



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

**SCHEME FOR
FIFTH SEMESTER (ELECTRICAL ENGINEERING)**

Sr. No.	Subject	Study Scheme			EVALUATION SCHEME						Total Marks
					INTERNAL ASSESSMENT		EXTERNAL ASSESMENT (EXAMINATION)				
					Theory	Practical	Written Paper		Practical		
					Max. Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	
Hrs/Week		L	T	P							
L	T				P						
	Industrial Training	-	-	-	-	50	-	-	50	-	100
5.1*	Employability Skills-I	-	-	2	-	25	-	-	50	3	75
5.2	Electrical Machines-II	4	-	3	25	25	100	3	50	3	200
5.3	Electrical Power-I	4	-	-	25	-	100	3	-	-	125
5.4**	Industrial Electronics and Control of Drives	4	-	3	25	25	100	3	50	3	200
5.5	Digital Electronics and Microprocessors	5	-	3	25	25	100	3	50	3	200
5.6	Minor Project Work	-	-	3	-	50	-	-	50	3	100
5.7	Environmental Education	3	-	-	25	-	100	3	-	-	125
	# Student Centered Activities including Entrepreneurial Awareness Camp	-	-	6	-	25	-	-	-	-	25
	Total	20	-	20	125	225	500	-	300	-	1150

* Common with other diploma programmes

** Common with diploma programme in Power Station Engineering

+ Includes 25 marks for Viva-voce

Student Centered 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 Defense/Disaster Management activities etc.



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SYLLABUS: Polytechnic (EE)

Department: Electrical Engineering – 5th Semester

Subject: Employability Skills – I (Practical)

Subject Code: Emp. Skill (P)

Detailed Contents

Unit No 1 Writing skills

- Topic No.1: Official and business correspondence
- Topic No.2: Job application - covering letter and resume
- Topic No.3: Report writing - key features and kinds

Unit No. 2 Oral Communication Skills

- Topic No.4: Giving advice
- Topic No.5: Making comparisons
- Topic No.6: Agreeing and disagreeing
- Topic No.7: Taking turns in conversation
- Topic No.8: Fixing and cancelling appointments

Unit No. 3 Generic Skills

- Topic No.9: Stress management
- Topic No.10: Time management
- Topic No.11: Negotiations and conflict resolution
- Topic No.12: Team work and leadership qualities

STUDY SCHEME	EVALUATION SCHEME								Total Marks
	Internal Assessment			External Assessment (Examination)					
	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 Synchronous Machines

- Topic No.1: Main constructional features of synchronous machine including commutator and Brushless excitation system
- Topic No.2: Generation of three phase emf
- Topic No.3: Production of rotating magnetic field in a three phase winding
- Topic No.4: Concept of distribution factor and coil span factor and emf equation, Armature reaction at unity, lag and lead power factor
- Topic No.5: Operation of single synchronous machine independently supplying a load – Voltage regulation by synchronous impedance method
- Topic No.6: Need and necessary conditions of parallel operation of alternators synchronizing an alternator (Synchroscope method) with the bus bars
- Topic No.7: Operation of synchronous machine as a motor –its starting methods
- Topic No.8: Effect of change in excitation of a synchronous motor
- Topic No.9: Concept and Cause of hunting and its prevention
- Topic No.10: Rating and cooling of synchronous machines
- Topic No.11: Applications of synchronous m/c (as an alternator, as a synchronous condenser)

Unit No.2 Induction Motors

- Topic No.12: Salient constructional features of squirrel cage and slip ring 3-phase induction motors
- Topic No.13: Principle of operation, slip and its significance
- Topic No.14: Locking of rotor and stator fields
- Topic No.15: Rotor resistance, inductance, emf and current
- Topic No.16: Relationship between copper loss and the motor slip
- Topic No.17: Power flow diagram of an induction motor
- Topic No.18: Factors determining the torque
- Topic No.19: Torque-slip curve, stable and unstable zones
- Topic No.20: Effect of rotor resistance upon the torque slips relationship
- Topic No.21: Double cage rotor motor and its applications
- Topic No.22: Starting of 3-phase induction motors, DOL, star-delta, auto transformer
- Topic No.23: Causes of low power factor of induction motors
- Topic No.24: Testing of 3-phase motor on no load and blocked rotor test and to find efficiency
- Topic No.25: Speed control of induction motor
- Topic No.26: Harmonics and its effects, cogging and crawling in Induction Motors.

