

**Ramgarhia Polytechnic College,**  
**Phagwara**



**Electronics and Communication**  
**Engineering Department**

Head of Department:	Er. Simranjit Singh Kahlon
Name of the Faculty:	Er. Inderjeet kaur
Discipline:	ECE Department
Semester:	5 <sup>th</sup>
Subject:	Digital communication
Lesson Plan Duration:	16 Weeks














**RATIONAL** This course deals with the advanced digital and data communication techniques beyond the conventional communication. It involves the use of modems in synchronous and asynchronous data transmission. It encompasses the modern communication network and integrated services like ISDN and Radio paging along with

cellular mobile telephones, FAX, electronic exchanges etc. so vital for present day communication.

**LEARNING OUTCOMES**

After completion of the course, the learner should be able to:

- CO1. Describe and identify block diagram of digital and data communication link
- CO2. Demonstrate and explain different coding schemes(5-bit Baudot, 7-bit ASCII, ARQ, EBCDIC) and error detecting and correcting techniques(redundancy, parity, Block Check Character, Vertical Redundancy Check, Longitudinal Redundancy Check, Cyclic Redundancy Check, Hamming code
- CO3. Transmit Hamming code on a serial link and reconvert at the receiving end
- CO4. Plot and interpret wave forms at input and output of ASK and FSK modulators
- CO5. Transmit parallel data on a serial link using USART
- CO6. Transmit data using MODEM
- CO7. Describe Space and time switching systems.

PO 	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 							
CO1							
CO2							
CO3							
CO4							
CO5							
CO6							
CO7							

### Syllabus

Units	Details	Hours
1.	Introduction: Basic block diagram of digital and data communication systems. Their comparison with analog communication systems.	(05 hrs)
2.	Coding : Introduction to various common codes 5 bit Baudot code, 7 bit ASCII, ARQ, EBCDIC b) Code error detection and correction techniques - Redundancy, parity, block check character (BCC), Vertical Redundancy check (VRC), Longitudinal Redundancy Check (LRC), Cyclic Redundancy check (CRC), Hamming code	(12 hrs)
3.	Digital Modulation Techniques: - Basic block diagram and principle of working of the following: 143 - Amplitude shift keying (ASK): Interrupted continuous wave (ICW), two tone modulation - Frequency Shift keying (FSK) - Phase shift keying (PSK), Quadrature Phase Shift Keying(QPSK)	(13 hrs)
4.	Characteristics/working of data transmission circuits; bandwidth requirements, data transmission speeds, noise, cross talk, echo suppressors, distortion, equalizers .	(12 hrs)
5.	Modems: Need and function of modems, Mode of modems operation (low speed, medium speed and high speed modems). Modem interconnection, Modem data transmission speed, Modem modulation method	(12 hrs)
6.	Space and time switching: Working principle of STS and TST switches.	(10hrs)

#### Reference Books:

1. Communication system by A.K. Gautam S.K. Kataria Sons, Delhi
2. Electronics communication by K.S. Jamwal, Dhanpat Rai and Sons, Delhi

#### Delivery/Instructional Methodologies

Sr.No.	Description
1.	Chalk and Talk
2.	PowerPoint Presentation

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### Assessment Methodologies

Sr. No.	Description	Type
1.	Student Assignment	Direct
2.	Test	Direct
3.	Board Examination	Direct
4.	Student Feedback	Direct

### Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
	N/A	N/A	N/A

### Topics beyond syllabus/advanced topics

Units	Details	Hours
N/A	N/A	N/A

### Web Source References

Sr. No.	URL
1.	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>

## Lesson Plan

Week	Theory		Practical	
	Lecture Day		Practical Day	
1 <sup>st</sup>	1 <sup>st</sup>	Basic block diagram of digital and data communication systems	1.	Transmission of Hamming code on a serial link and its reconversion at the receiving end.(GROUP-1)
	2 <sup>nd</sup>			
	3 <sup>rd</sup>	Advantages of digital data communication		
	4 <sup>th</sup>	Comparission between analog and digital data transmission		
2 <sup>nd</sup>	5 <sup>th</sup>	Block diagram of data communication system	2.	Transmission of Hamming code on a serial link and its reconversion at the receiving end.(GROUP-2)
	6 <sup>th</sup>	Introduction to various common codes 5 bit Baudot code		
	7 <sup>th</sup>	7 bit ASCII		
	8 <sup>th</sup>	ARQ		
3 <sup>rd</sup>	9 <sup>th</sup>	EBCDIC	3.	Observe wave forms at input and output of ASK and FSK modulators with the help of CRO(GROUP-1)
	10 <sup>th</sup>	Code error detection and correction techniques - Redundancy		
	11 <sup>th</sup>	parity		
	12 <sup>th</sup>	Block check character (BCC)		
4 <sup>th</sup>	13 <sup>th</sup>	Vertical Redundancy check (VRC)	4.	Observe wave forms at input and output of ASK and FSK modulators with the help of CRO(GROUP-2)
	14 <sup>th</sup>	Longitudinal Redundancy Check (LRC)		
	15 <sup>th</sup>	Cyclic Redundancy check (CRC)		
	16 <sup>th</sup>	Hamming code		
5 <sup>th</sup>	17 <sup>th</sup>	Amplitude shift keying (ASK): Interrupted continuous wave (ICW)	5.	Transmission of data using MODEM.(GROUP-1)
	18 <sup>th</sup>			
	19 <sup>th</sup>			

	20 <sup>th</sup>			
6 <sup>th</sup>	21 <sup>st</sup>	Two tone modulation	6.	Transmission of data using MODEM.(GROUP-2)
	22 <sup>nd</sup>			
	23 <sup>rd</sup>	<b>REVISION</b>		
	24 <sup>th</sup>	<b>1<sup>st</sup> Sessional Test (Tentative)</b>		
7 <sup>th</sup>	25 <sup>th</sup>	Frequency Shift keying (FSK)	7.	Observe wave forms at input and output of QPSK modulators(GROUP-1)
	26 <sup>th</sup>			
	27 <sup>th</sup>	Phase shift keying (PSK)		
	28 <sup>th</sup>			
8 <sup>th</sup>	29 <sup>th</sup>	Quadrature Phase Shift Keying(QPSK)	8.	Observe wave forms at input and output of QPSK modulators(GROUP-2)
	30 <sup>th</sup>			
	31 <sup>st</sup>	Characteristics/working of data transmission circuits; bandwidth requirements,		
	32 <sup>nd</sup>			
9 <sup>th</sup>	33 <sup>rd</sup>	Data transmission speeds	9.	REVISION/VIVA VOICE
	34 <sup>th</sup>			
	35 <sup>th</sup>	Noise		
	36 <sup>th</sup>	Cross talk		
10 <sup>th</sup>	37 <sup>th</sup>	Echo suppressors	10.	Observe wave forms at input and output of PSK modulators(GROUP-1)
	38 <sup>th</sup>	Distortion		

	39 <sup>th</sup>	Equalizers		
	40 <sup>th</sup>	Class Test		
11 <sup>th</sup>	41 <sup>st</sup>	Need and function of modems	11.	Observe wave forms at input and output of PSK modulators(GROUP-2)
	42 <sup>nd</sup>	Mode of modems operation (low speed, medium speed and high speed modems)		
	43 <sup>rd</sup>			
	44 <sup>th</sup>	<b>REVISION</b>		
12 <sup>th</sup>	45 <sup>th</sup>	<b>PTM</b>	12.	Observe the working of space and time switching circuit.(GROUP-1)
	46 <sup>th</sup>	<b>2<sup>nd</sup> Sessional Test (Tentative)</b>		
	47 <sup>th</sup>	Modem interconnection		
	48 <sup>th</sup>			
13 <sup>th</sup>	49 <sup>th</sup>	Modem data transmission speed	13.	Observe the working of space and time switching circuit.(GROUP-2)
	50 <sup>th</sup>			
	51 <sup>st</sup>	Modem modulation method		
	52 <sup>nd</sup>			
14 <sup>th</sup>	53 <sup>rd</sup>	Space and time switching	14	<b>PRACTICAL PERFORMANCE TEST</b>
	54 <sup>th</sup>			
	55 <sup>th</sup>			
	56 <sup>th</sup>	Introduction		

15 <sup>th</sup>	57 <sup>th</sup>	Working principle of STS	15.	PRACTICAL PERFORMANCE TEST
	58 <sup>th</sup>			
	59 <sup>th</sup>	TST switches		
	60 <sup>th</sup>			
16 <sup>th</sup>	61 <sup>st</sup>	Class Test	16.	PRACTICAL PERFORMANCE TEST
	62 <sup>nd</sup>	<b>PTM</b>		
	63 <sup>rd</sup>	<b>REVISION</b>		
	64 <sup>th</sup>	<b>3<sup>rd</sup> Sessional Test (Tentative)</b>		