DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA,BHOPAL

SCHEME OF STUDIES & EXAMINATIONS (IMPLEMENTED FROM SESSION : JULY 2023)

SCHEME	NAME OF BRANCH	BRANCH CODE	SEMESTER
OCBC JULY 2022/2023	ET. & TELECOMMUNICATION	E03	THIRD (III)

S.N.	PAPER CODE	SUBJECT CODE	SUBJECT NAME	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDITS	TOTAL MARKS
				HRS PER WEEK	CREDITS	TERM WORK				THEORY PAPER		HRS PER WEEK	CREDITS	LAB WORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7456	301	ET. DEVICES & CIRCUITS	3	3	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	5	150
2	7457	302	DIGITAL SYSTEM	3	3	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	5	150
3	7458	303	ET. MEASUREMENT & INST.	3	3	10	10	10	30	70	03 Hrs.	2	1	20	30	03 Hrs.	4	150
4	7459	304	ELECTRIC CIRCUITS & NETWORK	4	4	10	10	10	30	70	03 Hrs.	0	0	0	0	0	4	100
5	7460	305	PRINCIPLES OF ET. COMM.	3	3	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	5	150
6			**SUMMER INTERNSHIP- I	0	0	0	0	0	0	0	0	0	2	20	30	03 Hrs.	2	50
7			PROFESSIONAL DEVELOPMENT	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
8			***RECOVERY CLASSES/LIBERARY etc.	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
TOTAL				16	16				150	350		20	9	100	150		25	750

NOTE - (1)* Two Best, out of Three Mid Term Tests (Progressive Tests) Marks should be entered here.

(2)** 3-4 Weeks Summer Internship after II Semester.

(3)***To recover courses if session delays due to summer internship.

GRAND TOTAL OF CREDITS	GRAND TOTAL OF MARKS
25	750

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING (E03) /
DIPLOMA IN ELECTRONICS ENGINEERING (E06)

SEMESTER III

COURSE TITLE	:	ELECTRONICS DEVICES AND CIRCUITS
PAPER CODE	:	7456
SUBJECT CODE	:	301
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	02

Course objective: The aim of this course is to help the student to attain the following knowledge through various teaching- learning experiences:

- Identify different Electronic components.
- Learn working principle and application of different Electronic components.
- Learn working principle of rectifiers.
- Learn working principle of Amplifiers and Oscillators

Course Content

Unit	Sub – Topic	Hours	Marks
Unit 1 Semiconductor and Diodes	• Definition of Extrinsic & Intrinsic, N-type & p-type semiconductor • PN Junction Diode , operation of PN Junction diode (Concept of Depletion layer, Drift current, Diffusion current) • Biasing (Forward and Reverse Bias), V- I Characteristics of Diode, Shockley Diode Equation (Equation only) • Application of Diode as Rectifiers – Half Wave and Full Wave Rectifier, (Circuit Diagram, Working, Input, Output Waveform). • Definition of Rectifier Efficiency, Ripple Factor & PIV, Comparison of Rectifier on the basis of Rectifier Efficiency, Ripple Factor & PIV , Applications of Rectifiers. Use of Filters – C, L, LC & PI Filters. • Zener Diode – construction, Principle, working & VI characteristics, • Application of Zener Diode as **a Voltage Regulator** • Block Diagram of regulated DC power supply.	15	16
Unit 2 Bipolar Junction Transistor (BJT)	• Bipolar Junction Transistor (BJT), Types of BJT, BJT Structure(Area, Doping) • Four possible Biasing condition of a BJT (Active region, Saturation region, Cutoff region, Inverse Active Region), Concept of Q- Point. • NPN and PNP Transistor – Operation and characteristics • Applications of BJT as a switch. • Common Base (CB) Configuration – characteristics and working • Common Emitter (CE) Configuration – characteristics and working • Common Collector (CC) Configuration – characteristics and working • Relation between Current Gain (Alpha, Beta, Gamma) , • Numerical based on current Gain • Comparison between CB, CE, CC on Basis of Current Gain, Voltage Gain, Input Impedance, Output Impedance, Application	15	16
Unit 3 Field Effect	• Introduction of Field Effect Transistors (FET)- Working Principle, Comparison of BJT & FET as Current controlled & Voltage Controlled	10	16

