

Department of Electrical Engineering

Lesson Plan

Name of Faculty	Er Amit Attri
Discipline	Electrical Engineering
Semester	5th
Subject	EC&A(L-5 Hrs./Week)
Lesson Plan Duration	August – December 2024

Week	Topic	Theory
1 st (12Aug. –19Aug.)	Unit – I Energy Conservation Basics	Energy Scenario: Primary and Secondary Energy, Energy demand and supply, National scenario. Energy conservation
2 nd (20Aug. – 27Aug.)	Unit – I Energy Conservation Basics	Energy audit; concepts and difference Star Labelling: Need and its benefits
3 rd (28Aug. – 03Sep.)	Unit – II Energy Conservation in Electrical Machines	Need for energy conservation in induction motor. Energy conservation techniques in induction motor by: Motor survey Matching motor to load
4 th (04Sep– 10Sep.)	Unit – II Energy Conservation in Electrical Machines	Operating in star mode. Rewinding of motor. Replacement by energy efficient motor, Periodic maintenance
5 th (11Sept. –18 Sept.)	Unit – II Energy Conservation in Electrical Machines	Energy efficient motor; significant features, advantages, applications and limitations. Need for energy conservation in transformer: Energy efficient transformers, amorphoustransformers; epoxy Resin cast transformer / Dry type of transformer
Class Test – 1		In Second Week of September 2024.
6 th (19Sept. –25Sept)	Unit– III Energy conservation in Electrical Installation systems	Aggregated Technical and commercial losses (ATC); Power system at state, regional, national and global level. Technical losses; causes and measures to reduce these (no expression only theory part) a) Controlling I 2R losses
7 th (26Sept. – 03 Oct)	Unit– III Energy conservation in Electrical Installation systems	b) Optimizing distribution voltage c) Balancing phase currents Energy conservation in lighting sources:
8 th (04Oct. – 10Oct.)	Unit– III Energy conservation in Electrical Installation systems	a) Replacing Lamp sources. b) Using energy efficient luminaries
9 th (11Oct. – 19 Oct.)	Unit– IV Energy conservation through Cogeneration and Tariff	Co-generation and Tariff; concept, significance for energy conservation Co-generation Types of cogeneration on basis of sequence of energy use (basic introduction to Topping cycle & Bottoming cycle)

10 th (21 Oct. – 26 Oct.)	Unit– IV Energy conservation through Cogeneration and Tariff	Types of cogeneration basis of technology (Steam turbine cogeneration, Gas turbine cogeneration). Factors governing the selection of cogeneration system, advantages of cogeneration.
Class Test – 2		In Third Week of October 2024.
11 th (28 Oct. – 04 Nov.)	Unit– IV Energy conservation through Cogeneration and Tariff	Tariff: Types of tariff structure: Special tariffs; Time-off-day tariff, Peak-off-day tariff, Power factor tariff, Maximum Demand tariff, Load factor tariff. Application of tariff system to reduce energy bill.
12 th (05 Nov. – 12 Nov.)	Unit– V Energy Audit of Electrical System	Energy audit (definition as per Energy Conservation Act)Energy audit instruments and their use
House Test		In Second Week of November 2024.
13 th (13Nov. – 20 Nov.)	Unit– V Energy Audit of Electrical System	Questionnaire for energy audit projects.Energy flow diagram (Sankey diagram)
14 th (21 Nov. – 27Nov.)	Unit– V Energy Audit of Electrical System	Questionnaire for energy audit projects.Energy flow diagram (Sankey diagram)
15 th (28Nov-02 Dec)	Revision	Revision & doubt clearance

NOTE: Lesson Plan is Tentative, subject to availability of Time, Students & Faculty.

Signature of Teacher/Prepared by
(Er. Amit Attri)

Signature of HOD
(Er. Amit Attri)

R.G.Government Polytechnic Banikhet, Distt. Chamba H.P-176303

Department of Electrical Engineering

Lesson Plan


Name of Faculty	Er Amit Attri
Discipline	Electrical Engineering
Semester	5th
Subject	Electric Vehicles (L-5 Hrs./Week)
Lesson Plan Duration	August – December 2024

