RGPV (DIPLOMA WING) BHOPAL				OBE CURR	FORMA	r- 3	Sheet No. 1/5		
Branch		E	lectron	ics & Tele-commur	nication	Semester		4	
Course (Code	E0	3	Course Name	Digital	Communicat	tion		
Course	Outco	me 1	Ident	ify different digita	al signals and their p	arameters	Teac Hrs	∣Marks	
Learning	g Outc	ome 1	Classi	fy different digita	l signals (Cognitive)		6	10	
Contents		5	Hexa	decimal, Advanta	, Types of Digital sig ges of Digital Commi pand Transmission	• •		•	
Method	of Asse	ssment	External						
Learning Outcome 2			Define different parameters related to digital signals (Cognitive) 8						
Contents			Atten chanr Doma	uation, Distortion nel, Shannon capa	ud-rate, Transmission, Noise, BER, Jitter, acity for noisy chann of periodic and nor	Nyquist rate el, Frequenc	for no	Time-	
Method of Assessment		ssment	Exterr	nal					
Learning Outcome 3		ome 3	1	ze various digital si homotor)	gnals		6	10	
Contents		S	Time-Domain representation of periodic and non-periodic digital signal Calculation of frequency & bandwidth and other parameters.						
Method of Assessment		Internal							

RGPV (DIPLOMA	OBE CURRICULUM FOR		Sheet
WING) BHOPAL	THE COURSE	FORMAT-5	No. 2/5

Branch		E	Electronics & Tele-communication Semester				3		
Course (Code	E0	3	Course Name Analog Circuits					
Course	Outco	ome 2		n different steps igital line codes.	of signal processing	in PCM	Teach Hrs	Marks	
Learnin	g Outo	ome 4		ibe various signal modulation (Cog r	processing method: nitive)	s in pulse	8	10	
Contents		s	Nyquist Sampling Theorem, Impulse sampling, Natural sampling- sample and hold operation – Quantization, Quantization levels, Quantization noise, PCM Encoding, Companding, Scrambling. Interleaving. Functional Block Diagram of PCM						
Method	of Asse	essment	External						
Learning	g Outo	ome 5	Compare various digital line codes (Cognitive) 5 10					10	
Contents		s	Digital Line Codes: non return-to-zero (NRZ), return-to-zero (RZ), Manchester code						
Method	Method of Assessment			nal					
Learning Outcome 6		come 6	Verify PCM modulation / demodulation. (Psychomotor) 6				6	10	
Contents			Perform PCM modulation /demodulation considering various signal processing steps Viz., Different type of Sampling, Quantization, Quantization levels, Quantization noise, Encoding. (On Trainer Kits/ Simulation Software)						
Method of Assessment		Exter	nal						

RGPV (DIPLOMA WING)
BHOPAL

				THE	COURSE			
Branch		ı	Electron	ics & Tele-commur	nication	Semester		3
Course	Code	E0	3	Course Name	Ana	log Circuits		
Course	Outco	me 3		fy different digita	I modulation, demodupplication.	ılation	Teach Hrs	Marks
Learnin	g Outco	ome 7		Illustrate different digital modulation and 8 10 demodulation techniques (Cognitive)				
Contents			Digital modulation techniques with block diagram, ASK, FSK BPSK, GMSK. Digital Demodulation techniques with block diagram, ASK, FSK, BPSK, GMSK.					
Method	of Asses	ssment	Extern	al				
Learnin	g Outco	ome 8	Outline various applications of digital modulation and demodulation techniques. (Cognitive)			lation and	6	10
Co	ontents	}		•	nodulation techniques Bluetooth, DTH, DSL T		s, FTTH	
Method	of Asses	ssment	Intern	al				
Learnin	g Outco	ome 9	-	Verify digital modulation and demodulation (Psychomotor)			8	10
Perform digital modulation — ASK, FSK, BPSK & GMSK and obs output waveform and verify it. Perform digital demodulation — ASK, FSK, BPSK & GMSK and obs output waveform and verify it (On Trainer Kits/ Simulation Software)								
Method of Assessment External				· · · · · · · · · · · · · · · · · · ·	·			

RGPV ((DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT	Sheet No. 4/5		
Branch	Electron	ics & Tele-communication	Semester	3		

