

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3		Sheet No. 1/5	
Branch	Electronics & Tele-communication			Semester	4		
Course Code	E03	Course Name	Digital Communication				
Course Outcome 1	Identify different digital signals and their parameters				Teach Hrs	Marks	
Learning Outcome 1	Classify different digital signals (Cognitive)				6	10	
Contents	Analog vs Digital Signal, Types of Digital signal: Binary, Tertiary, Octal, Hexadecimal, Advantages of Digital Communication, Baseband Transmission vs Broadband Transmission						
Method of Assessment	External						
Learning Outcome 2	Define different parameters related to digital signals (Cognitive)				8	10	
Contents	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						
Method of Assessment	External						
Learning Outcome 3	Analyze various digital signals (Psychomotor)				6	10	
Contents	Time-Domain representation of periodic and non-periodic digital signal Calculation of frequency & bandwidth and other parameters.						
Method of Assessment	Internal						

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3		Sheet No. 2/5	
Branch	Electronics & Tele-communication			Semester	3		
Course Code	E03	Course Name	Analog Circuits				

Course Outcome 2	Explain different steps of signal processing in PCM and digital line codes.	Teach Hrs	Marks
Learning Outcome 4	Describe various signal processing methods in pulse code modulation (Cognitive)	8	10
Contents	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 Assessment	External		
Learning Outcome 5	Compare various digital line codes (Cognitive)	5	10
Contents	Digital Line Codes: non return-to-zero(NRZ), return-to-zero (RZ), Manchester code		
Method of Assessment	External		
Learning Outcome 6	Verify PCM modulation /demodulation. (Psychomotor)	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	External		

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 3/5
Branch	Electronics & Tele-communication		Semester	3	
Course Code	E03	Course Name	Analog Circuits		
Course Outcome 3	Identify different digital modulation, demodulation techniques and their application.		Teach Hrs	Marks	

Learning Outcome 7	Illustrate different digital modulation and demodulation techniques(Cognitive)	8	10
Contents	Digital modulation techniques with block diagram,ASK,FSKBPSK,GMSK. Digital Demodulation techniques with block diagram,ASK, FSK, BPSK, GMSK.		
Method of Assessment	External		
Learning Outcome 8	Outline various applications of digital modulation and demodulation techniques.(Cognitive)	6	10
Contents	Applications of digital modulation techniques in Mobile communication, Wi-Fi, Bluetooth, DTH, DSL Technologies, FTTH		
Method of Assessment	Internal		
Learning Outcome 9	Verify digital modulation and demodulation (Psychomotor)	8	10
Contents	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)		
Method of Assessment	External		

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3		Sheet No. 4/5	
Branch	Electronics & Tele-communication			Semester	3		
Course Code	E03	Course Name	Analog Circuits				
Course Outcome 4	Analyze different Multiplexing and Multiple Access methods and their applications.			Teach Hrs	Marks		
Learning Outcome 10	Compare different Multiplexing and Multiple Access techniques. (Cognitive)			8	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 Assessment	External		
Learning Outcome 11	List out various applications of Multiplexing and Multiple Access techniques. (Cognitive)	6	10
Contents	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.		
Method of Assessment	Internal		
Learning Outcome 12	Verify different Multiplexing and Multiple Access techniques. (Psychomotor)	8	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		FORMAT-3	Sheet No. 5/5
Branch	Electronics & Tele-communication		Semester		
Course Code	E03	Course Name	Analog Circuits		
Course Outcome 5	Explain different Spread Spectrum methods and their applications.		Teach Hrs.	Marks	
Learning Outcome 13	Compare different Spread Spectrum methods (Cognitive)		8	10	

Contents	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 hoppingspread spectrum system (FHSS)		
Method of Assessment	External		
Learning Outcome 14	Outline different applications of DSSS and FHSS(Cognitive)	6	10
Contents	Application of DSSS, FHSS in Mobile communication, Wi-Fi, Bluetooth, DTH, DSL Technologies, FTTH.		
Method of Assessment	Internal		
Learning Outcome 15	Simulate and verifyFHSS and DSSS. (Psychomotor)	8	10
Contents	Simulate and PerformDirect sequence spread spectrum systems (DSSS), Frequency hoppingspread spectrum system (FHSS) and verify it. (On Trainer Kits/ Simulation Software)		
Method of Assessment	Internal		

Suggested List of Experiments*:

S.N.	Experiment	CO
1	Generate Digital Signals on Function Generator and observe waveforms and parameters of signal on CRO/DSO	CO403.1
2	PerformPCM modulation /demodulation on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.2
3	PerformASK, FSK, BPSK, GMSK modulation on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.3
4	PerformASK, FSK, BPSK, GMSK demodulation on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.3
5	PerformFDM, TDM , OFDM multiplexing/ de-multiplexing on Trainer	CO403.4

	Kits/ Simulation Software and observe waveforms on CRO/DSO	
6	PerformFDMA, TDMA ,CDMA, OFDMA access methods on Trainer Kits/ Simulation Software and observe waveforms on CRO/DSO	CO403.4
7	PerformFHSS, 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 (Sciencetech - 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 Communication Systems	B.P. Lathi
2	Digital Communication	Sanjay Sharma
3	Fundamentals of Digital Communication	UpamanyuMadhow
4	Analog and digital communication	T.L Singal
5	Communication Systems: Analog and Digital	R .P Singh and S D Sapre
6	www.Nptel.ac.in	
7	www.Swayam.gov.in	