



SCHEME FOR THIRD SEMESTER (ELECTRONICS & COMMUNICATION ENGINEERING)

Sr. No.	Subject	Study Scheme			EVALUATION SCHEME						Total Marks
					INTERNAL ASSESSMENT		EXTERNAL ASSESSMENT (EXAMINATION)				
					Theory	Practical	Written Paper		Practical		
					Max. Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	
3.1**	Analog Electronics – II	3	-	3	25	25	100	3	50	2	200
3.2**	Digital Electronics - I	4	-	2	25	25	100	3	50	3	200
3.3*	Principles of Communication Engineering	3	-	2	25	25	100	3	50	3	200
3.4**	Computer Programming and Applications	2	-	4	25	25	100	3	50	3	200
3.5*	Electrical Machines	3	-	3	25	25	100	3	50	3	200
3.6**	Electronic Instruments and Measurement	3	-	3	25	25	100	3	50	3	200
# Student Centred Activities		-	-	5	-	25	-	-	-	-	25
Total		18	-	22	150	175	600	-	300	-	1225

* Common with other diploma programmes in Electronics (Power Electronics), Electronics and Instrumentation

** Common with diploma programmes in Electronics (Power Electronics), Instrumentation and Control,

Student Centred Activities will comprise of co-curricular activities like extension lectures, library studies, games, hobby clubs e.g. photography, painting, singing, seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities, Civil Defence/Disaster Management activities etc.



SYLLABUS: Polytechnic (ECE)

Department: Electronics & Communication Engineering – 3rd Semester

Subject: Analog Electronics –II (Theory)

Subject Code: 121031

Detailed Contents

Unit No.1 Multistage Amplifiers

Topic No.1: Need for multistage amplifier

Topic No.2: Gain of multistage amplifier

Topic No.3: Different types of multistage amplifier like RC coupled, Transformer coupled, Direct coupled, and their frequency Response and bandwidth

Unit No. 2 Large Signal Amplifier

Topic No.4: Difference between voltage and power amplifiers

Topic No.5: Importance of impedance matching in amplifiers

Topic No.6: Class A, Class B, Class AB, and Class C amplifiers collector efficiency and Distortion in class A,B,C

Topic No.7: Single ended power amplifiers, Graphical method of calculation (without derivation) of output power; heat Dissipation curve and importance of heat sinks. Push-pull amplifier and complementary symmetry Push-pull amplifier.

Unit No 3 Feedback in Amplifiers

Topic No.8: Basic principles and types of feedback.

Topic No.9: Derivation of expression for gain of an amplifier employing feedback.

Topic No.10: Effect of feedback (negative) on gain, stability, distortion and bandwidth of an amplifier.

Topic No.11: RC coupled amplifier without emitter bypass capacitor.

Topic No.12: Emitter follower amplifier and its application.

Unit No.4 Sinusoidal Oscillators

Topic No.13: Use of positive feedback

Topic No.14: Barkhausen criterion for oscillations

Topic No.15: Different oscillator circuits-tuned collector, Hartley, Colpitts, phase shift, Wien's bridge, and crystal Oscillator. Their working principles (no mathematical derivation but only simple numerical problems)

Unit No.5 Tuned Voltage Amplifiers

Topic No.16: Series and parallel resonant circuits and bandwidth of resonant circuits

Topic No.17: Single and double tuned voltage amplifiers and their frequency response characteristics

Unit No. 6 Wave Shaping Circuits

Topic No.18: General idea about different wave shapers

Topic No.19: RC and RL integrating and differentiating circuits with their applications

Topic No.20: Diode clipping and clamping circuits and simple numerical problems on these circuits

Unit No.7 Multivibrator Circuits

Topic No.21: working principle of transistor as switch

Topic No.22: Concept of multi-vibrator: astable, monostable, and bistable and their applications

Topic No.23: Block diagram of IC 555 and its working and Applications

Topic No.24: IC 555 as monostable and astable multi-vibrator

Unit No.8 Operational Amplifiers

Topic No.25 Characteristics of an ideal operational amplifier and its block diagram

Topic No.26 Definition of differential voltage gain, CMRR, PSRR, slew rate and input offset current

Topic No.27 Operational amplifier as an inverter, scale changer, adder, subtractor, differentiator, and integrator

Topic No.28 Concept of Schmitt trigger circuit and sample/hold circuit using operational amplifier and their application

Unit No. 9 Regulated DC Power supply

Topic No.29: Concept of D.C. Power supply.

Topic No.30: Line and load regulation, Concept of fixed Voltage,

Topic No.31: IC regulators like 78xx, 79xx, Working principle and block diagram of SMPS.



STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125

LIST OF RECOMMENDED BOOKS

- (1) Basic Electronics and Linear Circuits by NN Bhargava, Tata McGraw Hills, New Delhi
- (2) Electronic Principles by Sahdev, Dhanpat Rai and Sons, New Delhi.
- (3) Electronics Principles by Malvino, Tata McGraw Hills, New Delhi
- (4) Electronic Circuit Theory by Boylestad
- (5) Electronic Devices and Circuits by BL Theraja, S Chand and Co Ltd. New Delhi
- (6) Analog Electronics-II by D.R. Arora, North Publication, Jalandehar
- (7) Operational Amplifiers and Linear Integrated Circuits by Ramakant A. Gaykwad
- (8) Electronics Devices and Circuits by Rama Reddy, Narosa Publishing House Pvt. Ltd., New Delhi
- (9) Electronics Devices and Circuits-II by Rajesh Kumar, Eagle Prakashan, Jalandhar
- (10) Principles of Electrical and Electronics Engineering by VK Mehta; S Chand and Co., New Delhi
- (11) Electronic Components and Materials by SM Dhir, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.
- (12) Principles of Electronics by SK Bhattacharya and Renu Vig, SK Kataria and Sons, Delhi
- (13) Basic Electronics by JB Gupta, SK Kataria and Sons, New Delhi

INSTRUCTIONAL STRATEGY

This subject being of fundamental importance for diploma holders in electronics engineering and related fields, emphasis on conceptual understanding may be given by taking the help of charts, simulation packages etc. Sufficient exercises may be given to the students in single stage and multistage amplifier circuits in addition to simple exercises in fabricating and testing of various simple d.c circuits. The students may be encouraged to perform some additional practical exercises apart from the list provided.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr.No.	Unit Name	Time Allotted (Hrs)	Marks Allotted (%)
1	Multistage Amplifiers	06	12
2	Large Signal Amplifier	06	16
3	Feedback in Amplifier	06	14
4	Sinusoidal Oscillators	06	16
5	Tuned Voltage Amplifiers	04	06
6	Wave Shaping Circuits	06	10
7	Multivibrator Circuits	06	10
8	Operational amplifiers	06	12
9	Regulated DC power Supply	02	04
Total		48	100



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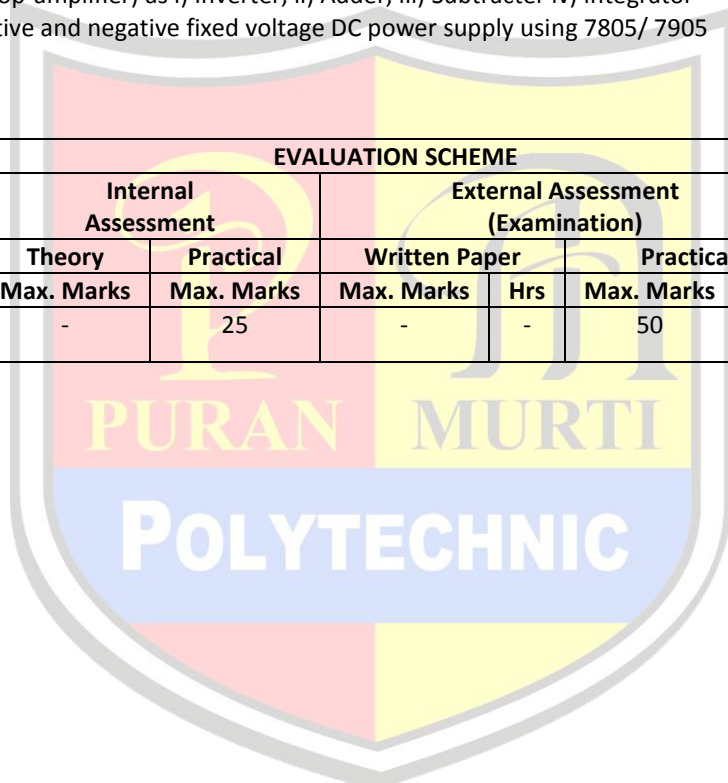
Subject: Analog Electronics –II (Practical)

Subject Code: 121031(P)

LIST OF PRACTICALS

- (1) Plot the frequency response of two stages RC coupled amplifier and calculate the bandwidth and compare it with single Stage amplifier
- (2) To measure the gain of push-pull amplifier at 1KHz
- (3) To measure the voltage gain of emitter follower circuit and plot its frequency response.
- (4) Plot the frequency response curve of Hartley and Colpitts Oscillator
- (5) Plot the frequency response curve of phase shift and Wein bridge Oscillator
- (6) To observe the output waveforms of series and shunt clipping circuits
- (7) To observe the output for clamping circuits
- (8) Use of IC 555 as Monostable multivibrator and observe the output for different values of RC
- (9) Use of IC 555 as Astable multivibrator and observe the output at different duty cycles
- (10) To use IC 741 (op-amplifier) as i) Inverter, ii) Adder, iii) Subtractor iv) Integrator
- (11) To realize positive and negative fixed voltage DC power supply using 7805/ 7905

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	3	-	25	-	-	50	3	75





Detailed Content

Unit No. 1 Introduction

Topic No.1: Define digital and analog signals and systems, Difference between analog and digital Signals