Week	Topic	Theory
1 st (12Aug. –19Aug.)	Unit – I Introduction to Hybrid Electric Vehicles	Evolution of Electric vehicles Introduction to advanced Electric drive vehicle technology
2 nd (20Aug. – 27Aug.)	Unit – I Introduction to Hybrid Electric Vehicles	Vehicle types-Electric vehicles (EV), Hybrid Electric drive (HEV), Plugin Electric vehicle (PIEV), Advantages of HEV over ICE.
3 rd (28Aug. – 03Sep.)	Unit – II Dynamics of hybrid and Electric vehicles	General description of vehicle movement Factors affecting vehicle motion
4 th (04Sep– 10Sep.)	Unit – II Dynamics of hybrid and Electric vehicles	- Vehicle resistance, tyre ground adhesion, rolling resistance, aerodynamic drag. Classification of motors used in Electric vehicles (brief introduction)
5 th (11Sept. –18 Sept.)	Unit – II Dynamics of hybrid and Electric vehicles	Basic architecture of hybrid drive trains, types of HEVs, Energy saving potential of hybrid drive trains.
Class Test – 1		In Second Week of September 2024.
6 th (19Sept. –25Sept)	Unit– III DC-DC Converters for EV and HEV	EV and HEV configuration based on power converters,
7 th (26Sept. – 03 Oct)	Unit– III DC-DC Converters for EV and HEV	Classification of converters – unidirectional and bidirectional, Principle of step down operation
8 th (04Oct. – 10Oct.)	Unit– III DC-DC Converters for EV and HEV	Brief introduction of Boost and Buck- Boost converters.
	Unit– IV DC-AC Inverter & Motors for EV and HEVs	DC-AC Converters Principle of operation of half bridge DC-AC inverter (R load, R-L load)
9 th (11Oct. – 19 Oct.)	Unit– IV DC-AC Inverter & Motors for EV and HEVs	Electric Machines used in EVs and HEVs(brief introduction), principle of operation,
10 th (21 Oct. – 26 Oct.)	Unit– IV DC-AC Inverter & Motors for EV and HEVs	working of Permanent magnet motors, switched reluctance motor, applications of above motors.

Class Test – 2		In Third Week of October 2024.
11 th (28 Oct. – 04 Nov.)	Unit– V Batteries used in Electric Vehicles	General description of batteries, material required for making batteries (brief introduction).
12 th (05 Nov. – 12 Nov.)	Unit– V Batteries used in Electric Vehicles	Types of batteries (brief introduction) – Lithium-Ion Batteries, Nickel-Metal Hydride Batteries, Lead Acid Batteries and Ultra capacitors.
House Test		In Second Week of November 2024.
13 th (13Nov. – 20 Nov.)	Unit– V Batteries used in Electric Vehicles	Recycling of Batteries, limitations of Electric Vehicles.
14 th (21 Nov. – 27Nov.)	Revision	Revision & doubt clearance
15 th (28Nov-02 Dec)	Revision	Revision & doubt clearance

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Department of Electrical Engineering

Lesson Plan

Name of Faculty	Mr x
Discipline	Electrical Engineering
Semester	5th
Subject	Industrial Automation & Conditioning monitoring (L-5 Hrs./Week)
Lesson Plan Duration	August – December 2024

Week	Topic	Theory
1 st (12Aug. –19Aug.)	Unit – I Fundamentals of instrumentation	Basic purpose of instrumentation. Basic block diagram (transduction, signal conditioning, signal presentation) and their function
2 nd (20Aug. – 27Aug.)	Unit – I Fundamentals of instrumentation	Brief introduction to switching devices- Push button, limit switch, float switch, pressure switch, thermostat, electromagnetic relay
3 rd (28Aug. – 03Sep.)	Unit – II Transducers	Distinguish between Primary and Secondary, Electrical and Mechanical, Analog and Digital, Active and Passive. Mechanical devices pry. And sec. transducers Advantages of electric transducers
4 th (04Sep– 10Sep.)	Unit – II Transducers	Required characteristics of transducers. Factors affecting the choice of transducers Brief introduction to resistive transducers.
5 th (11Sept. –18 Sept.)	Unit – II Transducers	Brief introduction to Inductive transducers. Applications of transducers.
Class Test – 1		In Second Week of September 2024.
6 th (19Sept. –25Sept)	Unit– III Signal Conditioning	Basic Concept of signal conditioning System. Draw pin configuration of IC 741. Define Ideal OP-AMP and Electrical Characteristics of OP-AMP
7 th (26Sept. – 03 Oct)	Unit– III Signal Conditioning	Different Parameters of op-amp:-Input offset voltage, Input offset current, Input bias current, Differential input resistance, CMMR, SVRR,
8 th (04Oct. – 10Oct.)	Unit– III Signal Conditioning Unit– IV Data Acquisition System	voltage gain, output voltage, slew rate, gain bandwidth, Output, short circuit current. Generalized DAS- Block diagram and description of Transducer, signal conditioner, multiplexer, converter and recorder
9 th (11Oct. – 19 Oct.)	Unit– IV Data Acquisition System	Draw Single Channel and Multi-channel DAS- Block diagram only. Difference between Signal Channel and