Unit No.3 Fractional Kilo Watt (FKW) Motors

- Topic No.27: Single phase induction motors; Construction characteristics and applications
- Topic No.28: Nature of field produced in single phase induction motor
- Topic No.29: Split phase induction motor
 - 29.1: Capacitors start and run motor
 - 29.2: Shaded pole motor
 - 29.3: Reluctance start motor
- Topic No.30: Alternating current series motor and universal motors
- Topic No.31: Single phase synchronous motor
 - 31.1: Reluctance motor
 - 31.2: Hysteresis motor

Unit No.4 Special Purpose Machines

- Topic No.32: Construction and working principle of linear induction motor
- Topic No.33: Stepper motor
- Topic No.34: Servomotor,
- Topic No.35: Submersible motor



Topic No.36: Introduction to energy efficient motors.

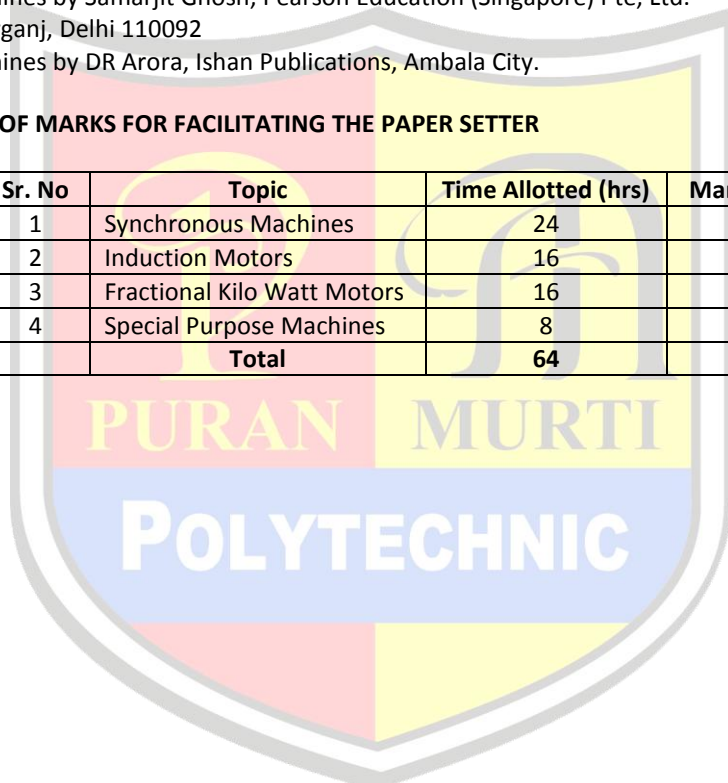
STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
4	-	-	25	-	100	3	-	-	125

RECOMMENDED BOOKS

1. Electrical Machines by SK Bhattacharya, Tata Mc Graw Hill, New Delhi
2. Electrical Machines by SK Sahdev, Uniek Publications, Jalandhar
3. Electrical Machines by Nagrath and Kothari, Tata Mc Graw Hill, New Delhi
4. Electrical Engineering by JB Gupta, SK Kataria and sons, New Delhi
5. Electrical Machines by Samarjit Ghosh, Pearson Education (Singapore) Pte, Ltd.
6. 482, FIE Patparganj, Delhi 110092
7. Electrical Machines by DR Arora, Ishan Publications, Ambala City.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No	Topic	Time Allotted (hrs)	Marks Allocation (%)
1	Synchronous Machines	24	40
2	Induction Motors	16	25
3	Fractional Kilo Watt Motors	16	25
4	Special Purpose Machines	8	10
	Total	64	100