Topic No.2: Need of digitization, Applications of digital systems

Topic No.3: Applications of digital systems

Unit No. 2 Number System

Topic No.4: Decimal, Binary, Octal, Hexadecimal number systems

Topic No.5: Conversion of number from one number system to another including decimal points

Topic No.6: Binary addition & Subtraction, Multiplication, 1's and 2's complement method of subtraction

Topic No.7: BCD code numbers and their limitations, Addition of BCD coded numbers

Topic No.8: Conversion of BCD to decimal and vice-versa

Topic No.9: Excess-3 codes Binary to Excess-3 codes, Gray code, Binary to gray and gray to binary conversion

Topic No.10: Concept of parity, single and double parity, Error detection and correction using parity

Unit No. 3 Logic Gates

Topic No.11: Logic Gates, Positive and negative logic, Pulse waveform, definition, symbols, truth tables, pulsed Operation of NOT, OR, AND, NAND, NOR, EX-OR, EX-NOR

Topic No.12: NAND and NOR as universal logic gates

Unit No.4 Logic Simplification

Topic No.13: Rules and laws of Boolean algebra logic expression, Demorgan's theorems, their proof

Topic No.14: Sum of products form (minterm), Product of sum form (MAXTERMS)

Topic No.15: Simplification of Boolean expressions with the help of Rules and laws of Boolean algebra

Topic No.16: Karnaugh mapping techniques up to 4 variables and their applications for simplification of Boolean expression

Unit No. 5 Arithmetic Circuits

Topic No.17: Half Adder, Full Adder, Parallel Binary Adder, 2 Bit full adder, 4 bit binary full adder

Unit No. 6 Multiplexer/Demultiplexer

Topic No.18: Basic functions, symbols and logic diagrams of 4-inputs and 8-inputs multiplexers

Topic No.19: Function/utility of 16 and 32 inputs multiplexers

Topic No.20: Basic function, symbols and logic diagram of 4 outputs and 8 output DEMUX

Topic No.21: Realization of Boolean expression using multiplexer/Demultiplexer

Unit No.7 Decoders, Display Devices and Associated Circuits

Topic No.22: Basic Binary decoder, 4-line to 16 line decoder circuit, 4-line to 16 line decoder circuit, BCD to decimal Decoder, BCD to 7-segment decoder/driver, LED/LCD display

Unit No. 8 Encoders and Comparators

Topic No.23: Encoder Introduction, Decimal to BCD encoder, Decimal to BCD priority encoder, Keyboard

Topic No.24: Magnitude comparators, Symbols and logic diagrams of 2-bit and 4-bit Comparators

Topic No.25: Symbols and logic diagrams of 2-bit and 4-bit comparators

Unit No. 9 Latches and Flip-Flop

Topic No.26: Latch, SR-latch, D-latch, Flip-flop, difference between latch and flip-flop

Topic No.27: S-R & D flip flop, their operation using waveform and truth tables, Race around Condition

Topic No.28: JK flip-flop, Master slave and their operation using waveform and truth tables

Unit No. 10 Counters

Topic No.29: Asynchronous counter, 4-bit Asynchronous counter, 4-bit Asynchronous counter, 4-bit Asynchronous Counter, 4-bit synchronous binary counter, Up/down Asynchronous counters



Topic No.30: 3 Bit Asynchronous up/down counter. Ring counters, Cascaded counter, counter applications

Unit No. 11 Shift Register

Topic No.31: Shift registers functions, Serial-in-serial out, Serial-in-parallel-out, Parallel-in-parallel out shift register

Topic No.32: Universal shift register, Shift registers counter, Applications of shift registers

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
4	-	-	25	-	100	3	-	-	125

LIST OF RECOMMENDED BOOKS

- (1) Digital Electronics and Applications by Malvino Leach, Tata McGraw Hill, New Delhi
- (2) Digital Logic Designs by Morris Mano, Prentice Hall of India, New Delhi
- (3) Digital Fundamentals by Thomas Floyds, Universal Book Stall
- (4) Digital Electronics by RP Jain, Tata McGraw Hill, New Delhi
- (5) Digital Electronics by KS Jamwal, Dhanpat Rai & Co., New Delhi
- (6) Digital Electronics by Yashpal and Sanjeev Kumar North Publication, Jalandhar
- (7) Digital Electronics by BR Gupta, Dhanpat Rai & Co., New Delhi
- (8) Digital Systems: Principles and Applications by RJ Tocci, Prentice Hall of India, New Delhi
- (9) Digital Electronics by Rajaraman V., Prentice Hall of India, New Delhi

INSTRUCTIONAL STRATEGY

The Digital Electronic – 1 has significant importance in the field of Electronics. Adequate competency need to be developed by giving sufficient practical knowledge in microprocessor, A/D, D/A, convertors and other topics. Help may be taken in the form of charts, simulation packages to teach of the subject.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING

Sr. No.	Topic	Time Allotted(hrs)	Marks Allocation (%)
1.	Introduction	02	06
2.	Number Systems	10	06
3.	Logic Gates	04	06
4.	Logic Simplification	08	12
5.	Arithmetic Circuits	03	10
6.	Multiplexer/Demultiplexer	04	10
7.	Decoders, Display Device and Associated Circuits	04	10
8.	Encoders and Comparators	04	10
9.	Latches and Flip Flops	07	10
10.	Counters	10	10
11.	Shift Registers	08	10
Total		64	100



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Subject: Digital Electronics -I (Practical)

Subject Code: 120832(P)

LIST OF PRACTICALS

- (1) Study of logic breadboard with verification of truth table for AND, OR, NOT, NAND, EX-OR, NOR gate.
- (2) Verification of NAND and NOR gate as universal gates.
- (3) Construction of half-adder and full adder circuits using EX-OR and NAND gate and verification of their operation.
- (4) Verify the operation of
 - a) Multiplexer using an IC
 - b) De-multiplexer using an IC
- (5) a) Verify the operation of BCD to decimal decoder using an IC
b) Verify the operation of BCD to 7 segment decoder using an IC
- (6) Verify operation of SR, JK, D-flip-flop master slave JK flip-flop using IC.
- (7) Verify operation of SISO, PISO, SIPO, PIPO shift register. (Universal shift register)
- (8) Study of ring counter, Up/down counter
- (9) Construct and verify the operation of an asynchronous binary decade counter using JK flip-flop
- (10) Testing of digital ICs using IC tester

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-		2	-	25	-	-	50	3	75



Detailed Contents

Unit No.1 Introduction

- Topic No.1: Basic scheme of a modern communication system.
- Topic No.2: Need for modulation and demodulation in communication systems
- Topic No.3: Noise and its different types (No mathematical derivation).

Unit No.2 Amplitude modulation

- Topic No.4: Derivation of expression for an amplitude modulated wave. Carrier and side band components. Modulation index. Spectrum and BW of AM Wave. Relative power distribution in carrier and side bands.
- Topic No.5: Elementary idea of DSB-SC, SSB-SC, ISB and VSB modulations, their comparison, and areas of applications.

Unit No.3 Frequency Modulation

- Topic No.6: Expression for frequency modulated wave and its frequency spectrum (without Proof and analysis of Bessel function) Modulation index, maximum frequency deviation and deviation ratio, BW of signals, Carson's rule.
- Topic No.7: Comparison of FM and AM in communication systems
- Topic No. 8: Narrow band and Wide Band FM.
- Topic No.9: Basic idea about the selection of Heat sink for thyristors.

Unit No.4 Phase Modulation

- Topic No.10: Expression for phase modulated wave, modulation index, comparison with frequency modulation.

Unit No.5 Principles of AM Modulators

- Topic No.11: Circuit Diagram and working operation of Collector and Base Modulator.
- Topic No.12: Circuit Diagram and working operation of Balanced Modulator Ring Modulator

Unit No.6 Demodulation of AM Waves

- Topic No.13: Principles of demodulation of AM wave using diode detector circuit; concept of Clipping and Formula for RC time constant for minimum distortion (no derivation)

Unit No.7 Principles of FM Modulators

- Topic No.14: Circuit Diagram and working of reactance modulator, varactor diode modulator, VCO and Armstrong phase modulator.

Unit No.8 Demodulation of FM Waves

- Topic No.15: Basic principles of FM detection using slope detector
- Topic No.16: Principle of working of the following FM demodulators Foster-Seeley discriminator Ratio detector

Unit No.9 Pulse Modulation

- Topic No.17: Statement of sampling theorem and elementary idea of sampling frequency for pulse modulation.
- Topic No.18: Basic concepts of time division multiplexing (TDM) and frequency division multiplexing (FDM)
- Topic No.19: Types of pulse modulation-PAM, PPM, PWM (Generation and Detection) and their comparison.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125



LIST OF RECOMMENDED BOOKS

- (1) Electronics Communication System by Kennedy, Tata McGraw Hill Education Pvt Ltd, New Delhi
- (2) Fundamentals of Communication System by Fitz, Tata McGraw Hill Education Pvt Ltd, New Delhi
- (3) Principles of Communication Engineering by Taub, Tata McGraw Hill Education Pvt Ltd,
- (4) Electronics Communication by KS Jamwal, Dhanpat Rai and Co, New Delhi
- (5) Radio Engineering by GK Mittal, Khanna Publishers, New Delhi
- (6) Principles of Communication Engineering by Yash pal & Sanjeev Kumar North Publications, Ambala
- (7) Principles of Communication Engineering by Manoj Kumar, Satya Prakashan, New Delhi
- (8) Principles of Communication Engineering by Anokh Singh, S.Chand and Co., New Delhi
- (9) Principles of Communication Engineering by Roody , Coolin