Transistors (FET)	device. • Classification of FET, • JFET - Construction, Circuit Symbols, Operation, Drawback of JFET • MOSFET - Types of MOSFET, Construction, Circuit Symbols Working, Characteristics(Drain Characteristics, Transfer Characteristics) • MOSFET as a Switch • Concept of CMOS		
Unit 4 SCR ,DIAC & TRIAC, UJT	Introduction to SCR , DIAC & TRIAC: • SCR – Construction, Symbol, operation, , V-I characteristics (Concept of Holding Current & Latching Current), List Applications • TRIAC - Construction, Symbol, operation, V- I characteristics , List applications • Comparison of SCR, TRIAC • DIAC - Construction, operation, V-I characteristics • UJT – Equivalent Circuit & operation	10	10
Unit 5 Amplifiers and Oscillators	• Classification of Amplifier (Concept of Voltage Amplifier & Power Amplifier) • Basic Concept of Feedback in Amplifiers & Oscillator (Concept of Positive & Negative feedback , Barkhausen' s criteria) • Feedback Amplifier Topologies: Voltage Series, Voltage Shunt Current Series, Current Shunt (Block Diagram only) Properties of negative Feedback, Effect of Negative feedback on Amplifier Characteristics (Points Only) • Introduction of Oscillator, • Comparison between an Amplifier & an Oscillator, • Classification of Oscillators (Sinusoidal oscillators & Non Sinusoidal Oscillators) • Basic Principles of RC Oscillators (Phase shift Oscillator) , Crystal Oscillator	10	12

ELECTRONICS DEVICES AND CIRCUITS LAB

SUGGESTED PRACTICALS/ EXERCISES

S. No.	Practical	Unit No.
1.	Construct the circuit and plot the VI characteristics of the PN Junction Diode, find the cut in voltage	1
2.	Construct the circuit and plot the characteristics of a Zener Diode. Find the breakdown voltage	1
3.	Construct a Half Wave Rectifier and obtain regulation characteristics – Without Filters and with Filters Compare the results	1
4.	Construct a Full Wave Rectifier and obtain regulation characteristics – Without Filters and with Filters Compare the results	1
5.	Construct a Bridge Rectifier and obtain regulation characteristics – Without Filters and with Filters	1
6.	Obtain the Input & Output characteristics of BJT in CB configuration.	2
7.	Obtain the Input & Output characteristics of BJT in CE configuration	2
8.	Obtain the characteristics of DIAC and TRIAC	3
9.	Obtain the VI characteristics of SCR.	3
10.	Simulate half wave, full wave and bridge rectifier using simulation tool like PSpice/ Orcad/ Multisim	1

Reference Books:

S. No.	Title of Book	Author	Publication
1.	Analog Circuits	A.K. Maini	Khanna Publishing House Ed. 2018 (ISBN: 978-93-86173-584)
2.	Electronic Devices and Circuits	S. Salivahanan and N. Suresh Kumar	McGraw Hill Education; Fourth edition (1 July 2017) ISBN: 978-9339219505
3.	Electronics Devices and circuit theory	Boyestad & Nashelsky	Pearson Education India; 11 edition (2015) ISBN: 978-9332542600
4.	Electronic Principles	Albert Malvino & David Bates	Tata McGraw Hill Publication 2010 ISBN: 978-007063424
5.	A Textbook of Applied Electronics	R S Sedha	S Chand Publication
6.	Principles of Electronics	V K Mehta	S Chand and company limited

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING (E03) /
DIPLOMA IN ELECTRONICS ENGINEERING (E06)

SEMESTER III

COURSE TITLE	:	DIGITAL SYSTEMS
PAPER CODE	:	7457
SUBJECT CODE	:	302
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	02

Course objective: The aim of this course is to help the student to attain the following knowledge through various teaching- learning experiences:

- Interpret Number system and Boolean algebra.
- Learn working principle of Logic Gates.
- Learn working principle of Combinational and Sequential logic circuits
- Identify Memory Devices