Subject: Electrical Machine- II (Practical)

Subject Code: 120951(P)

LIST OF PRACTICALS

1. Demonstration of revolving field set up by a 3-phase wound stator
2. To plot relationship between no load terminal voltage and excitation current in a synchronous generator at constant speed
3. Determination of the relationship between the voltage and load current of an alternator, keeping excitation and speed constant
4. Determination of the regulation and efficiency of alternator from the open circuit and short circuit test
5. Synchronization of poly phase alternators and load sharing
6. Determination of the effect of variation of excitation on performance of a synchronous motor
7. Study of ISI/BIS code for 3-phase induction motors
8. Perform at least two tests on a 3- phase induction motor as per BIS code
9. Determination of efficiency by (a) no load test and blocked rotor test on an induction motor (b) direct loading of an induction motor (refer BIS code)
10. Determination of effect of rotor resistance on torque speed curve of an induction motor
11. To study the effect of a capacitor on the starting and running of a single-phase induction motor by changing value of capacitor and also to reverse the direction of rotation of a single phase induction motor

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 Contents

Unit No.1 Introduction to Electrical Measuring Instruments

- Topic No.1: Main resources of energy
- Topic No.2: Conventional and non-conventional sources of Energy
- Topic No.3: Thermal power station -Flow diagrams and brief details of their operation
- Topic No.4: Hydro power station -Flow diagrams and brief details of their operation
- Topic No.5: Gas turbine power station-Flow diagrams and brief details of their operation
- Topic No.6: Diesel power station -Flow diagrams and brief details of their operation
- Topic No.7: Nuclear power station -Flow diagrams and brief details of their operation
- Topic No.8: Comparison of the generating stations on the basis of running cost, site, starting, maintenance etc.
- Topic No.9: Importance of non-conventional sources of energy in the present scenario
- Topic No.10: Brief details of solar energy, bio-energy, wind energy

Unit No.2 Economics of Generation

- Topic No.11: Fixed and running cost, load estimation, load curves, demand factor, load factor, diversity factor, power factor and their effect on cost of generation
- Topic No.12: Base load and peak load power stations
- Topic No.13: Inter-connection of power stations and its advantages
- Topic No.14: Concept of regional and national grid

Unit No.3 Transmission Systems

- Topic No.15: Layout of transmission system,
- Topic No.16: Selection of voltage for H.T and L.T lines
- Topic No.17: Advantages of high voltage for Transmission of power in both AC and DC
- Topic No.18: Comparison of different systems: AC versus DC for power transmission
- Topic No.19: Comparison of conductor material
- Topic No.20: Constructional features of transmission lines:

Unit No.4 Miscellaneous Measuring Instruments

- Topic No.21: Types of supports, types of insulators, Types of conductors
- Topic No.22: Selection of insulators, conductors, earth wire and their accessories
- Topic No.23: Transposition of conductors and string efficiency of suspension type insulators
- Topic No.24: Bundle Conductors
- Topic No.25: Mechanical features of line: Importance of sag
- Topic No.26: Calculation of sag, effects of wind
- Topic No.27: Indian electricity rules pertaining to clearance
- Topic No.28: Electrical features of line: Calculation of resistance, inductance and capacitance
- Topic No.29: voltage regulation, and concept of corona
- Topic No.30: Effects of corona and remedial measures
- Topic No.31: Transmission Losses

Unit No.5 Distribution System

- Topic No.32: Layout of HT and LT distribution system, constructional feature of distribution lines and their erection.
- Topic No.33: LT feeders and service mains
- Topic No.34: AC radial distribution system, determination of size of conductor
- Topic No.35: Preparation of estimates of HT and LT lines (OH and Cables)
- Topic No.36: Constructional features of LT (400 V), HT (11 kV) underground cables
- Topic No.37: Advantages and disadvantages of underground system with respect to overhead system
- Topic No.38: Calculation of losses in distribution system
- Topic No.39: Faults in underground cables-determine fault location by Murray Loop Test, Varley Loop Test