INSTRUCTIONAL STRATEGY

The subject requires both theory and practical emphasis simultaneously, so that the student can understand the practical significance of the various areas. Visits to instrumentation and communications industries must be carried out, so as to make the students can understand where and how the various instruments are used in the industry.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr.No.	Unit Name	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction	04	5
2	Amplitude Modulation	06	10
3	Frequency Modulation	06	10
4	Phase Modulation	06	10
5	Principles of AM Modulators	06	15
6	Demodulation of AM Waves	02	10
7	Principles of FM Modulators	06	10
8	Demodulation of FM Waves	04	10
9	Pulse Modulation	08	20
Total		48	100



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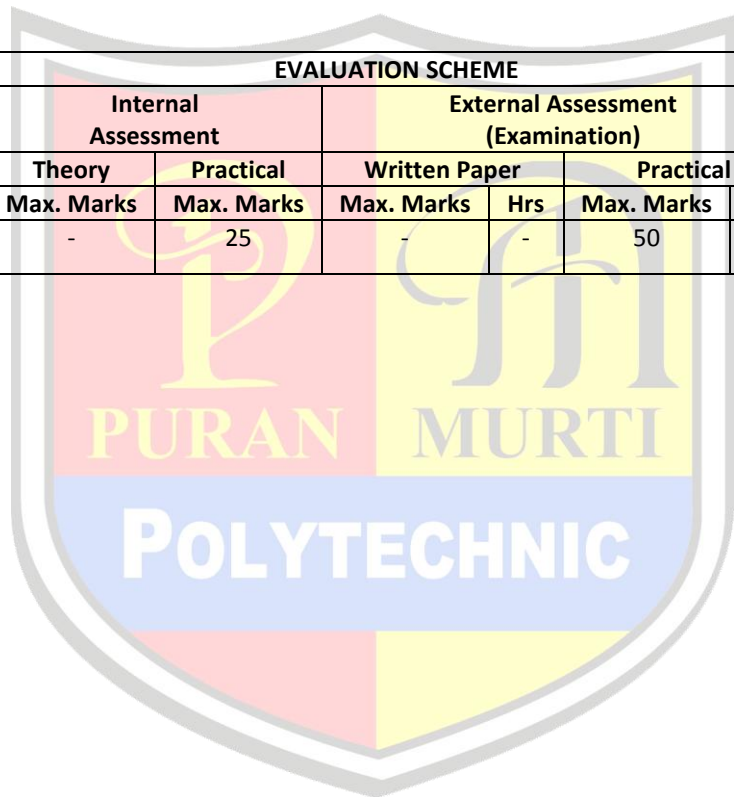
Subject: Principle of Communication Engineering (Practical)

Subject Code: 121033(P)

LIST OF PRACTICALS

- (1) To observe an AM wave on CRO produced by a standard signal generator.
- (2) To obtain an FM wave and measure the frequency deviation for different modulating signals.
- (3) To obtain demodulated modulating signal from an AM detector circuit.
- (4) To obtain demodulated signal from a FM detector.
- (5) To observe the sampled signal and compare it with the analog input signal. Note the effect of varying the Sampling pulse width and frequency on the sampled output.
- (6) To observe and note the pulse amplitude modulated signal (PAM) and compare them with the corresponding analog input signal.
- (7) To observe PPM signal and compare it with the analog input signal.
- (8) To observe PWM signal and compare it with the analog input signal.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	-	75





Detailed Content

Unit No.1 Algorithm and Program Development

- Topic No.1: Steps in development of a program
- Topic No.2: Flow-charts
- Topic No.3: Algorithm development
- Topic No.4: Approaches towards Programming
- Topic No.5: Introduction to various computer languages
- Topic No.6: Low level language: machine & assembly language
- Topic No.7: High level language (HLL)
- Topic No.8: Introduction to translators: Assembly, Compiler, Interpreter

Unit No.2 Fundamentals of C Programming

- Topic No.9: Overview of C: History of 'C' Features and Characteristics, Structure of C, Header files.
- Topic No.10: I/O Statements: input output statements, Assignment Statement
- Topic No.11: Variables, Constants, Data types, Operators & Expressions with their precedence
- Topic No.12: Standard Formatted and Unformatted I/O function
- Topic No.13: Control Structures: Decision and Loop statements
- Topic No.14: if-else, while, do-while, for loops
- Topic No.15: breaks, switch statements
- Topic No.16: Function: introduction of function, function declaration and definition
- Topic No.17: Parameter passing-call by value-call by reference, storage class specifier
- Topic No.18: Local and Global Variables, standard library function, recursion
- Topic No.19: Arrays: introduction to array, array declaration and initialization
- Topic No.20: Single and multi dimensional arrays, character arrays
- Topic No.21: Pointers: introduction to pointers, declaration and initialization
- Topic No.22: Address operators & pointers, to various data types
- Topic No.23: Pointers in parameters passing, pointers to function
- Topic No.24: Structures: Declaration & definition of a structure, pointer to structure
- Topic No.25: Union and array of structure, self referential structures
- Topic No.26: Strings: string processing, functions and standard library function
- Topic No.27: Data files: file handling and manipulation, file reading and writing
- Topic No.28: Binary and ASCII files
- Topic No.29: file records using standard function type mouse