Course Content

Unit	Sub – Topic	Hours	Marks
Unit 1 Number systems & boolean algebra	Introduction to different number systems- Binary, Octal, Decimal, Hexadecimal • Concepts and Significance of each number system • Conversion from one number system to another • Binary to Decimal, Octal, Hexadecimal and vice versa • Decimal to Octal, Hexadecimal and vice versa • Octal to Hexadecimal and vice versa • Fractional number conversions in Binary, Decimal, Octal, Hexadecimal (up to two decimal points) Boolean variables – Rules and laws of Boolean Algebra • Concept of true/false or 1/0, Basic operations: AND, OR, NOT and Truth tables for basic operations • Commutative laws, Associative laws, Distributive laws, Identity laws, Complement laws, Idempotent laws, Absorption laws, Duality principle De-Morgan's Theorem • First law and Second Law • Applications in simplifying Boolean expressions • Proof and verification using truth tables Simplification of expressions: • Algebraic simplification methods using Boolean algebraic rules and laws • Karnaugh map simplification(2, 3, and 4 variables) • Don't care conditions in logic design • Advantages and Limitations of K-maps	14	14
Unit 2 Logic gates	Logic Gates – AND, OR, NOT, NAND, NOR, XOR, XNOR • Symbolic representation, Truth tables, Boolean expressions for each gate	12	14

	• Universal gates (NAND and NOR) • Physical implementation of NOT gate using transistors (basic concept) Implementation of Boolean expressions using gates: • Converting Boolean expressions to logic circuits • Multi-level gate implementations • Using Universal Gates Practical applications of logic gates • Basic digital circuits (majority voter (up to 4 variable), parity generator (up to 4 variable)) • Introduction to combinational logic design		

Unit 3 Combinational logic circuits	Arithmetic Circuits
	• Binary addition and subtraction
	• 1's and 2's complement representation
	• Half Adder, Full Adder, Half Subtractor and Full Subtractor
	  o Block Diagram and explanation
	  o Truth table and Boolean expression
	  o Cascading full adders (introduction)
	• Parallel and Series Adders(Block Diagram)
	  o Ripple carry adder
	  o Carry look-ahead adder
	Encoder and Decoder
	• Binary encoders (8-to-3 encoder)
	• Priority encoders
	• Binary decoders (3-to-8 decoder)
	• BCD to 7-segment decoder
	Multiplexer (MUX)
	• 2-to-1 MUX, 4-to-1 MUX, 8-to-1 MUX
	• Applications of multiplexers
	  o Parallel-to-serial conversion
	Demultiplexer (DEMUX)
	• 1-to-2 DEMUX, 1-to-4 DEMUX, 1-to-8 DEMUX
	• Applications of demultiplexers
	  o Serial-to-parallel conversion
		12	14

Unit 4 Sequential logic circuits	Latch • SR latch (circuit using NAND and NOR, working, limitations) Triggering • Edge-triggering and level-triggering Flip Flops • SR, JK with Race Round condition (circuit using NAND and NOR, working, truth table, limitations, applications) • Block diagram , working and application of T, D, Master-Slave JK Flipflop Counters • Asynchronous (Ripple) 4-bit Up Counter • Synchronous 4-bit Up Counter • Asynchronous (Ripple) 4-bit Down Counter • Synchronous 4-bit Down Counter • Mod-3 Up Synchronous Counters • Johnson Counter • Ring Counter	12	14

	Registers
	• 4-bit Shift Register types
	  o Serial In Serial Out (SISO)
	  o Serial In Parallel Out (SIPO)
	  o Parallel In Serial Out (PISO)
	  o Parallel In Parallel Out (PIPO)		

Unit 5- Memory devices	Classification of Memories
	• Volatile vs. Non-volatile memory
	• Random Access vs. Sequential Access
	Random Access Memory (RAM)
	• RAM organization and architecture
	• Address lines and memory size calculations
	• Static RAM (SRAM)& Dynamic RAM (DRAM)
	  o Advantages and disadvantages
	  o Refresh cycles in DRAM
	• Bipolar RAM
	• DDR RAM (Double Data Rate)
	  o Concept and advantages
	Read Only Memory (ROM)
	• Basic Concept of ROM organization
	• Expanding memory capacity
	• Programmable ROM (PROM)
	• Erasable Programmable ROM (EPROM)
	• Electrically Erasable Programmable ROM (EEPROM)
	• Flash memory
		10	14

