205	RAVI PRATAP
15	15EC37	15104107206	ABHIJEET ARYAN
16	15EC38	15104107207	MD ISLAM
17	15EC39	15104107208	RAHUL RAJ
18	15EC41	15104107209	SNEHI KUMARI
19	15EC42	15104107210	AMIT KUMAR
20	15EC03	15104107214	ASHWANI JYOTI
21	15EC04	15104107215	PRIYANKA KUMARI
22	15EC11	15104107216	ROHIT KUMAR
23	15EC12	15104107217	RAUSHAN KUMAR
24	15EC13	15104107218	ANOOP PATEL
25	15EC17	15104107219	PUSHPAM BHARTI
26	15EC18	15104107220	KARUNA KESHAR
27	15EC19	15104107221	SATYAM KESHARI
28	15EC20	15104107222	AMRITA KUMARI
29	15EC25	15104107223	UDAY SHANKAR KUMAR
30	15EC30	15104107224	CHANDA KUMARI
31	15EC46	15104107225	VIJETA
32	15EC29	15104107226	HIMANSHU KUMAR
33	15EC35	15104107261	SUJEET KUMAR PANDIT
34	15EC40	15104107284	DEEPAK KUMAR
35	15EC47	15106107232	HASMAIN KASHMI
36	16(LE)EC01	16104107901	BAISHALI CHOUDHARY
37	16(LE)EC02	16104107902	CHIRANJEEV KUMAR GUPTA

TEXT BOOKS:

TB1: 'Telecommunication topics and applications of functions and probabilities in electronic communication by E. Brya. Prentice Hall'.

12

• REFERENCE BOOKS:

RB1: Data communication and networking by Forouzan, TMH.

RB2: Data and computer communication by Satalling Pearson .

RB3: Internet working with TCP IP, Vol-1 Principles protocols and architecture by Douglas E. Comer, PHI

COURSE PLAN

Lecture Number	Topics	Text Book / Reference Book	Page no.
1-3	Numbering systems, Baudet Code and ASII code; Line encoding Formats	TB 1	1-36
4 - 12	Information and Entropy, Hartley Shannon Theorem, Discrete channel with discrete noise, channel capacity and BW efficiency; Inter-symbol Interference (ISI) AND Equalizer, Communication through Fading Media	TB1	38-130
13-25	Nyquist Sampling Theorem ADC, PCM, COMPANDING & RECONSTRUCTION; Source Encoding, Channel Encoding.	TB1	131-156
26-31	Digital Modulation Scheme : Binary Shift Keying and M-ary keying	TB1	161-212
32- 37	Secure Communication : Spread spectrum communication & Cryptography.	TB1	368-385
38-43	Special topics : Various Switching System, protocol ISDN, LAN, ARPANET, ALOHA Ethernet, Internet.	TB 1	386-399

ASSIGNMENT

QUESTION BANK:

- Q.1.1) Mention two reasons justifying the source encoding operation in a digital communication system.
- Q1.2) Give examples of three channels, which are used for purpose of communication
- Q1.3) If a sinusoid of peak amplitude 1.0V and of frequency 500Hz is sampled at 2 k-sample /sec and quantized by a linear quantizer, determine SQNR in dB when each sample is represented by 6 bit.
- Q1.4) How much is the improvement in SQNR of problem 1.3 if each sample is represented by 10 bits?
- Q1.5) What happens to SQNR of problem 1.4 if each sampling rate is changed to 1.5 k-samples/ sec?