Course Code E03		3	Course Name	Analog Circuits			
Course Outco	ome 4		Analyze different Multiplexing and Multiple Access methods and their applications. Teach Hrs				Marks
Learning Outc	ome 10	Comp techn				10	
Contents		Difference between Multiplexing and Multiple Access. Need of multiplexing, Comparison of Time division multiplexing (TDM), Frequency division multiplexing (FDM), Orthogonal Frequency Division Multiplexing (OFDM). Need of multiple Access, Comparison of Time Division Multiple access (TDMS), Frequency Division Multiple access (FDMA), Code Division Multiple access (CDMA)					
Method of Asse	essment	Extern	al				
Learning Outc	ome 11	List out various applications of Multiplexing and Multiple Access techniques. (Cognitive)			10		
Content	s	Fi, Blu Applic	etooth, DTH, DSL cation of FDMA, C	M, OFDM in PSTN, Mobile Technologies, FTTH DMA, OFDMA in Mobile cor chnologies, FTTH.			
Method of Asse	essment	Intern	al				
Learning Outcome 12		Verify different Multiplexing and Multiple Access techniques. (Psychomotor)			10		
Contents		Perform and verify different Multiplexing and Multiple Access techniques- FDM, TDM, OFDM, FDMA, TDMA, CDMA, OFDMA. (On Trainer Kits/ Simulation Software)					
Method of Assessment		Internal					

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMA	г.3	Sheet No. 5/5			
Branch		E	lectron	ics & Tele-commun	ication	Semester			
Course (Code	E0	3	Course Name	An	alog Circuits			
Course	Outco	me 5		n different Spread	d Spectrum method	s and their	Teac Hrs.	Marks	
Learnir	ng Out 13	come	Comp (Cogn	•	ead Spectrum meth	ods	8	10	
Contents		s	Advantages of spread spectrum systems — Pseudo noise sequence- Functional block diagram and operation of Direct sequence spread spectrum systems(DSSS), Functional block diagram and operation of Frequency hopping spread spectrum system (FHSS)						
Method	of Asse	ssment	External						
Learnir	ng Out 14	come	Outline different applications of DSSS and FHSS 6 10 (Cognitive)						
Application of DSSS, FHSS in Mobile communication, Wi-Fi, B DTH, DSL Technologies, FTTH. Contents				Bluetooth,					
Method	of Asse	ssment	Intern	al					
Learning Outcome 15		come		ate and verify FHS homotor)	S and DSSS.		8	10	
Contents Simulate and Perform Direct sequence spread spectrum system (DSSS), Frequency hopping spread spectrum system (FHSS) at it. (On Trainer Kits/ Simulation Software)									
Method of Assessment		Intern	al	·					

Suggested List of Experiments*:

S.N.	Experiment	CO

	<u> </u>	
1	Generate Digital Signals on Function Generator and observe waveforms and parameters of signal on CRO/DSO	CO403.1
2	Perform PCM modulation /demodulation on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.2
3	Perform ASK, FSK, BPSK, GMSK modulation on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.3
4	Perform ASK, FSK, BPSK, GMSK demodulation on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.3
5	Perform FDM, TDM, OFDM multiplexing/ de-multiplexing on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.4
6	Perform FDMA, TDMA, CDMA, OFDMA access methods on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.4
7	Perform FHSS, DSSS on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.5

Ten experiments in a semester as per the discretion of the subject teacher.

Major Equipment/Materials:

1.	Cathode Ray Oscilloscope(CRO)
2.	Digital Storage Oscilloscope(DSO)
3.	Function generator
4.	Spectrum analyser
5.	Simulation Software
6.	Computer
7.	Trainer kits

Suggestions for Practicals:

Experiments are expected to be performed

- 1. Using Trainer kits.
- 2. On simulation software (Scientech Simtel Digital Communication System Simulation Software etc.
- 3. On virtual lab platforms available online

Reference Books/Web Portals:

S.N.	Title	Author
1	Modern Digital and Analog	B.P. Lathi
	Communication Systems	
2	Digital Communication	Sanjay Sharma
3		Upamanyu Madhow
	Fundamentals of Digital	
	_	
	Communication	
4	Analog and digital communication	T.L Singal
5		R .P Singh and S D Sapre
	Communication Systems: Analog and	
	Digital	
6	www.Nptel.ac.in	
7	www. Swayam.gov.in	

SCHEME FOR LEARNING OUTCOME

	LO Code	CO Code	de	Course Code			Branch Code		
Format I	1	1	3	0	4	3	0	E	

COURSE NAME	Digital Communication
CO Description	Identify different digital signals and their parameters
LO Description	Classify different digital signals