Unit No.6 Substations

- Topic No.40: Brief idea about substations; outdoor grid substation 220/132 KV
- Topic No.41: 66/33 KV outdoor substations



- Topic No.42: Pole mounted substations and indoor substation
Topic No.43: Layout of 33/11andkV/400V distribution substation
Topic No.44: various auxiliaries and equipment associated with it

Unit No.6 Power Factor

- Topic No.45: Concept of power factor
Topic No.46: Reasons and disadvantages of low power factor
Topic No.47: Methods for improvement of power factor using capacitor banks, VAR Static Compensator (SVC)

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

RECOMMENDED BOOKS

1. Electrical Power System and Analysis by CL Wadhwa, 3rd edition, New Age International Publishers, New Delhi
2. Substation Design and Equipment by Satnam and PV Gupta, Dhanpat Rai & Sons, New Delhi
3. Electrical Power –I by SK Sahdev, Uneek Publications, Jalandhar
4. Electrical Power System by VK Mehta, S Chand and Co., New Delhi
5. Electrical Power System by JB Gupta, SK Kataria and Sons, New Delhi
6. Sub-Station Design by Satnam, Dhanpat Rai and Co., New Delhi
7. Electrical Power Distribution System by AS Pabla, Tata McGraw Hill, New Delhi
8. Electrical Power System by S Channi Singh, Tata McGraw Publishing Co. New Delhi

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No	Topic	Time Allotted (hrs)	Marks Allocation (%)
1	Power Generation	10	15
2	Economics of Generation	8	10
3	Transmission Systems	20	35
4	Distribution System	14	20
5	Substations	8	10
6	Power Factor	4	10
	Total	64	100



Detailed Contents

Unit No.1 Number Systems

- Topic no.1: Decimal number systems, Binary number systems, octal number systems
- Topic no. 2: Hexa-Decimal BCD and ASCII code number systems, Their Inter-conversion, Binary addition
- Topic no. 3: Hexadecimal addition, Subtraction and multiplication
- Topic no. 4: Topic no. 9:1's and 2's complement methods of Addition
- Topic no. 5:1's and 2's complement methods of Subtraction

Unit No.2 Gates

- Topic no. 6: Definition of Gate, symbol and truth tables for inverter gate, OR gate
- Topic no. 7: AND gate, NAND Gate, NOR and X-OR exclusive-And Gates

Unit No.3 Boolean algebra

- Topic no. 8: Boolean relations and their applications, DeMorgan's theorems, K-Map upto four Variables

Unit No.4 Combinational Circuits

- Topic no. 10: Half Adder, Full adder, Encoder, Decoder, Multiplexer, Demultiplexer
- Topic no. 11: LED display devices, LCD display devices, 7- segment display devices

Unit No.5 Flip Flops

- Topic no. 12: J-K flip Flop, R-S flip Flop, D- Type flip Flop, T-Type flip Flop, Applications of flip Flop

Unit No.6 Introduction of Shift Registers and Counter

- Topic no. 13: Shift Registers, Counters

Unit No.7 A/D and D/A converters

- Topic no. 14: Counter ramp Method of A/D Conversion, Successive approximation Method of A/D Conversion
- Topic no. 15: Binary weighted D/A Convertors, R-2R D/A convertors

Unit No.8 Semi- Conductors Memories

- Topic no. 16: Types of Semi- Conductors Memories, Merits of Semi- Conductors Memories
- Topic no. 17: Demerits of Semi- Conductors Memories, Applications of Semi- Conductors Memories