Unit No.3 Software Application in Electronics Engineering

- Topic No.30: Computer application overview through various application software related to Electronics engineering branch viz: ORCAD
- Topic No.31: PSPICE, OPTSIM
- Topic No.32: KEIL, Circuit Maker
- Topic No.33: MATLAB, Electronic Workbench

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
2	-	4	25	-	100	3	-	-	125



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Recommended Books

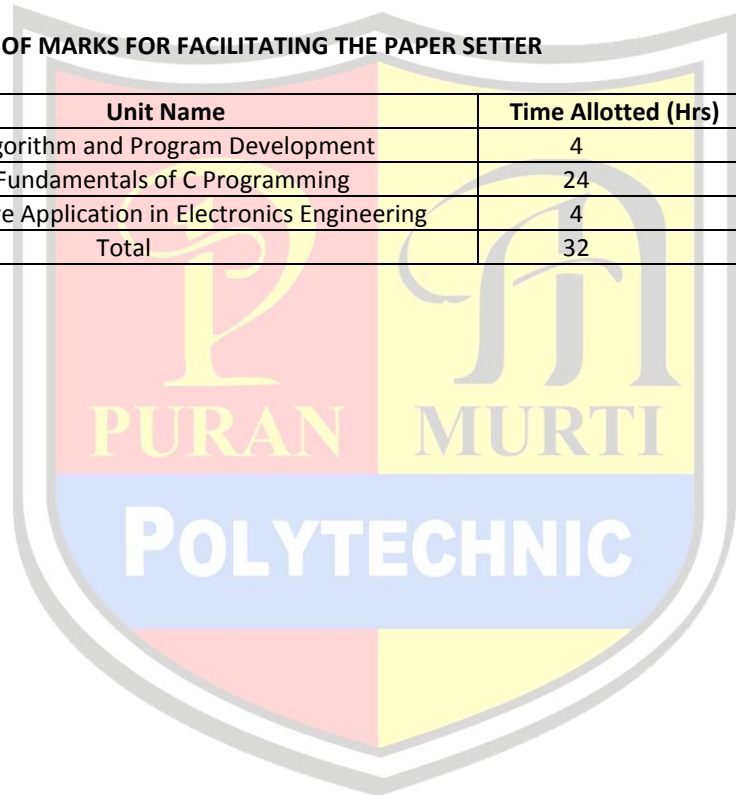
- (1) Programming in C by Balagurusamy, Tata McGraw Hill Education Pvt Ltd, New Delhi
- (2) Programming in C by Gottfried, Tata McGraw Hill Education Pvt Ltd, New Delh
- (3) Let us C- Yashwant Kanetkar, BPB Publications, New Delhi
- (4) Computer Programming and Applications by Preeti Chhabra, Ishan Publication.
- (5) Programming in C by R Subburaj, Vikas Publishhing House Pvt. Ltd., Jangpura, New Delhi
- (6) Programming in C by Kris A Jansa, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi
- (7) Programming in C by BP Mahapatra, Khanna Publishers, New Delhi
- (8) Pointers in C by Yashwant Kanetkar, BPB Publishers New Delhi
- (9) Programming in Applications by Chandershekhar, Unique International Publications, Jalandhar

INSTRUCTIONAL STRATEGY

This course is a highly practical and self- study oriented courses. The teachers are expected to explain the theoretical part and ensure that the students to execute and debug different programs. The PC needed to have Turbo C & MATLAB software.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr.No.	Unit Name	Time Allotted (Hrs)	Marks Allotted (%)
1	Algorithm and Program Development	4	15
2	Fundamentals of C Programming	24	70
3	Software Application in Electronics Engineering	4	15
	Total	32	100





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Subject: Computer Programming and Application (Practical)

Subject Code: 121034(P)

LIST OF PRACTICALS

- (1) Programming exercise on executing a C Programs.
- (2) Programming exercise on editing a C program.
- (3) Programming exercise on defining variables and assigning values to variables
- (4) Programming exercise on arithmetic and relation operators
- (5) Programming exercise on arithmetic expressions and their evaluation
- (6) Programming exercise on reading a character
- (7) Programming exercise on writing a character
- (8) Programming exercise on formatting input using print
- (9) Programming exercise on formatting output using scan
- (10) Programming exercise on simple IF statement
- (11) Programming exercise on IF... ELSE statement
- (12) Programming exercise on SWITCH statement
- (13) Programming exercise on GOTO statement
- (14) Programming exercise on DO-WHILE statement
- (15) Programming exercise on FOR statement
- (16) Programming exercise on one dimensional arrays
- (17) Programming exercise on two dimensional arrays
- (18) Demonstration of Application Software such as MATLAB, PSPICE, OPTSIM etc.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	4	-	25	-	-	50	3	75



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Subject: Electrical Machines (Theory)

Subject Code: 121035

Detailed Contents

Unit No.1 Three Phase Supply

Topic No.1: Advantages of 3 phase System over Single Phase System

Topic No.2: Star Delta Connections

Topic No.3: Relation between Phase Voltage and Line Voltage, Phase Current and Line Current in a 3 Phase System

Topic No.4: Power and Power Factor (p.f) in 3 Phase System and their Measurements, Importance of p.f

Unit No.2 Transformer

Topic No.5: Principle of Transformer, Construction

Topic No.6: Voltage and Current Transformation.