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-01	Analog vs Digital Signal, Types of Digital signal: Binary, Tertiary, Octal, Hexadecimal, Advantages of Digital Communication, Baseband Transmission vs Broadband Transmission	Interactive classroom lecture, PPT, demonstration, quiz, assignments	Teacher will explain the contents and provide handouts to students. Teacher will conduct quiz/ assignments/ tutorial.	6	0	Text Books, PPT, Handouts, chalk board, charts.Videos lectures- NPTEL& others	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-01	End Semester Theory Exam	 Student will be asked to(and/or): Define Binary, Tertiary, Octal, Hexadecimal signals Differentiate Baseband and Broadband signals Describe advantages of Digital Communication 	10	Question paper, Rating scale	External

SCHEME FOR LEARNING OUTCOME

_	LO Code	CO Code	de	Course Code			Branch Code	
Format No. 4	2	1	3	0	4	3	0	Ε

COURSE NAME	Digital Communication			·	·	
CO Description	Identify different digital signals and their parameters					
LO Description	Define different parameters related to digital signals					

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-02	Bitrate, Bandwidth, Baud rate, Transmission impairment: Attenuation, Distortion, Noise, BER, Jitter, Nyquist rate for noiseless channel, Shannon capacity for noisy channel, Frequency and Time-Domain representation of periodic and non-periodic Digital Signal, frequency, bandwidth	Interactive classroom lecture, PPT, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct quiz/assignments/tutorial to make students practice their knowledge.	8	0	Text Books, PPT, Handouts, chalk board, charts, Numerical Problems Workbook	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-02	End Semester Theory Exam	 Student will be asked to(and/or): Define Bitrate, Baud rate, Attenuation, Distortion, Jitter State Nyquist theorem for noiseless channel State Shannon's theorem for noisy channel Calculate bitrate for given channel. 	10	Question paper, Rating scale	External

		ma Wing \ Dhanal	SCHEME FOR LEARNING	Branch Code			Course Code			CO Code	LO Code	Д
	RGPV (Diploma Wing) Bhopal		OUTCOME	E	0	3	4	0	3	1	3	Format No. 4
	COURSE NAME	Digital Communication										
	CO Description	Identify different digital signals and their parameters										

СО

LO

SCHEME OF STUDY

LO Description

Analyze various digital signal

S. No.	Learning Content	Teaching -Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-03	Time-Domain representation of given periodic and non-periodic digital signal, calculation of frequency, bandwidth and other parameters.	Lab demonstration, hands on practice, lab assignments, V-Lab.	 Teacher will explain the content in class/lab. Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments. 	0	6	Lab manual, charts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-03	Practical test in laboratory	Student will be asked to 1. Evaluate parameters of given waveform using CRO/DSO	10	Rubrics/Rating scale	Internal

RGPV ((Diploma	Wing) Bhopal
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SCHEME FOR LEARNING OUTCOME

	LO Code	CO Code	de	ourse Co	Co	le	ranch Cod	В
Format No. 4	4	2	3	0	4	3	0	E

COURSE NAME	Digital Communication
CO Description	Explain different steps of signal processing in PCM and digital line codes.
LO Description	Describe various signal processing methods in pulse code modulation.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-04	Nyquist Sampling Theorem, Impulse sampling, Natural sampling- sample and hold operation – Quantization, Quantization levels, Quantization noise, PCM Encoding, Companding, Scrambling. Interleaving. Functional Block Diagram of PCM	Interactive classroom lecture, PPT, demonstration, quiz,assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	0	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-04	End Semester Theory Exam	 Student will be asked to(and/or): Define Nyquist Sampling Theorem. Describe Quantization, Quantization levels, Quantization noise, companding. Calculate bitrate of given PCM signal. Explain operation of PCM encoder 	10	Question paper, Rating scale	External

RGPV ((Diploma	Wing)	Bhopal
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SCHEME FOR LEARNING OUTCOME

_	LO Code	CO Code	de	urse Co	Co	le	ranch Cod	В
Format No. 4	5	2	3	0	4	3	0	E

COURSE NAME	Digital Communication
CO Description	Explain different steps of signal processing in PCM and digital line codes.
LO Description	Compare various digital line codes

