

ACADEMIC LESSON PLAN OF WINTER 2025

Discipline: Electrical	Semester:3 rd	Name of the Teaching Faculty: DEBENDRA DEHURY
Subject: ELECTRIC AL AND ELECTRON IC MEASURE MENTS	No. of days/per week class allotted:3p/week	Semester from: 14.07.2025 to 15.11.2025 No. of weeks:15 weeks
Week	Class/week	Theory Topics
1 st	1 st	1. Fundamentals of Measurements 1.1 Measurement: Significance, units, fundamental quantities and standards 1.2 Classification of Instrument Systems
	2 nd	1.3 Null and deflection type instruments 1.4 Absolute and secondary instruments 1.5 Analog and digital instruments
	3 rd	1.6 Static and dynamic characteristics 1.6.1 Types of errors 1.7 Calibration: need and procedure
2 nd	1 st	1.7 Calibration: need and procedure (Contd.) 1.8 Classification of measuring instruments: indicating, recording and integrating instruments
	2 nd	1.9 Essential requirements of an indicating instruments
	3 rd	2. Measurement of voltage and current 2.1 DC Ammeter: Basic, Multi range, Universal shunt
3 rd	1 st	2.2 DC Voltmeter: Basic, Multi-range, concept of loading effect and sensitivity
	2 nd	2.3 AC voltmeter: Rectifier type (half wave and full wave)
	3 rd	2.4 CT and PT: construction, working and applications
4 th	1 st	3. Measurement of Electric Power 3.1 Analog meters: Permanent magnet moving coil (PMMC) and Permanent magnet moving iron (PMMI) meter, their construction, working, salient features, merits and demerits
	2 nd	3.1 Analog meters: Permanent magnet moving coil (PMMC) and Permanent magnet moving iron (PMMI) meter, their construction, working, salient features, merits and demerits (Contd.) 3.2 Dynamometer type wattmeter: Construction and working
	3 rd	3.2 Dynamometer type wattmeter: Construction and working (Contd.)
5 th	1 st	3.3 Errors and compensations of PMMI, PMMC and Dynamometer type wattmeter
	2 nd	3.4 Active and reactive power measurement: One, two and three wattmeter method
	3 rd	3.5 Effect of Power factor on wattmeter reading in two wattmeter method 3.6 Maximum Demand indicator (Definition only)
6 th	1 st	3.5 Effect of Power factor on wattmeter reading in two wattmeter method (Contd.) 3.6 Maximum Demand indicator (Definition only)
	2 nd	4. Measurement of Electric Energy 4.1 Single and three phase electronic energy meter: Constructional features and working principle
	3 rd	4.1 Single and three phase electronic energy meter: Constructional features and working principle (contd.)
7 th	1 st	4.2 Errors and their compensations
	2 nd	4.2 Errors and their compensations (Cond.)

	3 rd	4.3 Calibration of single-phase electronic energy meter using direct loading.
8 th	1 st	4.3 Calibration of single-phase electronic energy meter using direct loading (Contd.)
	2 nd	5. Circuit Parameter Measurement, CRO and Other Meters 5.1 Measurement of resistance
	3 rd	5.1.1 Low resistance: Kelvin's double bridge,
9 th	1 st	5.1.2 Medium Resistance: Voltmeter and ammeter method
	2 nd	5.1.3 High resistance: Megger and Ohm meter: Series and shunt
	3 rd	5.1.3 High resistance: Megger and Ohm meter: Series and shunt (Contd.)
10 th	1 st	5.2 Measurement of inductance using Anderson bridge (no derivation and phasor diagram)
	2 nd	5.3 Measurement of capacitance using Schering bridge (no derivation and phasor diagram)
	3 rd	5.4 Single beam/single trace CRO (Working principle and block diagram only)
11 th	1 st	5.5 Digital storage Oscilloscope: Basic block diagram, working
	2 nd	5.5 Cathode ray tube, electrostatic deflection, vertical amplifier, time base generator, horizontal amplifier
	3 rd	5.5 measurement of voltage/ amplitude/ time period/ frequency/ phase angle delay line, specifications.
12 th	1 st	5.6 Other meters: Earth tester, Digital Multimeter
	2 nd	5.6 L-C-R meter, Frequency meter (ferromagnetic and Weston type)
	3 rd	5.6 Phase sequence indicator, power factor meter (single phase and three phase dynamometer type)
13 th	1 st	5.6 Synchro scope, Tri-vector meter
	2 nd	5.7 Signal generator: need, working and basic block diagram.
	3 rd	Revision (Unit-1)
14 th	1 st	Revision (Unit-2)
	2 nd	Revision (Unit-3)
	3 rd	Revision (Unit-3) (Contd.)
15 th	1 st	Revision (Unit-4)
	2 nd	Revision (Unit-5)
	3 rd	Revision (Unit-5) (Contd.)