Unit No.9 Microprocessor

- Topic no. 18: study of 8085 Microprocessor Architecture
- Topic no. 19: Pin configuration, BUS organization, Registers flags, interrupts
- Topic no. 20: Instruction set of 8085 Microprocessor, Addressing Modes, and Instruction Modes
- Topic no. 21: Writing some Simple Assembly language programmes including debugging
- Topic no. 22: Use of stacks and Sub-routines in programming
- Topic no. 23: Interfacing and data transfer between peripherals
- Topic no. 24: I/O and Microprocessor, Study of Peripheral Chip 8251, Study of Peripheral Chip 8155
- Topic no. 25: Study of Peripheral Chip 8055, Study of Peripheral Chip 8257, Study of Peripheral Chip 8259
- Topic no. 26: Introduction of 16-bit Microprocessor, Introduction of 32-bit Microprocessor
- Topic no. 27: Their advantages over 8-bit microprocessor

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



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SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No	Topic	Time Allotted (hrs)	Marks Allocation (%)
1	Number Systems	8	10
2	Gates	6	7
3	Boolean Algebra	8	10
4	Combinational Circuits	8	10
5	Flip-Flops	8	10
6	Shift Registers and Counters	6	8
7	A/D and D/A Converters	6	7
8	Semi-conductor Memories	6	8
9	Microprocessor	24	30
	Total	80	100

RECOMMENDED BOOKS

1. Modern Digital Electronics by RP Jain, Tata McGraw Hill, Education Pvt. Ltd. New Delhi
2. Digital Principles and Electronics by Malvino and Leach, Tata McGraw Hill, New Delhi
3. Digital Electronics by SN Ali
4. Digital Electronics by Rajive Sapra, Eshan Publications, Ambala City
1. Digital Fundamentals by Floyd and Jain, Pearsons Education (Singapore) Pte Ltd Patparganj, Delhi 110092
5. Digital Electronics by Jamwal, Dhanpat Rai and Co. New Delhi
6. Microprocessors Architecture, Programming and Application with 8085/8080A, Ramesh S Gaonkar, Wiley Eastern Ltd. New Delhi
7. Introduction to Micro processors by Aditya Mathur, TMH Publishing Co., New Delhi
8. Microprocessors and Microcontrollers by BP Singh, Galgotia Publications, New Delhi
9. Digital Systems by Sanjay K Bose, Wiley Eastern(P) Ltd. New Delhi
10. Digital Systems : principles and Applications by RJ Tocci, Prentice Hall of India, New Delhi
11. Digital Integrated Circuits by AK Gautam, SK Kataria and Sons, New Delhi
12. Microprocessors(The 8086 and 8088) by AK Gautam and A Jaiswal; SK Kataria and Sons, New Delhi

