

ACADEMIC LESSON PLAN OF WINTER -2024

Discipline: Electrical	Semester: 5 th (SEC A)	Name of the Teaching Faculty: Smt. SUNITA ORAM
Subject: PE&PLC	No. of days/per week class allotted:4p/week	Semester From: 1 st JULY 2024 to 8 th Nov 2024 No. of weeks:19 weeks
Week	Class Day	Theory Topics
1 st	1 st	1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES 1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT (CONTD.)
	2 nd	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT
	3 rd	1.2 Two transistor analogy of SCR.
	4 th	1.3 Gate characteristics of SCR.
2 nd	1 st	1.4 Switching characteristic of SCR during turn on and turn off. (CONTD.)
	2 nd	1.4 Switching characteristic of SCR during turn on and turn off.
	3 rd	1.5 Turn on methods of SCR.
	4 th	1.6 Turn off methods of SCR (Line commutation and Forced commutation) 1.6.1 Load Commutation
3 rd	1 st	1.6.2 Resonant pulse commutation
	2 nd	1.7 Voltage and Current ratings of SCR.
	3 rd	1.8 Protection of SCR 1.8.1 Over voltage protection
	4 th	1.8.2 Over current protection 1.8.3 Gate protection
4 th	1 st	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit
	2 nd	1.9.2 R firing circuits
	3 rd	1.9.3 R-C firing circuit
	4 th	1.9.4 UJT pulse trigger circuit
5 th	1 st	1.9.5 Synchronous triggering (Ramp Triggering)
	2 nd	1.10 Design of Snubber Circuits
	3 rd	2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS. 2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter. (CONTD.)
	4 th	2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter.
6 th	1 st	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
	2 nd	2.3 Understand need of freewheeling diode.
	3 rd	2.4 Working of single phase fully controlled converter with resistive and R- L loads.

	4 th	2.5 Working of three-phase half wave controlled converter with Resistive load
7 th	1 st	2.6 Working of three phase fully controlled converter with resistive load.
	2 nd	2.7 Working of single phase AC regulator.
	3 rd	2.8 Working principle of step up & step down chopper.
	4 th	2.9 Control modes of chopper
8 th	1 st	2.10 Operation of chopper in all four quadrants(CONTD.)
	2 nd	2.10 Operation of chopper in all four quadrants
	3 rd	3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS
	4 th	3.1 Classify inverters.
9 th	1 st	3.2 Explain the working of series inverter.
	2 nd	3.3 Explain the working of parallel inverter
	3 rd	3.4 Explain the working of single-phase bridge inverter.
	4 th	3.5 Explain the basic principle of Cyclo-converter.
10 th	1 st	3.6 Explain the working of single-phase step up & step down Cyclo-converter.(CONTD.)
	2 nd	3.6 Explain the working of single-phase step up & step down Cyclo-converter.
	3 rd	3.7 Applications of Cyclo-converter.
	4 th	4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS
11 th	1 st	4.1 List applications of power electronic circuits.
	2 nd	4.2 List the factors affecting the speed of DC Motors.
	3 rd	4.3 Speed control for DC Shunt motor using converter.
	4 th	4.4 Speed control for DC Shunt motor using chopper.
12 th	1 st	4.5 List the factors affecting speed of the AC Motors.
	2 nd	4.6 Speed control of Induction Motor by using AC voltage regulator.
	3 rd	4.7 Speed control of induction motor by using converters and inverters (V/F control).
	4 th	4.8 Working of UPS with block diagram.
13 th	1 st	4.9 Battery charger circuit using SCR with the help of a diagram.
	2 nd	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
	3 rd	5. PLC AND ITS APPLICATIONS
	4 th	5.1 Introduction of Programmable Logic Controller(PLC)
13 th	1 st	5.2 Advantages of PLC
	2 nd	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.
	3 rd	5.4 Applications of PLC
	4 th	5.5 Ladder diagram
13 th	1 st	5.6 Description of contacts and coils in the following states i) Normally open ii) Normally closed iii) Energized output iv)latched Output v) branching
	2 nd	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
	3 rd	
	4 th	

14 th	1st	5.8 Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	2nd	5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
	3rd	5.10 Counters-CTU, CTD
	4th	5.11 Ladder diagrams using Timers and counters
15 th	1st	5.12 PLC Instruction set
	2nd	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	3rd	5.14 Special control systems- Basics DCS & SCADA systems
	4th	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
16 th	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class
17 th	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class
18 th	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class
19 th	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class