Debandra Debbar

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF WINTER 2025

Discipline: Electrical	Semester:3 rd	Name of the Teaching Faculty: DEBENDRA DEHURY,BISWANITA SAHOO
Subject: ELECTRICAL & ELECTRONIC MEASUREME NTS LAB (G1)	No. of days/per week class allotted:2p(2 hour each)/week	Semester from: 14.07.2025 to 15.11.2025 No. of weeks:15 weeks
Week	Class/week	LAB Topics
1 st	1 st	Identify measuring instruments on the basis of symbols on dial, type, accuracy, class position and scale (Contd.)
	2 nd	Identify measuring instruments on the basis of symbols on dial, type, accuracy, class position and scale
2 nd	1 st	Identify the components of PMMC and MI instruments (Contd.)
	2 nd	Identify the components of PMMC and MI instruments
3 rd	1 st	Use electro-dynamic watt-meter for measurement of power in a single phase circuit (Contd.)
	2 nd	Use electro-dynamic watt-meter for measurement of power in a single phase circuit
4 th	1 st	Use single three phase wattmeter for measurement of active and reactive power of three phase-balanced load(contd.)
	2 nd	Use single three phase wattmeter for measurement of active and reactive power of three phase-balanced load (Contd)
5 th	1 st	Use single three phase wattmeter for measurement of active and reactive power of three phase-balanced load
	2 nd	Use two wattmeters for measuring active power of three-phase balanced load (Contd.)
6 th	1 st	Use two wattmeters for measuring active power of three-phase balanced load (Contd.).
	2 nd	Use two wattmeters for measuring active power of three-phase balanced load.
7 th	1 st	Calibrate single-phase electronic energy meter by direct loading (Contd.).
	2 nd	Calibrate single-phase electronic energy meter by direct loading.
8 th	1 st	Use Kelvin's double bridge for measurement of low resistance (Contd.)
	2 nd	Use Kelvin's double bridge for measurement of low resistance
9 th	1 st	Use voltmeter and ammeter method for measurement of medium resistance (Contd.).
	2 nd	Use voltmeter and ammeter method for measurement of medium resistance (Contd.)
10 th	1 st	Use voltmeter and ammeter method for measurement of medium resistance
	2 nd	Use Megger for insulation resistance measurements (Contd.).
11 th	1 st	Use Megger for insulation resistance measurements (Contd.).
	2 nd	Use Megger for insulation resistance measurements
12 th	1 st	Measure the unknown frequency and phase angle, using CRO by Lissajous figure (Contd.).
	2 nd	Measure the unknown frequency and phase angle, using CRO by Lissajous figure (Contd.).
13 th	1 st	Measure the unknown frequency and phase angle, using CRO by Lissajous figure (Contd.).
	2 nd	Revision Class
14 th	1 st	Revision Class
	2 nd	Revision Class
15 th	1 st	Revision Class
	2 nd	Revision Class

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ACADEMIC LESSON PLAN OF WINTER 2025