SCHEME OF STUDY

S. No.	Learning Content	Teaching — Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-05	Digital Line Codes: non return-to-zero (NRZ), return- to-zero (RZ), Manchester code	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	5	0	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximu m Marks	Resources Required	External / Internal
LO-05	End Semester Theory Exam	Student will be asked to(and/or): 1.Describe (NRZ), return-to-zero (RZ), Manchester code 2. Calculate bitrate and bandwidth of given Line code	10	Question paper + Rating scale.	External

DCD\	//Diplo	ma Mina	· \ Phonol	SCHEME FOR LEARNING	Br	anch Code	C	ourse Code		CO Code	LO Code	Format No. 4
KGPV	(Dipid	illa vvillg	g) Bhopal	OUTCOME	E	0 3	4	0	3	2	6	Format No. 4
COURS	E NAME	Digital Comm	unication									
CO Des	cription	Explain diffe	rent steps of sig	nal processing in PCM and digital line co	des.							
LO Des	cription											
				SCHEME OF STUD	Y							
S. No.	Learnii	ng Content	Teaching - Learning Method	Description of T-L Process	Teach Hrs.	Prac /Tut Hrs	:	LI	Rs Rec	quire	d	Remarks
LO-06	Perform PCM modulation / demodulation considering various signal processing steps Viz., Different type of Sampling, Quantization, Quantization levels, Quantization noise, Encoding. (On Trainer Kits/ Simulation Software)		Lab demonstration PPT , hands o practice, lab assignments.	procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	0	6	H tr m co si	ab man landout rainer ir neasurii ompute imulatio igh spe	s, expensive strum and instrument of the second of the sec	erime ients, rume relev ware	kit wit nts, ant and	h
S. No.	Metho	od of Assessn	nent	SCHEME OF ASSESSM Description of Assessment	Maximum Marks			Resources Re			ed	External / Internal

S. No.	Meth	od of			Description of Asse		•		Maxi	imun	1	Re	sourc	es	External
LO-07	block dia Digital D	gram, ASk Jemodulat	on technique K, FSK BPSK, GN tion technique K, FSK, BPSK, GI	MSK. es with	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explai contents and provid handouts to student Teacher will condu assignments/ quiz/t to make students pr their knowledge.	e s. ct utorial actice		8		0	PP' cha	kt Bool Γ, Han Ilk boa arts, Viα ture- N d other	douts, rd, deo IPTEL	
S. No.			ng Content		Teaching – Learning Method	Description of Process		Н	ach rs.	/	act. Tut Irs.		Rs Req		Remarks
					SCH	HEME OF STUDY									
LO Des	cription	Illustrate	e different digit	tal modul	lation and demodula	tion techniques									
CO Des	cription	Identify	different digita	al modula	ition, demodulation	techniques and their	applica	ition.							
COURS	SE NAME	Digital Co	ommunication												
RGP	/ (Diplo	ma W	ing) Bhop	pal	OUTCO	OME	E	0	3	4	0	3	3	7	Format No.
					SCHEME FOR	LEARNING	Bra	nch Code		Co	urse Coo	de	CO Code	LO Code	
				ADDIT	IONAL INSTRUCTIO	ONS FOR THE HOD	' FACU	LTY (I	F AN	Y)					
LO-06	End S	emester p Exam	ractical	 Student will be asked to Perform PCM modulation/ demodulation on trainer kit/ simulation software 			,	10		F	Rubric	rics, Rating scale			External

Lo-07	End Se Theory		 Descri Explain 	be ASK, n ASK, FS	esked to(and/o FSK BPSK, GMS SK BPSK, GMSK between ASK, I	K modulation.		-	10	_	stion pa		External
				AD	DITIONAL INS	STRUCTIONS FOR THE HOD	/ FACULTY	(IF AN	IY)				
					SCHEM	E FOR LEARNING	Branch (Code	Cou	urse Code	co	LO	
RGPV	/ (Diplo	ma W	ing) Bh	opal		OUTCOME	E 0	3	4	0 3	Code 3	Code 8	Format No. 4
COURS	E NAME	Digital Co	ommunicatio	on						<u> </u>			I
CO Des	cription	Identify	different di	gital mo	dulation, demo	dulation techniques and thei	r applicatio	n.					
LO Des	cription	Outline	various app	lications	of digital modu	ulation and demodulation ted	hniques.						
						SCHEME OF STUDY							
S. No.	Lea	rning Co	ntent		eaching – ning Method	Description of T-L Process	Teach Hrs.	1	ect. Hrs.	LRs R	equire	ed	Remarks
J. 140.	Applications of di modulation techn Mobile communic Fi, Bluetooth, DTI Technologies, FTI			Interac	ctive oom lecture,	Teacher will explain the contents and provide	6	(0	Text Bo	oks, PP as, chall		