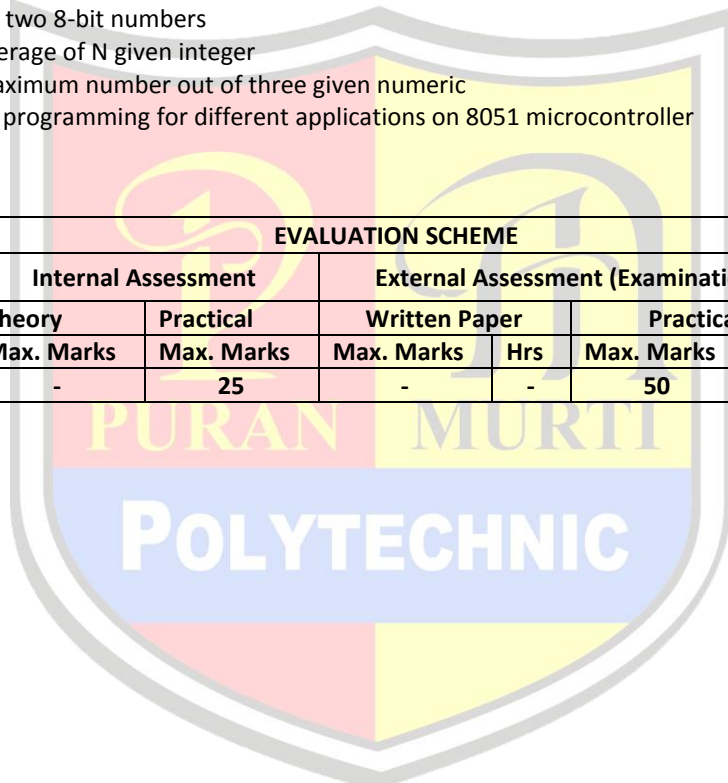


Detailed Contents

LIST OF PRACTICALS

1. Verification and interpretation of truth table for AND, OR, NOT, NAND, NOR, X-OR gates
2. Construction of Half Adder/Full Adder using gates
3. To verify the truth table for R-S and JK flip flop
4. Construction and testing of any counter
5. Verification of operation of a 8-bit D/A Converter
6. Writing assembly language program using numemoanics and test them on P Ki (any three)
 - a. Addition of two 8-bit numbers
 - b. Subtraction of two 8-bit numbers
 - c. Multiplication of two 8-bit numbers
 - d. Division of two 8-bit numbers
 - e. Finding average of N given integer
 - f. Finding maximum number out of three given numeric
7. Assembly language programming for different applications on 8051 microcontroller

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 Contents

Unit No.1 Environmental Education

- Topic No.1: Definition
- Topic No.2: Scope and Importance of Environmental Education

Unit No.2 Eco system

- Topic No.3: Basics of ecology
- Topic No.4: Biodiversity
- Topic No.5: Eco system
- Topic No.6: Sustainable development

Unit No.3 Sources of pollution

- Topic No.7: Natural and manmade causes
- Topic No.8: Effects of pollution
- Topic No.9: Control measures of pollution
- Topic No.10: Units of measurement

Unit No.4 Solid waste management

- Topic No.11: Causes of urban and industrial waste
- Topic No.12: Effects of urban and industrial waste
- Topic No.13: Control measures of urban and industrial waste

Unit No.5 Mining and deforestation

- Topic No.14: Causes
- Topic No.15: Effects
- Topic No.16: Control measures

Unit No.6 Environmental Legislation

- Topic No.17: Water (prevention and control of pollution) Act 1974
- Topic No.18: Air (Prevention and Control of Pollution) Act 1981
- Topic No.19: Environmental Protection Act 1986
- Topic No.20: Role and Function of State Pollution Control Board
- Topic No.21: Environmental Impact Assessment (EIA)

Unit No.7 Non-conventional Energy Resources

- Topic No.22: Solar Energy
- Topic No.23: Wind Energy
- Topic No.24: Bio Energy
- Topic No.25: Hydro Energy

Unit No.8 Current Issues in Environmental Pollution

- Topic No.26: Global Warming, Green House Effect, Depletion of Ozone Layer, Recycling of Material
- Topic No.27: Environmental Ethics, Rain Water Harvesting, Maintenance of Groundwater
- Topic No.28: Acid Rain, Carbon Credits

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



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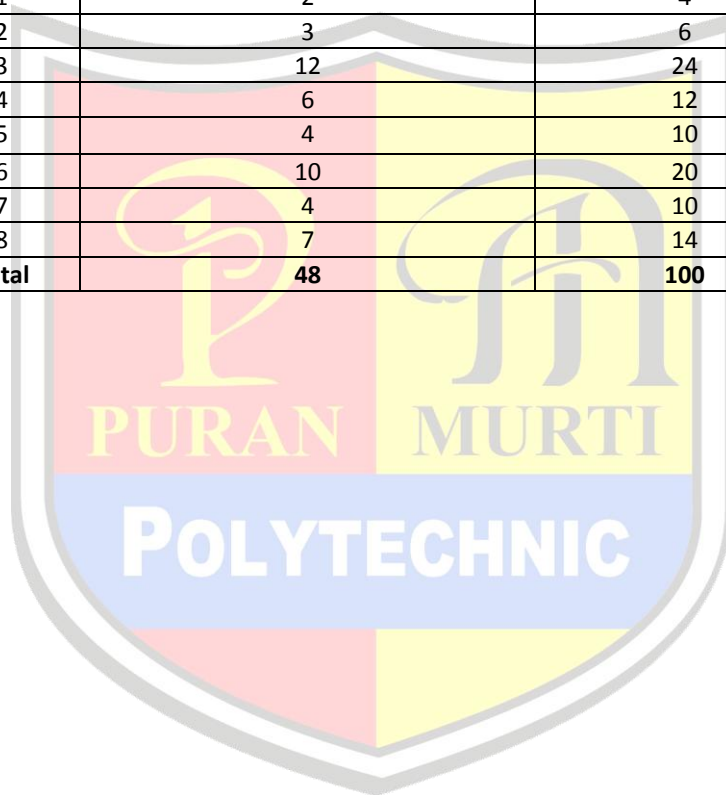
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RECOMMENDED BOOKS