Topic No.7: Methods of Connection in 3 Phase Transformers

Topic No.8: Current and Voltage Relationship

Topic No.9: Auto Transformer and its Uses

Topic No.10: Instrument Transformer

Topic No.11: Voltage Regulation and its Significance

Topic No.12: Need for Isolation,

Topic No.13: Electrical and Transients Suppression

Topic No. 14: Principles of isolation Transformer

Topic No. 15: Specifications of all types of Transformers, Losses in a Transformer

Unit No.3 DC Motor

Topic No.16: Principle, Significance of Back emf

Topic No.17: Types of Motors and their Construction

Topic No.18: Motor Characteristics for Shunt and series

Topic No.19: Speed Control of DC Motors and Factors Controlling the Speed

Topic No.20: Starting Methods

Topic No.21: Construction and Working of 3 point Starter, 25 Applications (simple problems)

Unit No.4 Three Phase Induction Motors

Topic No.22: Principle and Construction

Topic No.23: Concept of Slip, Torque and Characteristics

Topic No.24: Effect of Motor Resistance on Torque (running and starting)

Topic No.25: Rotor Current and Output Power

Topic No.26: Different Methods of Speed Control, Starting Methods

Topic No.27: Construction and Working of 3 point Starter, Applications (simple problems)

Unit No.5 Synchronous Motors

Topic No.28: Principle, Construction and Working,

Topic No.29: Effect of Load and Excitation on Synchronous Motor

Topic No.30: Starting of Motor and their Applications

Unit No. 6 Single Phase Motors

Topic No.31: Principle, Construction and Working

Topic No.32: Speed Control

Topic No.33: Starting, Applications of following motors:

a) Induction motor

b) Universal motor

Unit No. 7 Stepper Motor and Servo Motor

Topic No.34: Types, Construction and Working and Their applications



STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125

RECOMMENDED BOOKS

- 1) Electrical Machine by SK Bhattacharya, Tata McGraw Hill Education Pvt Ltd, New Delhi
- 2) Electrical Machines by Nagrath and Kothari, Tata McGraw Hill Education Pvt Ltd, New Delhi
- 3) Experiments in Basic Electrical Engineering: by S.K. Bhattacharya, KM Rastogi: New Age International (P) Ltd. Publishers, New Delhi
- 4) Electrical Machines by SK Sahdev, Uneek Publications, Jalandhar
- 5) Electrical Engineering by JB Gupta, SK Kataria & Sons, New Delhi
- 6) Electrical Machines by DR Arora, Ishan Publications, Ambala City.
- 7) Electrical Technology Vol. - I and II B.L. Thareja, S Chand and Co. New Delhi

INSTRUCTIONAL STRATEGY

For conceptual understanding a field/industrial visit (preferably Transformer Factory) may be organized to give live exposure to students. For this the teacher should visit first to understand the assembly line-up which could be followed by a visit of the students, where the teacher can give an idea of the working of the factory without much seeking assistance of the factory staff. In addition, emphasis may be given on field applications and simple numerical problems.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr.No.	Unit Name	Time Allotted (Hrs)	Marks Allotted (%)
1	Three Phase Supply	6	12
2	Transformer	8	20
3	DC Motor	8	15
4	Three Phase Induction Motors	8	20
5	Synchronous Motors	6	10
6	Single Phase Motors	6	13
7	Stepper Motor and Servo Motor	6	10
Total		48	100



LIST OF PRACTICALS

1. DC machines
 - 1.1 Speed control of dc shunt motor (i) Armature control method (ii) Field control method
 - 1.2 Study of dc series motor with starter (to operate the motor on no load for a moment)
2. Transformers (single phase) Open circuit and short circuit test for determining parameter of a transformer
3. Determining the regulation and efficiency from the data obtained from open circuit and short circuit test
4. Three-phase transformers Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations
5. To measure power and power factors in 3 - phase load using two wattmeter method.
6. To connect a dc shunt motor with supply through 3 - phase starter and to run the motor at different speed with the help of a field regulator.
7. To run a 3 - phase squirrel cage Induction motor with the help of a star delta starter.
8. To change the direction of rotation of induction motor.
9. To run a synchronous motor with a.c. supply and to measure speed to verify the relation

$$N = \frac{120f}{P}$$

STUDY SCHEME		EVALUATION SCHEME							Total Marks
		Internal Assessment		External Assessment (Examination)					
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	3	-	25	-	-	50	3	75



