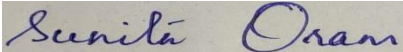


## ACADEMIC LESSON PLAN OF WINTER -2023

Discipline: Electrical	Semester: 5 <sup>th</sup> (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 <sup>st</sup> Aug 2023 to 30 <sup>th</sup> Nov 2023  No. of weeks:17 weeks
Week	Class Day	Theory Topics
1 <sup>st</sup>	1 <sup>st</sup>	<b>1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES</b> 1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT (CONTD.)
	2 <sup>nd</sup>	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT
	3 <sup>rd</sup>	1.2 Two transistor analogy of SCR.
	4 <sup>th</sup>	1.3 Gate characteristics of SCR.
2 <sup>nd</sup>	1 <sup>st</sup>	1.4 Switching characteristic of SCR during turn on and turn off. (CONTD.)
	2 <sup>nd</sup>	1.4 Switching characteristic of SCR during turn on and turn off.
	3 <sup>rd</sup>	1.5 Turn on methods of SCR.
	4 <sup>th</sup>	1.6 Turn off methods of SCR (Line commutation and Forced commutation) 1.6.1 Load Commutation
3 <sup>rd</sup>	1 <sup>st</sup>	1.6.2 Resonant pulse commutation
	2 <sup>nd</sup>	1.7 Voltage and Current ratings of SCR.
	3 <sup>rd</sup>	1.8 Protection of SCR 1.8.1 Over voltage protection
	4 <sup>th</sup>	1.8.2 Over current protection 1.8.3 Gate protection
4 <sup>th</sup>	1 <sup>st</sup>	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit
	2 <sup>nd</sup>	1.9.2 R firing circuits
	3 <sup>rd</sup>	1.9.3 R-C firing circuit
	4 <sup>th</sup>	1.9.4 UJT pulse trigger circuit
5 <sup>th</sup>	1 <sup>st</sup>	1.9.5 Synchronous triggering (Ramp Triggering )
	2 <sup>nd</sup>	1.10 Design of Snubber Circuits
	3 <sup>rd</sup>	<b>2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.</b> 2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter. (CONTD.)
	4 <sup>th</sup>	2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter.
6 <sup>th</sup>	1 <sup>st</sup>	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
	2 <sup>nd</sup>	2.3 Understand need of freewheeling diode.
	3 <sup>rd</sup>	2.4 Working of single phase fully controlled converter with resistive and R- L loads.

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

14 <sup>th</sup>	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 <sup>th</sup>	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 <sup>th</sup>	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class
17 <sup>th</sup>	1st	Revision Class
	2nd	Revision Class
	3rd	Revision Class
	4th	Revision Class



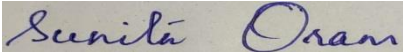
Signature of Teaching Faculty

## ACADEMIC LESSON PLAN OF WINTER-2023

Discipline: Electrical	Semester: 5 <sup>th</sup> (SEC B)	Name of the Teaching Faculty: Smt. SUNITA ORAM
Subject: PE&PLC	No. of days/per week class allotted:4p/week	Semester From: 1 <sup>st</sup> Aug 2023 to 30 <sup>th</sup> Nov 2023  No. of weeks:17 weeks
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	4 <sup>th</sup>	2.5 Working of three-phase half wave controlled converter with Resistive load
7 <sup>th</sup>	1 <sup>st</sup>	2.6 Working of three phase fully controlled converter with resistive load.
	2 <sup>nd</sup>	2.7 Working of single phase AC regulator.
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Signature of Teaching Faculty