Discipline: Electrical	Semester: 5 th	Name of the Teaching Faculty: DEBENDRA DEHURY
Subject: POWER ELECTRO NICS AND PLC (SEC- A)	No. of days/per week class allotted: 4p/week	Semester from: 14.07.2025 to 15.11.2025 No. of weeks: 15 weeks
Week	Class/week	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
	2 nd	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT (contd.)
	3 rd	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT (contd.)
	4 th	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT (contd.)
2 nd	1 st	1.2 Two transistor analogy of SCR. 1.3 Gate characteristics of SCR.
	2 nd	1.4 Switching characteristic of SCR during turn on and turn off. 1.5 Turn on methods of SCR.
	3 rd	1.5 Turn on methods of SCR (Contd.) 1.6 Turn off methods of SCR (Line commutation and Forced commutation)
	4 th	1.6 Turn off methods of SCR (Line commutation and Forced commutation) (Contd.) 1.6.1 Load Commutation
3 rd	1 st	1.6.2 Resonant pulse commutation 1.7 Voltage and Current ratings of SCR 1.8 Protection of SCR
	2 nd	1.8.1 Over voltage protection 1.8.2 Over current protection 1.8.3 Gate protection
	3 rd	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit
	4 th	1.9.2 R firing circuits 1.9.3 R-C firing circuit
4 th	1 st	1.9.4 UJT pulse trigger circuit 1.9.5 Synchronous triggering (Ramp Triggering)
	2 nd	1.9.5 Synchronous triggering (Ramp Triggering) (Contd.) 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.
	4 th	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
5 th	1 st	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads. (Contd.) 2.3 Understand need of freewheeling diode.
	2 nd	2.4 Working of single phase fully controlled converter with resistive and R-L loads.
	3 rd	2.5 Working of three-phase half wave controlled converter with Resistive load
	4 th	2.6 Working of three phase fully controlled converter with resistive load.
6 th	1 st	2.7 Working of single phase AC regulator

	2 nd	2.8 Working principle of step up & step down chopper
	3 rd	2.8 Working principle of step up & step down chopper (Contd)
	4 th	2.9 Control modes of chopper
7 th	1 st	2.10 Operation of chopper in all four quadrants.
	2 nd	3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS 3.1 Classify inverters
	3 rd	3.2 Explain the working of series inverter
	4 th	3.3 Explain the working of parallel inverter
8 th	1 st	3.4 Explain the working of single-phase bridge inverter
	2 nd	3.5 Explain the basic principle of Cyclo-converter.
	3 rd	3.6 Explain the working of single-phase step up & step down Cyclo-converter
	4 th	3.6 Explain the working of single-phase step up & step down Cyclo-converter (Contd.) 3.7 Applications of Cyclo-converter.
9 th	1 st	4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS 4.1 List applications of power electronic circuits. 4.2 List the factors affecting the speed of DC Motors.
	2 nd	4.3 Speed control for DC Shunt motor using converter
	3 rd	4.4 Speed control for DC Shunt motor using chopper
	4 th	4.5 List the factors affecting speed of the AC Motors.
10 th	1 st	4.6 Speed control of Induction Motor by using AC voltage regulator.
	2 nd	4.7 Speed control of induction motor by using converters and inverters (V/F control).
	3 rd	4.8 Working of UPS with block diagram.
	4 th	4.9 Battery charger circuit using SCR with the help of a diagram
11 th	1 st	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
	2 nd	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications (Contd.)
	3 rd	5. PLC AND ITS APPLICATIONS 5.1 Introduction of Programmable Logic Controller(PLC) 5.2 Advantages of PLC
	4 th	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC
12 th	1 st	5.4 Applications of PLC 5.5 Ladder diagram
	2 nd	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
	3 rd	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate
	4 th	5.8 Ladder diagrams for combination circuits using NAND, NOR, AND, OR and NOT
13 th	1 st	5.9 Timers-i) T ON ii) T OFF and iii) Retentive timer
	2 nd	5.10 Counters-CTU, CTD
	3 rd	5.11 Ladder diagrams using Timers and counters 5.12 PLC Instruction set
	4 th	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
14 th	1 st	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller (Contd.) 5.14 Special control systems- Basics DCS & SCADA systems
	2 nd	5.14 Special control systems- Basics DCS & SCADA systems (Contd.)
	3 rd	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	4 th	Revision Class 1
15 th	1 st	Revision Class 2
	2 nd	Revision Class 3
	3 rd	Revision Class 4
	4 th	Revision Class 5

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ACADEMIC LESSON PLAN OF WINTER 2025