Detailed Content

Unit No.1 Basics of Measurements

- Topic No.1: Measurement
- Topic No.2: Methods of measurement
- Topic No.3: Types of instruments
- Topic No.4: Specifications of instruments: Accuracy, precision, sensitivity, resolution, range Errors
- Topic No.5: Sources of errors, limiting errors,
- Topic No.6: Loading effect, Importance and applications

Unit No.2 Voltage, Current and Resistance Measurement

- Topic No.7: Principles of operation and construction of permanent magnet moving coil (PMMC)
- Topic.No.8: Moving iron type instruments, measurement of D.C voltage and current
- Topic No.9: Block diagram Working principle, application and comparison of Analog and digital Multimeter.
- Topic No.10: Specifications of multimeter and its applications
- Topic No.11: Limitations with regard to frequency and input impedance

Unit No.3 Cathode Ray Oscilloscope

- Topic No.12: Construction and working of Cathode Ray Tube(CRT)
- Topic No.13: Time base operation and need for blanking during flyback, synchronization
- Topic No.14: Block diagram, description of a basic CRO triggered ,sweep oscilloscope, panel controls.
- Topic No.15: Specifications of CRO and their explanation
- Topic No.16: Measurement of voltage, current, frequency, time period and phase using CRO
- Topic No.17: CRO probes, special features of dual beam, dual trace, delay sweep
- Topic No.18: DSO: block diagram and working principle

Unit No.4 Signal Generators and Analytical Instruments

- Topic No.19: Explanation of block diagram specifications of low frequency and RF generators
- Topic No.20: Pulse generator, Function generator

Unit No.5 Impedance Bridges and Q Meters

- Topic No.21: Wheat stone bridge
- Topic No.22: AC bridges: Maxwell's induction bridge, Hay's bridge,
- Topic No.23: De-Sauty's bridge, Schering bridge and Anderson bridge
- Topic No.24: Block diagram description of laboratory type RLC Bridge, specifications of RLC Bridge
- Topic No.25: Block diagram and working principle of Q-meter

Unit No.6 Digital Instruments

- Topic No.26: Comparison of analog and digital instruments Topic No.28: Working principle of ramp, dual slope and integration type digital voltmeter
- Topic No.27: Measurement of time interval, time period and Frequency using Universal counter/frequency counter
- Topic No.28: Working principle of logic probe, logic pulser, logic analyzer, logic comparator, signature analyzer

STUDY SCHEME		EVALUATION SCHEME							Total Marks
		Internal Assessment			External Assessment (Examination)				
Hrs/week		Theory	Practical	Written Paper		Practical			
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125



PM POLYTECHNIC

A Unit of Puran Murti Educational Society
Approved by AICTE, Ministry of HRD, Govt. of India,
Affiliated to State Board of Technical Education, Panchkula, Haryana

LIST OF RECOMMENDED BOOKS

- (1) Electronics Measurement and Instrumentation by AK Sawhney, Dhanpat Rai and Sons, New Delhi
- (2) Electronics Measurement and Instrumentation by Oliver, Tata McGraw Hill Education Pvt Ltd, New Delhi
- (3) Electronics Instrumentation by Cooper, Prentice Hall of India, New Delhi
- (4) Electronics Test and Instrumentation by Yashpal and Sanjeev Kumar, North Publications, Jalandhar
- (5) Electronics Instrumentation by JB Gupta, Satya Prakashan, New Delhi

INSTRUCTIONAL STRATEGY

The subject requires both theory and practical emphasis simultaneously, so that the student can understand the practical significance of the various areas. Visits to instrumentation and communications industries must be carried out, so as to make the students can understand where and how the various instruments are used in the industry.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING

Sr. No.	Unit Name	Time Allotted(Hrs)	Marks Allocation%
1.	Basics of Measurements	04	5
2.	Voltage, Current and Resistance Measurement	12	20
3.	Cathode Ray Oscilloscope	10	20
4.	Signal Generators and Analysis Instruments	06	15
5.	Impedance Bridges and Q Meters	10	20
6.	Digital Instruments	06	20
	Total	48	100



PM POLYTECHNIC

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Affiliated to State Board of Technical Education, Panchkula, Haryana

Subject: Electronic Instruments & Measurement (Practical)

Subject Code: 121036(P)

LIST OF PRACTICALS

1. Measurement of voltage, resistance, frequency, using digital multimeter
2. Measurement of voltage, frequency, time period and phase using CRO
3. Measurement of voltage, frequency, time and phase using DSO
4. Interfacing of DSO with printer.
5. Measurement of rise time and fall time using DSO
6. Measurement of Q of a coil and its dependence on frequency
7. Measurement of resistance and inductance of coil using RLC Bridge
8. Use of logic pulser and logic probe
9. Measurement of time period, frequency, average period using universal counter/ frequency counter
10. Measurement of Impedance using Maxwell Induction Bridge
11. To find the value of unknown resistance using Wheat Stone Bridge

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks		Hrs
-	-	3	-	25	-	-	50	3	75