Sanita Oram

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF WINTER 2024

Discipline: ELECTRICAL	Semester: 3 rd Sem (Sec B)	Name of the Teaching Faculty: Sunita Oram
Subject: Electrical Engineering Material	No. of days/per week class allotted: 4p/week	Semester From: 1 st July 2024 to 08 th Nov 2024 No. of Weeks: 19 weeks
1 st	1 st	Unit-1: CONDUCTING MATERIALS 1.1 Introduction, Resistivity, factors affecting resistivity, Classification of conducting materials into low-resistivity and high resistivity materials.
	2 nd	1.2 Low Resistivity Materials and their Applications. (Copper, Silver, Gold, Aluminium, Steel)
	3 rd	1.3 Stranded Conductors
	4 th	1.4 Bundle Conductors
2 nd	1 st	1.5 Low resistivity copper alloys
	2 nd	1.6 High Resistivity Materials and their Applications (Tungsten, Carbon, Platinum, Mercury)
	3 rd	1.7 Super conductivity, Superconducting Materials
	4 th	1.8 Application of Super Conductor materials
3 rd	1 st	UNIT-2: SEMICONDUCTING MATERIALS 2.1 Introduction, Semiconductors
	2 nd	2.2 Electron Energy and Energy band theory
	3 rd	2.3 Excitation of atoms
	4 th	2.4 Insulators, semiconductors and conductors
4 th	1 st	2.4 Insulators, semiconductors and conductors
	2 nd	2.5 Semiconductor Materials
	3 rd	2.6 Co-valent bonds
	4 th	2.7 Intrinsic semiconductors, Extrinsic semiconductors
5 th	1 st	2.8 N-Type materials, P-Type materials
	2 nd	2.9 Minority and Majority carriers
	3 rd	2.10 Semiconductor materials, Application of semiconductor materials
	4 th	Application of Semiconducting materials
6 th	1 st	UNIT-3: INSULATING MATERIALS 3.1 Introduction, General properties of insulating materials (contd.)
	2 nd	3.2 General properties of insulating materials
	3 rd	3.3 Insulating materials – classification, properties and application
	4 th	3.3 introduction, Classification of insulating materials based on physical and chemical properties
7 th	1 st	3.3 Classification of insulating materials based on physical and chemical properties
	2 nd	3.4 Insulating Gases
	3 rd	3.4 Commonly used insulating gases
	4 th	UNIT-4: DIELECTRIC MATERIAL 4.1 Introduction
8 th	1 st	4.2 Dielectric constant of permittivity
	2 nd	4.3 Polarization
	3 rd	4.3 Polarization
	4 th	4.4 Dielectric loss
9 th	1 st	4.5 Electric Conductivity of Dielectrics and their breakdown
	2 nd	4.5 Electric Conductivity of Dielectrics and their breakdown
	3 rd	4.6 properties of Dielectrics
	4 th	4.7 Application of Dielectrics
10 th	1 st	UNIT-5: MAGNETIC MATERIALS 5.1 Introduction
	2 nd	5.2 Classification
	3 rd	5.2 Diamagnetism
	4 th	5.2 Paramagnetism

11 th	1 st	5.2 Ferromagnetism
	2 nd	5.3 Magnetization Curve
	3 rd	5.4 Hysteresis
	4 th	5.4 Hysteresis(contd.)
12 th	1 st	5.5 Eddy currents
	2 nd	5.6 Curie point, Magnetostriction
	3 rd	5.7 Soft magnetic materials
	4 th	5.7 Soft magnetic materials
13 th	1 st	5.8 Hard magnetic materials
	2 nd	5.8 Hard magnetic materials
	3 rd	UNIT-6:MATERIALS FOR SPECIAL PURPOSES 6.1 Introduction
	4 th	6.2 structural materials
14 th	1 st	6.3 protective materials: lead
	2 nd	6.3 steel tapes
	3 rd	6.3 wires and strips
	4 th	6.4 Other Materials: Thermocouple materials
15 th	1 st	6.4 Bimetals
	2 nd	6.4 soldering materials
	3 rd	6.4 Fuse and fuse materials
	4 th	6.4 Dehydrating materials
16 th	1 st	REVISION CLASS
	2 nd	REVISION CLASS
	3 rd	REVISION CLASS
	4 th	REVISION CLASS
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	2 nd	REVISION CLASS
	3 rd	REVISION CLASS
	4 th	REVISION CLASS
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