Description of Assessment

Maximum

Marks

Resources Required

External /

Internal

Method of

Assessment

S. No.

LO-08	Mid semester Exam Assignment, Quiz	 Student will be asked to (and/or): Compare ASK, FSK BPSK, GMSK. Explore Modulation, demodulation techniques used in Wi-Fi, Bluetooth, DTH, DSL Technologies, FTTH 	10	Question paper, Rating scale	Internal
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RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING Branch Code				Course Code			Code	Code	
		OUTCOME	E	0	3	4	0	3	3	9	Format No. 4
COURSE NAME	Digital Communication	Digital Communication									
CO Description	Identify different digital modulation, demodulation techniques and their application.										
LO Description	Verify digital modulation and	d demodulation.									

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-09	Perform digital modulation – ASK, FSK, BPSK & GMSK and observe output waveform and verify it. Perform digital demodulation – ASK, FSK, BPSK & GMSK and observe output waveform and verify it. (On Trainer Kits/ Simulation Software)	Lab demonstration, PPT , hands on practice, lab assignments.	 Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments. 	0	8	Lab manual, charts, Handouts, experimental trainer instruments /kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-09	End Semester practical Exam	 Student will be asked to Perform ASK, FSK BPSK,GMSK Digital Modulation on trainer kit/ simulation software Perform ASK, FSK BPSK,GMSK Digital Demodulation on trainer kit/ simulation software 	10	Rubrics, Rating scale	External

SCHEME FOR LEARNING OUTCOME

_	LO Code	CO Code	de	ourse Co	Co	le	ranch Cod	В	
Format No. 4	10	4	3	0	4	3	0	E	

COURSE NAME	Digital Communication									
CO Description	Analyze different Multiplexing and Multiple Access methods and their applications.									
LO Description Compare different Multiplexing and Multiple Access techniques.										

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-10	Difference between Multiplexing and Multiple Access. Need of multiplexing, Comparison of Time division multiplexing (TDM), Frequency division multiplexing (FDM), Orthogonal Frequency	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	0	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

	Need of multiple Access, Comparison of Time Division Multiple access(TDMS), Frequency Division Multiple access(FDMA), Code Division Multiple access(CDMA)				
	, , ,	SCHEME OF ASSESSMENT	'	<u>'</u>	
6. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
_O-10	End Semester Theory Exam	 Student will be asked to (and/or): Explain need of multiplexing. Describe TDM, FDM, OFDM. Differentiate between TDM, FDM, OFDM. Explain need of multiple access. Describe & Compare TDMA, FDMA, OFDMA. Differentiate between Multiplexing and Multiple Access 	10	Question paper, Rating scale.	External

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING Branch Code			de	Course Code		CO Code	LO Code	
		OUTCOME E		0	3	4	0 3	4	11	Format No. 4
COURSE NAME	Digital Communication									
CO Description	Analyze different Multiplexin	g and Multiple Access methods and their a	pplicat	ions.						
LO Description	List out various applications of Multiplexing and Multiple Access techniques.									
		SCHEME OF STUDY								

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-11	Application of FDM, TDM, OFDM in PSTN, Mobile communication, Wi-Fi, Bluetooth, DTH, DSL Technologies, FTTH Application of FDMA, CDMA, OFDMA in Mobile communication, Wi-Fi, Bluetooth, DTH, DSL Technologies, FTTH.	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	0	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Assessment Description of Assessment		Resources Required	External / Internal
LO-11	Mid semester Exam, Assignment, Quiz	 Student will be asked to(and/or): Write carrier frequencies and channel bandwidth of Wi-Fi, DTH, DSL, FTTH, PSTN, mobile comm. Differentiate FDM, TDM, OFDM. 	10	Question paper, Rating scale.	Internal

SCHEME FOR LEARNING OUTCOME

_	LO Code	CO Code	de	ourse Co	Co	e	ranch Cod	В
Format No. 4	12	4	3	0	4	3	0	Ε

COURSE NAME	Digital Communication								
CO Description	Analyze different Multiplexing and Multiple Access methods and their applications.								
LO Description	Verify different Multiplexing and Multiple Access techniques.								