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DIGITAL SYSTEMS LAB

S.No.	Practical / Exercise	Unit
1.	To verify the truth tables for all logic Gates – NOT, OR, AND, NAND NOR,XOR, XNOR	1
2.	Implement and realize Boolean Expressions with Logic Gates	2
3.	Implement Half Adder, Full Adder, Half Subtractor, Full subtractor using ICs	3
4.	Implement parallel and serial full-adder using ICs	3
5.	Design and development of Multiplexer and De-multiplexer using multiplexer ICs	3
6.	Verification of the function of SR,D, JK and T Flip Flops	4
7.	Design SIPO shift registers	4
8.	Construct a Single digit Decade Counter (0-9) with 7 segment display	4
9.	To design a programmable Up-Down Counter with a 7-segment display	4
10.	Study of different memory ICs	5

Suggested Learning Sources:

S.No.	Title of Book	Author	Publication
1	Digital Electronics	Menka Yadav	AICTE
2	Digital Electronics and Systems	Abhishek Bhatt	AICTE
3	Digital principles & Applications	Albert Paul Malvino & Donald P. Leach	McGraw Hill Education; Eighth edition ISBN: 978-9339203405
4	Digital Electronics	Roger L. Tokheim Macmillian	McGraw-Hill Education (ISE Editions); International 2 Revised ed edition ISBN: 978-0071167963
5	Digital Electronics – an introduction to theory and practice	William H. Gothmann	Prentice Hall India Learning Private Limited; 2 edition ISBN: 978-8120303485
6	Fundamentals of Logic Design	Charles H. Roth Jr	Jaico Publishing House; First edition ISBN: 978-8172247744
7	Digital Electronics	R. Anand	Khanna Publications, New Delhi (Edition 2018) ISBN: 978-93-82609445

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING (E03) /
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SEMESTER III

COURSE TITLE	:	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
PAPER CODE	:	7458
SUBJECT CODE	:	303
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	01

Course objective: The aim of this course is to help the student to attain the following knowledge through various teaching- learning experiences:

- Concept of Measurements and Bridges.
- Learn working principle of DC and AC Potentiometer.
- Concept of CRO
- Types and application of various Transducers

Course Content

Unit	Topics and Sub-topics	Hours	Marks
Unit – I Basics of Measurements and Bridges	• Basics of Measurements: block diagram of measurement system and working of each block, Accuracy, precision, Resolution , sensitivity, linearity, loading effect. • Types of Errors. • Bridge Measurement: Circuit diagram, working, balanced equation, advantages and disadvantages, application for all bridges • DC Bridges – Wheatstone and Kelvin Double Bridge • AC Bridges - Maxwell's Bridge, Hay's Bridge, De-Sauty's Bridge	12	14
Unit-2 Potentiometer	• Diagram, construction, working and application (derivation not required) for: o Permanent Magnet Moving Coil Instruments (PMMC) o Moving Iron type Instruments (MI) • Basics of voltmeter and ammeter • Range extension of meter (simple numerical) • Concept of energy and power measurement • Potentiometer: Basic concept of Potentiometer • List types of DC and AC potentiometer, DC Slide Wire Potentiometer (circuit diagram, working and application in calibration of voltmeter and ammeter)	12	14
Unit– 3 Measuring Instruments	• Electronic Instruments for Measuring Basic Parameters: Electronic multi-meter: Block diagram and working , Measurement of voltage, current, resistance, using electronic multimeter • Digital voltmeter (potentiometric type),	12	14

	• Q – Meter : Principle of operation, circuit diagram, working and application of Q – Meter		
Unit– 4 Oscilloscopes	• CRO : block diagram of CRO , Cathode ray tube: construction, operation, Vertical deflection system (derivation not required) , Horizontal deflection system, need of Delay line, time base generator, • Measurement of Amplitude, frequency using CRO, Lissajous patterns for frequency and phase measurement , component testing using CRO, • Dual Trace CRO • DSO: Block diagram, working and Application	12	14
Unit-5 Transducers	• Transducers : definition, types of transducers (active & passive, primary & secondary, analog and digital), Selection Criteria, Characteristics, Construction • Working Principles and Application of following Transducers: • RTD, Thermocouple, Thermistor, LVDT, Strain Gauge Load Cell, Piezoelectric Transducers	12	14