Discipline: Electrical	Semester: 5 th	Name of the Teaching Faculty: DEBENDRA DEHURY, SANGEETA KUMARI PATRO
Subject: POWER ELECTRONICS & PLC LAB ,(SEC- B)	No. of days/per week class allotted: 1p (3 hour each)/week	Semester from: 14.07.2025 to 15.11.2025 No. of weeks: 15 weeks
Week	Class/week	LAB Topics
1 st	1 st	Study of V-I characteristics of SCR
2 nd	1 st	Study of V-I characteristics of TRIAC
3 rd	1 st	Study of V-I characteristics of DIAC
4 th	1 st	To study phase controlled bridge rectifier using resistive load (Contd.)
5 th	1 st	To study phase controlled bridge rectifier using resistive load .
6 th	1 st	To study series Inverter (Contd.)
7 th	1 st	Study of voltage source Inverter (Contd.)
8 th	1 st	To perform the speed control of DC motor using Chopper (Contd.)
9 th	1 st	To perform the speed control of DC motor using Chopper.
10 th	1 st	To study single-phase Cyclo-converter
11 th	1 st	Introduction/Familiarization PLC Trainer & its Installation with PC (a) Learn the basics and hardware components of PLC (b) Understand configuration of PLC system (c) Study various building blocks of PLC (d) Determine the No. of digital I/O & Analog I/O (Contd.)
12 th	1 st	Introduction/Familiarization PLC Trainer & its Installation with PC (a) Learn the basics and hardware components of PLC (b) Understand configuration of PLC system (c) Study various building blocks of PLC (d) Determine the No. of digital I/O & Analog I/O .
13 th	1 st	Execute the different Ladder Diagrams (a) Demonstrate PLC and Ladder diagram-Preparation downloading and running (b) Execute Ladder diagrams for different Logical Gates (c) Execute Ladder diagrams using timers & counters
14 th	1 st	Execute the different Ladder Diagrams (a) Demonstrate PLC and Ladder diagram-Preparation downloading and running (b) Execute Ladder diagrams for different Logical Gates (c) Execute Ladder diagrams using timers & counters (Contd.)
15 th	1 st	Revision Class

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Discipline: Electrical	Semester: 5 th	Name of the Teaching Faculty: DEBENDRA DEHURY, SANGEETA KUMARI PATRO
Subject: POWER ELECTRONICS & PLC LAB ,(SEC- A (G2))	No. of days/per week class allotted: 1p (3 hour each)/week	Semester from: 14.07.2025 to 15.11.2025 No. of weeks: 15 weeks
Week	Class/week	LAB Topics
1 st	1 st	Study of V-I characteristics of SCR
2 nd	1 st	Study of V-I characteristics of TRIAC
3 rd	1 st	Study of V-I characteristics of DIAC
4 th	1 st	To study phase controlled bridge rectifier using resistive load (Contd.)
5 th	1 st	To study phase controlled bridge rectifier using resistive load .
6 th	1 st	To study series Inverter (Contd.)
7 th	1 st	Study of voltage source Inverter (Contd.)
8 th	1 st	To perform the speed control of DC motor using Chopper (Contd.)
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13 th	1 st	Execute the different Ladder Diagrams (a) Demonstrate PLC and Ladder diagram-Preparation downloading and running (b) Execute Ladder diagrams for different Logical Gates (c) Execute Ladder diagrams using timers & counters
14 th	1 st	Execute the different Ladder Diagrams (a) Demonstrate PLC and Ladder diagram-Preparation downloading and running (b) Execute Ladder diagrams for different Logical Gates (c) Execute Ladder diagrams using timers & counters (Contd.)
15 th	1 st	Revision Class

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Discipline: Electrical	Semester: 5 th	Name of the Teaching Faculty: DEBENDRA DEHURY, SANGEETA KUMARI PATRO
Subject: POWER ELECTRONICS & PLC LAB ,(SEC- A (G1))	No. of days/per week class allotted: 1p (3 hour each)/week	Semester from: 14.07.2025 to 15.11.2025 No. of weeks: 15 weeks
Week	Class/week	LAB Topics
1 st	1 st	Study of V-I characteristics of SCR
2 nd	1 st	Study of V-I characteristics of TRIAC
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15 th	1 st	Revision Class

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