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-12	Perform and verify different Multiplexing and Multiple Access techniques- FDM, TDM, OFDM, FDMA, TDMA, CDMA, OFDMA. (On Trainer Kits/ Simulation Software)	Lab demonstration, PPT, hands on practice, lab assignments.	 Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments. 	0	8	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-12	Practical test in laboratory	 Student will be asked to Perform TDM, FDM, OFDM on trainer kits/Simulation software. Perform TDMA, FDMA, OFDMA on trainer kits/Simulation software. 	10	Rubrics, Rating scale	Internal

SCHEME FOR LEARNING OUTCOME

_	LO Code	CO Code	de	urse Co	Co	e	ranch Cod	В
Format No. 4	13	5	3	0	4	3	0	E

COURSE NAME	Digital Communication										
CO Description	Explain different Spread Spectrur	xplain different Spread Spectrum methods and their applications.									
LO Description	Compare different Spread Spectr	rum methods									

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
O-13	Advantages of spread spectrum systems — Pseudo noise sequence- Functional block diagram and operation of Direct sequence spread spectrum systems(DSSS) , Functional block diagram and operation of Frequency hopping spread spectrum system (FHSS)	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	0	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-13	End Semester Theory Exam	 Student will be asked to(and/or): Explain pseudo noise sequence. Explain functional block diagram and operation of Direct sequence spread spectrum systems(DSSS) Explain functional block diagram and operation of Frequency hopping spread spectrum system (FHSS) 	10	Question paper, Rating scale.	External

	PV (Diploma Wing)		SCHEN	ME FOR LEARNING	Branch	Code	C	Course Co	ode	Code	Code	A
KGPV	/ (Dibio	ma wing) Bno	opai	OUTCOME	E	3	4	0	3	5	14	Format No. 4
COURS	E NAME	Digital Communicatio	n									
CO Des	cription	Explain different Spr	ead Spectrum metho	ds and their applications.								
LO Des	cription	Outline different app	plications of DSSS and	I FHSS.								
				SCHEME OF STUDY								
S. No.	Lea	rning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.		ract. ut Hrs		LRs R	equire	ed	Remarks
LO-14	Mobile co	on of DSSS, FHSS in omm., Wi-Fi, h, DTH, DSL gies, FTTH.	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6		0	Ha bo Vio	andou ard, c deo le	oks, PF ts, chall harts, cture- and oth	k	
				SCHEME OF ASSESSMEN	Т							
S. No.	Metho	d of Assessment	Descripti	on of Assessment	Maxir	num N	1arks	Re	sourc	es Rec	quired	External / Internal
LO-14 Mid semester Exam, Assignment, Quiz		·				10		Que		paper, scale.	Rating	Internal

DCD)	GPV (Diploma Wing) Bhopal				HEME FOR LEARNING			Branch Code			de	CO Code	LO Code	
KGPV	(Dipio	ina wing j bn	opai		OUTCOME		E O	3	4	0	3	5	15	Format No.
COURS	E NAME	Digital Communication	n				· · ·							
CO Description Explain different Spread Spectrum methods and their applications.														
LO Des	cription	Simulate and verify	FHSS and	d DSSS.										
					SCHEME O	F STUDY								
S. No.	5. No. Learning Content Learning				Description Proce	Teach Hrs.	1	act. Hrs.	LRs Required			ed	Remarks	
LO-15	0 11 11		nulate and Perform Direct quence spread spectrum stems (DSSS), Frequency pping spread spectrum stem (FHSS) and verify it. n Trainer Kits/ Simulation Lab demonstration, PPT, hands on practice, lab assignments. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct labels and Perform Direct from lab staff will demonstrate the procedure of lab experiments.		will the lab onduct lab ased on	0 8 Lab m Hando experi traine instrui		ndouts periment rumer h meas rumer nputer evant s tware	ntal nts/kit suring nts, with simula and hi	tion				
					SCHEME OF A	SSESSMENT	•							
S. No. Method of Assessment Description of Assessment				Maximur	n Marks		Reso	urce	s Requ	uired		External Interna		

LO-15	Practical test in laboratory	 Student will be asked to Perform DSSS on trainer kits/Simulation software. Perform FSSS on trainer kits/Simulation software. 	10	Rubrics, Rating scale	Internal
	1	ADDITIONAL INSTRUCTIONS FOR	R THE HOD/ FACULTY	(IF ANY)	