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ELECTRONIC MEASUREMENTS AND INSTRUMENTATION LAB

SUGGESTED PRACTICALS/ EXERCISES

S.No.	Practical / Exercise	Unit
1.	Measure unknown inductance using Maxwell Bridge	1
2.	Measure Low resistance by Kelvin's Double Bridge	1
3.	Calibrate an ammeter using DC slide wire potentiometer	2
4.	Calibrate a voltmeter using DC slide wire potentiometer	2
5.	Calibrate a single-phase energy meter by phantom loading	3
6.	Study the working of Q-meter and measure Q of coils	3
7.	Study working and applications of (i) C.R.O. (ii) D.S.O	4
8.	Measurement of displacement with the help of LVDT	5
9.	Draw the characteristics of the following temperature transducers (a)RTD (Pt-100) (b) Thermistor	5
10.	Measurement of strain/force with the help of strain gauge load cell	5

SUGGESTED LEARNING RESOURCES

S.No.	Title of Book	Author	Publication
1	Electrical & Electronic Measurement & Instruments	Dr Sudarshan Sahoo	AICTE
2	Electrical & Electronic Measurement & Instruments	A.K. Sawhney	Dhanpat Rai & Sons, India
3	Electronic Instrument and Measurement Technique	W.D. Cooper	Prentice Hall International, India
4	Electronic Instrumentation	J.G. Joshi	Khanna Publishing House
5	Electronic Instrumentation	H. S. Kalsi	Mcgraw-Hill
6	Basic Electrical Measurement	M.B. Stout	Prentice hall of India
7	Electrical and Electronics Measurement and Instrumentation	PrithwirajPukrait, Budhaditya Biswas, Santanu Das, Chiranjib Koley	Mcgraw-Hill
8	Electronic Instrumentation	H. S. Kalsi	Mcgraw-Hill
9	Measurement systems application and design	E.O. Doebelin and D. N. Manik	Mcgraw-Hill

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SEMESTER III

COURSE TITLE	:	ELECTRIC CIRCUITS AND NETWORK
PAPER CODE	:	7459
SUBJECT CODE	:	304
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	00

Course objective: The aim of this course is to help the student to attain the following knowledge through various teaching- learning experiences:

- Concept of electric circuits and network analysis
- Simplify circuits using Network Theorems
- Perform Time domain and frequency domain analysis of circuit
- Interpret basic filters
- Interpret Two-Port Networks.

Course Content

Unit	Topics and Sub-topics	Hours	Marks
UNIT 1 Basics of electric circuits and network analysis	Introduction to Electric Circuits • Concepts of current, voltage and power. • Concept of resistance, capacitance, inductance • Ohm's Law and its applications. • Understanding circuit graphs: nodes, branches, and loops as applied to circuit analysis. • Analysis of series and parallel resistive circuits (Voltage and current division rules). Mesh Analysis • Introduction to mesh (loop) analysis. • Applying mesh analysis to solve simple circuit problems. Node Analysis • Introduction to node (nodal) analysis. • Using node analysis to solve simple circuit problems. Note:(Simple Numericals on DC Resistive Circuits Only)	**12**	**14**
UNIT 2 Network theorems	• Introduction to network theorems and their importance. • Analyzing circuits with multiple sources using superposition. • Thevenin's Theorem, simplifying complex circuits into a simple equivalent circuit. • Norton's Theorem, simplifying complex circuits into a simple equivalent circuit. • Maximum power transfer.	**12**	**14**
	• Introduction to the Reciprocity Theorem and its application in linear bilateral networks. **Note: DC Resistive Circuit with Independent Sources Only**		

UNIT 3 Time domain and frequency domain analysis	• Series and Parallel combination of (i) R (ii) L (iii) C Time Domain Analysis: • Basic concepts of RC and RL circuits. • Charging and discharging of capacitors, growth and decay of current in inductors. • Introduction to transient response in simple circuits. (Unit Step Input Response Only) • Steady state vs. transient state. • Initial and final conditions in circuit elements. Frequency Domain Analysis: • Introduction to the Laplace Transform and its application in circuit analysis. • Conversion of circuit equations from the time domain to the frequency domain. Impedance and Reactance in AC Circuits: • Calculating impedance for RL, RC, and RLC circuits. • Phasor representation of sinusoidal signals, reactance and impedance. Introduction to Frequency Domain Concepts: • Understanding the concept of frequency domain and its significance. Basics of sinusoidal steady-state analysis.	**14**	**14**
UNIT 4 Basics of filter circuits	Introduction to Filters: • Definition and importance of filters in electrical circuits. • Decibel system, 3-dB bandwidth, pass-band and stop-band Types of Filters and their applications: • Low-pass, high-pass, band-pass, and band-stop filters. • Simple RC/RL low-pass and high-pass filter design. • Understanding the impulse response of basic filter circuits with transfer functions and graphs. Applications of filters in electronics and communication systems.	**10**	**14**
UNIT 5 Introduction to two-port networks	Concept of a two-port network and its applications in circuits: • Definition and calculation of Z-parameters. • Definition and calculation of Y-parameters. • Definition and importance of transmission parameters. Note:(Simple Numericals on DC Resistive Circuits Only)	**12**	**14**