1. Environmental Engineering and Management by Suresh K Dhameja; SK Kataria and Sons, NewDelhi.
2. Environmental Science by Dr. Suresh K Dhameja; SK Kataria and Sons, New Delhi.
3. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
4. Environmental Protection Law and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
5. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.
6. Engineering Chemistry by Jain and Jain; Dhanpat Rai and Co. (P) Ltd. Delhi.
7. Environmental Studies by Erach Bharucha; UGC University Press.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for Lectures (Periods)	Marks Allotted (%)
1	2	4
2	3	6
3	12	24
4	6	12
5	4	10
6	10	20
7	4	10
8	7	14
Total	48	100





Detailed Contents

Unit No.1 Introduction to SCR

- Topic No.1: Construction and working principles of an SCR, two transistor analogy and characteristics of SCR
- Topic No.2: SCR specifications and rating
- Topic No.3: Construction, working principles and V-I characteristics of DIAC, TRIAC and Quadriac
- Topic No.4: Basic idea about the selection of heat sinks for SCR and TRIACS
- Topic No.5: Methods of triggering a Thyristor. Study of triggering circuits
- Topic No.6: UJT, its Construction, working principles and V-I characteristics, UJT relaxation oscillator
- Topic No.7: Commutation of Thyristors (Concept)
- Topic No.8: Series and parallel operation of Thyristors
- Topic No.9: Applications of SCR, TRIACS and Quadriac such as light intensity control,
- Topic No.10: speed control of DC and universal motor, fan regulator, battery charger etc.
- Topic No.11: dv/dt and di/dt protection of SCR.

Unit No.2 Controlled Rectifiers

- Topic No.12: Single phase half wave controlled rectifier with resistive load and inductive load, concept of freewheeling diode.
- Topic No.13: Single phase half controlled full wave rectifier (No mathematical derivation)
- Topic No.14: Single phase fully controlled full wave rectifier bridge (Workshops only)
- Topic No.15: Single phase full wave centre tapped rectifier (Workshops only)
- Topic No.16: Three phase full wave half controlled bridge rectifier (Workshops only)
- Topic No.17: Three phase full wave fully controlled bridge rectifier (Workshops only)

Unit No.3 Inverters, Choppers, Dual Converters and Cyclo Converters

- Topic No.18: Inverter-introduction, working principles, voltage and current driven series and parallel inverters and applications
- Topic No.19: Choppers-introduction, types of choppers and their working principles and applications
- Topic No.20: Dual converters-introduction, working principles and applications
- Topic No.21: Cyclo-converters- introduction, types, working principles and applications

Unit No.4 Thyristor Control of Electric Drives

- Topic No.22: DC drives control (Basic Concept), Half wave drives, Full wave drives, Chopper drives, Slip control AC drives
- Topic No.23: AC drives control, Phase control, Variable frequency a.c. drives, Constant V/F application
- Topic No.24: Voltage controlled inverter drives, Constant current inverter drives, Cyclo convertors controlled AC drives

Unit No.5 Uninterrupted Power Supplies

- Topic No.25: UPS, Stabilizers, SMPS, UPS online, off line, Storage devices (batteries) and their maintenance