		Multi-Channel DAS. Data conversion- Construction and Working of Analog to digital conversion- successive approximation method
10 th (21 Oct. – 26 Oct.)	Unit– IV Data Acquisition System	Digital to Analog conversion- Construction and Working of binary weighted resistance method: Concept and methods of data transmission of electrical and electronic transmission.
Class Test – 2		In Third Week of October 2024.
11 th (28 Oct. – 04 Nov.)	Unit– V Condition Monitoring and Diagnostic Analysis	Definition of condition monitoring Insulation deterioration Mechanism- factors affecting occurrence and rate of deterioration,
12 th (05 Nov. – 12 Nov.)	Unit– V Condition Monitoring and Diagnostic Analysis	types of stresses responsible for deterioration Different tests on transformer,
House Test		In Second Week of November 2024.
13 th (13Nov. – 20 Nov.)	Unit– V Condition Monitoring and Diagnostic Analysis	their purpose, and the necessary condition of machine. Tests on Circuit breaker, purpose and required condition of machine.
14 th (21 Nov. – 27Nov.)	Revision	Revision & doubt clearance
15 th (28Nov-02 Dec)	Revision	Revision & doubt clearance

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Signature of Teacher/Prepared by
(Er. Divya)



Signature of HOD
(Er. Amit Attri)

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Department of Electrical Engineering

Lesson Plan

Name of Faculty	Er Divya
Discipline	Electrical Engineering
Semester	5th
Subject	S&P(L-5 Hrs./Week)
Lesson Plan Duration	August – December 2024

Week	Topic	Theory
1 st (12Aug. –19Aug.)	Unit – I Basics of Protection	Necessity, functions of protective system, Normal and abnormal conditions.
2 nd (20Aug. – 27Aug.)	Unit – I Basics of Protection	Types of faults and their causes. Protection zones and backup protection
3 rd (28Aug. – 03Sep.)	Unit – II Circuit Interruption Devices	Isolators - Vertical break, Horizontal break and Pantograph type. HRC fuses – Construction, working, characteristics and applications
4 th (04Sep– 10Sep.)	Unit – II Circuit Interruption Devices	Arc formation process, methods of arc extinction (High resistance and Low resistance), Arc voltage, Recovery voltage, Re-striking voltage, RRRV
5 th (11Sept. –18 Sept.)	Unit – II Circuit Interruption Devices	HT circuit breakers: Sulphur-hexa Fluoride (SF ₆), Vacuum circuit breaker – (Working, construction, specifications and applications).
Class Test – 1		In Second Week of September 2024.
6 th (19Sept. –25Sept)	Unit – II Circuit Interruption Devices	L.T. circuit breaker: Air circuit breakers (ACB), Miniature circuit breakers (MCB), Moulded case circuit breakers (MCCB) and Earth leakage circuit breaker (ELCB)) - Working and applications. Brief introduction to gas insulated switchgear.
7 th (26Sept. – 03 Oct)	Unit– III Protective Relays	Fundamental quality requirements: Selectivity, Speed, Sensitivity, Reliability, Simplicity, Economy. Basic relay terminology - Protective relay, Relay time, Pick up, Reset current, current setting, Plug setting multiplier, Time setting multiplier.
8 th (04Oct. – 10Oct.)	Unit– III Protective Relays	Protective relays: Classification, principle of working, construction and operation of – Electromagnetic attraction (Attracted armature type, Solenoid type and Watt-hour meter type only) relays.
9 th (11Oct. – 19 Oct.)	Unit– III Protective Relays	Electromagnetic Induction relays: Over current relays: Block diagram, working. Distance relaying- Principle, operation of Definite distance relays. Directional relay: Need and operation.
10 th (21 Oct. – 26 Oct.)	Unit– III Protective Relays	Operation of current and voltage differential relay. Brief introduction to Thermal Relay. Brief introduction to Static and Microprocessor based relays and their applications.

Class Test – 2		In Third Week of October 2024.
11th (28 Oct. – 04 Nov.)	Unit– IV Protection of Alternator and Transformer Alternator Protection	Faults, Differential protection over current, earth fault, overheating and field failure protection. Reverse power protection.
12th (05 Nov. – 12 Nov.)	Unit– IV Protection of Alternator and Transformer Alternator Protection	Different Faults (brief introduction), Differential, over current, earth fault, over heating protection, Limitations of differential protection. Buchholz relay: Construction, operation, merits and demer
House Test		In Second Week of November 2024.
13th (13 Nov. – 20 Nov.)	Unit– V Protection of Motors, Bus-bar and Transmission Line Motor	Faults, Short circuit protection, Overload protection, Single phase preventer
14th (21 Nov. – 27 Nov.)	Unit– V Protection of Motors, Bus-bar and Transmission Line Motor	Bus bar and Transmission line Faults on Bus bar and Transmission Lines. Bus bar protection: Differential and Fault bus protection. Transmission line: Over current, Distance and Pilot wire protection
15th (28 Nov-02 Dec)	Revision	Revision & doubt clearance

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