SUGGESTED LEARNING RESOURCES

S.No.	Title of Book	Author	Publication
1	Electric Circuits and Networks	Jamuna K. and Nilanjan Tewari	AICTE Publishing
2	A Textbook of Electrical Technology - Volume I (Basic Electrical Engineering)	B.L. Theraja,	Chand Publishing
3	Networks and Systems	Ashfaq Husain	Khanna Publishing House
4	Network Analysis	M. E. Van Valkenburg	Prentice Hall of India
5	Network Analysis & Synthesis	S.P. Ghosh and A K Chakarborty	McGraw Hill Education
6	Network Analysis And Synthesis	Umesh Sinha,	Satya Prakashan

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SEMESTER III

COURSE TITLE	:	PRINCIPLES OF ELECTRONIC COMMUNICATION
PAPER CODE	:	7460
SUBJECT CODE	:	305
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	02

Course objective: The aim of this course is to help the student to attain the following knowledge through various teaching- learning experiences:

- Concept of wireless signal
- Learn principle of Amplitude and Frequency Modulation
- Interpret AM and FM receivers
- Learn principle of PAM and PCM
- Learn Optical fiber communication

Course Content

Unit	Topics and Sub-topics	Hours	Marks
Unit 1	• Electromagnetic spectrum • Concept of wired and wireless communication • Representation of signals in time and frequency domain (double sided of sinusoidal). • Introduction to signals, classification of signals- continuous and discrete, periodic and non-periodic, deterministic and random signals. (graphical representation only) • Representation of band limited and band pass signal. • Noise sources and its classification. noise measurement – SNR, Noise figure.	**10**	**12**
Unit 2	• Introduction to Communication Systems – Modulation – Types – Need for Modulation. Concept of frequency translation. **Amplitude Modulation:** • Description of full AM, DSBSC and SSB in time and frequency domains (Mathematical representation of AM wave, modulation index, bandwidth requirement), Power relations in AM. (Simple numerical on modulation index, bandwidth and power). **Frequency Modulation:** • Descriptions of FM signal in time and frequency domains, frequency deviation and modulation index and their relationship. Narrowband and wideband FM. Signal to noise trade off. • Phase modulation: Definition and its relation with frequency modulation • Comparison of FM and AM	**14**	**16**

Unit 3	● Generation of AM, Block diagram and description of AM transmitter using low level and high level modulation, Suppression of carrier: Balanced Modulator (using diode). ● Detection of AM using Diode detector. ● AM receiver- Block Diagram of Super heterodyne receiver. ● IF Amplifier and selection of IF. ● Generation of FM waves- direct and indirect FM (only Block diagram and basic description) ● Detection of FM waves: Foster Seeley discriminator	**14**	**16**
Unit 4	● **PULSE ANALOG MODULATION-**Principle, Generation, detection, bandwidth, advantages, disadvantages and application. ● Sampling theorem, Types of sampling- Ideal sampling, natural and flat top sampling in time domains. ● **PCM SYSTEMS:** Uniform and Non-uniform quantization, Quantization levels, Quantization noise, Encoding. Functional Block Diagram and working of PCM generator. ● Companding	**10**	**12**
Unit 5	● **Optical Communication:** Principle of light propagation through fiber, Block diagram of optical fiber communication systems, optical frequency range, advantages, disadvantages and application of optical fiber communication. Intensity Modulation. ● Multimode and single-mode fibers, step and graded index fiber, acceptance angle, numerical aperture, simple numerical. ● Types of optical fiber cables. ● Losses in optical fiber- scattering, UV loss, IR loss, low loss window Concept of Dispersion, effect of Dispersion on Data rate, simple numerical	**12**	**14**