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

BOOKS RECOMMENDED

1. Industrial Control Electronics. John Webb, Kevin Greshock, Maxwell, Macmillan International editions.
2. Fundamentals of Power Electronics by S Rama Reddi, Narosa Publishing House Pvt. Ltd, New Delhi
3. Power Electronics, Circuits Devices and Applications by Mohammad H. Rashid
4. Power Electronics by PC Sen
5. Power Electronics by Dr. PS Bhimbra, Khanna Publishers, New Delhi



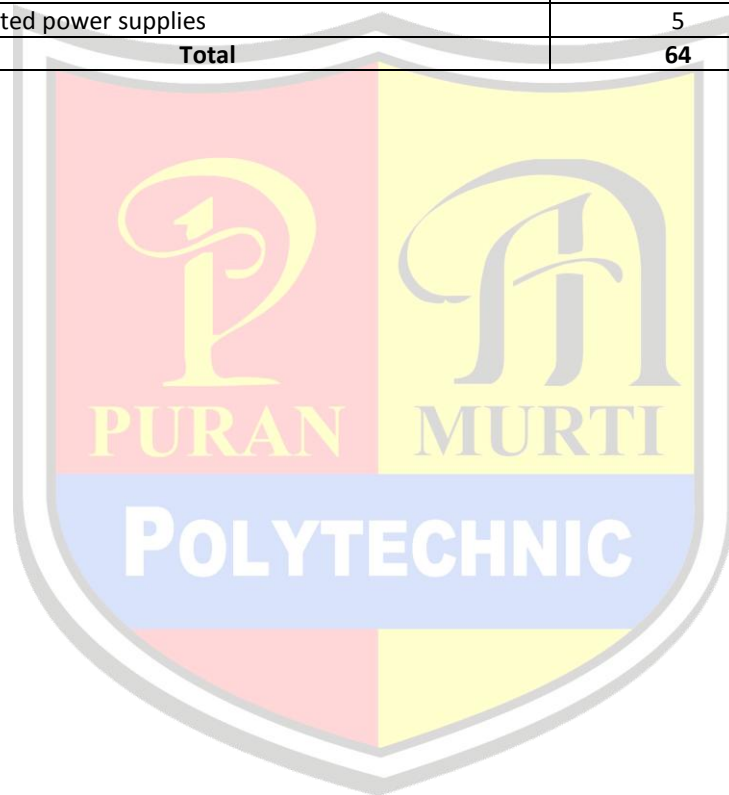
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6. Industrial Electronics & Control by SK Bhattacharya & S Chatterji, New Age international Publications(P) Ltd, New Delhi
8. Industrial Electronics and Control of Drives by SK Sahdev, Uneek Publication, Jalandhar
9. Industrial Power Electronics by JC Karhava, King India Publication,
10. Fundamentals of Electrical Drives by Gopal K Dubey, Narosa Publishing House Pvt. Ltd, New Delhi
11. Power Electronics and Controls by Samir K Datta, Prentice Hall of India, New Delhi

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No	Topic	Time Allotted (hrs)	Marks Allocation (%)
1	Introduction of SCR	16	25
2	Controlled Rectifiers	10	15
3	Inverters, Choppers, Dual Converters and cyclo converters	18	30
4	Thyristor Control of Electric Drives	15	20
5	Uninterrupted power supplies	5	10
	Total	64	100





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

Subject: Industrial Electronics and Control of Drives (Practical)

Subject Code: 120953(P)

LIST OF PRACTICALS

1. To draw V-I characteristics of an SCR
2. To draw V-I characteristics of a TRIAC
3. To draw V-I characteristics of a DIAC
4. To draw uni-junction transistor characteristics
5. Observe the output wave of an UJT relaxation oscillator
6. Observe the wave shape across SCR and load of an illumination control circuit
7. Fan speed regulator using TRIAC Quadriac (fabrication of this circuit)
8. Speed-control of a DC shunt motor or universal motor
9. To observe the output wave shape on CRO of a Single phase half controlled full wave rectifier
10. Single phase controlled rectifier
11. Use of Variable Frequency Drive for running a 3 phase Induction motor

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