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PRINCIPLES OF ELECTRONIC COMMUNICATION LAB

SUGGESTED PRACTICALS/ EXERCISES

S.No.	Practical / Exercise	Unit
1	Analyze and classify various signals using an oscilloscope and on simulation software.	**1**
2	Study the representation of signals in time and frequency domains.	**1**
3	Measure Signal-to-Noise Ratio (SNR) and Noise Figure of a simple communication setup.	**1**
4	Generate and detect an AM signal using discrete components	**2**
5	Analyze power distribution in AM signals.	**2**
6	Generate and detect an FM signal using direct and indirect FM generation methods	**2**
7	Study of AM receiver circuit	**3**
8	Study of FM receiver circuit	
9	Generate and observe a PAM signal.	**4**
10	Study the PCM encoding and decoding process.	**4**
11	Study the properties of optical fibers (numerical aperture, acceptance angle).	**5**
12	Measure attenuation and dispersion in optical fibers.	**5**

SUGGESTED LEARNING RESOURCES

S.No.	Title of Book	Author	Publication
1	Electronic Communication Systems	George Kennedy	M.H
2	Fundamentals of communication systems	Proakis & Salehi	Pearson education
3	Principles of Electronic communication	Roddey and Coolen	Pearson education
4	Communication Systems (Analog and Digital)	R.P. Singh, S.D.Sapre	T.M.H.
5	Modern Digital & Analog Communication	B.P. Lathi	Oxford Publications
6	Digital & Analog Communication Systems	K.S. Shanmugam	John Wiley

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SEMESTER III

COURSE TITLE	:	SUMMER INTERNSHIP - I
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

SUMMER INTERNSHIP –

- 3-4 weeks summer internship after 2nd Semester. It should be undertaken in an industry/Govt. or Pvt. Certified Agencies which are in social sector/Govt. Skill Centers/Schemes.
- Evaluation is based on work done, quality of report, performance in viva-voce, presentation etc

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SEMESTER III

COURSE TITLE	:	PROFESSIONAL DEVELOPMENT
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	00

Course Objectives:

Following are the objectives of this course:-

(1) To learn the principles of Professional and Social ethics.

(2) To know the concept of Lifelong learning and Self-directed learning.

(3) To present self for employment.

(4) To introduce the need of industrial visits.

(5) To understand CV, Resume, Bio-data and Interview and their significance.

(6) To develop the skills of Group Discussion.

Course Content:

Unit	Topics and Sub-topics	Hours
Unit-1 social skills	• Professional and Social Ethics Professional ethics, its need and importance, • General code of ethics for engineers, ethical issues for engineers. • Need and importance of social skills, social skills for better group performance, important social skills such as social perceptiveness, coordination, negotiation, persuasion etc.	**4**
Unit 2 Lifelong learning	• Lifelong learning and Self-directed Learning Lifelong learning, its examples, • self-directed learning, its examples, important steps in lifelong learning. • Need for planning self-directed learning, planning self-directed learning plan, examples.	**4**
Unit -3 Career Planning	• Importance of career planning, major career opportunities in concerned branch of engineering , study of the important career opportunities regarding qualification, knowledge, skills, experience required for them, • Role of personal factors like personal life style, interest areas, desires, personal preferences in career planning. Identification and detailing of important career opportunities in relation to branch of diploma. • Identification and detailing of important self-personal factors and self-personal preferences, development of self-career plan.	**5**
Unit 4 Industrial Visits	• Necessity of exposure to environment and practices, lectures by industry experts. Importance of Students' industrial visits, learning through observing real life industrial systems, planning and organizing the industrial visits.	**5**
Unit 5 CV, Resume	• CV, Resume, Bio-data and Interview Need of presenting self for employment, salient features and formats of bio-data, CV, resume, comparison of the three for their merits, limitations and specific uses, study of cases and examples of bio-data, CV, resume and covering letter by all students for self of for the given cases. • Importance of employment related interviews, purpose of interview, dress code, body language and posture of interviewee, do's and don'ts for interviews, interview checklist, practice of facing employment related interviews for all students.	**6**
Unit 6 Group Discussion	• Need and importance of group discussion in professional work, ideal group discussion and skills needed to effectively participate in group discussion, • Practice of group discussion skills.	**6**