

R.G. Government Polytechnic Banikhet, Distt. Chamba (H.P)176303
Department of Electrical Engineering

Lesson Plan



Name of Faculty	Mr X
Discipline	Electrical Engineering
Semester	6 th
Subject	Energy Management (L-4 Hrs./Week)
Lesson Plan Duration	Jan-May 2024

Week	Topic	Theory
1 st (29 Jan -3 Feb.)	1. Review of Various Energy Sources	Brief overview of present energy scenario in India and worldwide, brief overview of share (in %age) of various energy sources in present energy scenario in India & worldwide
2 nd (5 Feb-12 Feb.)	1. Review of Various Energy Sources 2. Energy Conservation	Basic concept and importance of Energy Management Energy Conservation and its Need Energy Conservation opportunities & energy efficient technologies in domestic and industrial sectors:
3 rd (13 Feb-19 Feb.)	2. Energy Conservation	- Energy Efficient lighting: Methods/Technologies of energy efficient lighting systems
4 th (20 Feb. -27 Feb.)	2. Energy Conservation	Heating: Energy efficient Methods/Technologies for energy savings in Furnaces, Ovens, Boilers, Heat Exchangers, Cooling Towers, and Pumps. - Cooling Systems : Methods/Technologies for Energy Savings in Ventilating systems and Air Conditioners (HVAC Systems)
5 th (28 Feb-5 March.)	2. Energy Conservation	Energy Efficient Motors, Soft Starters, and Variable Frequency Drives. - Power Factor improvement devices and their significance in energy conservation. Amorphous Core Transformers
6 th (6 March-14 March)	3. Energy Conservation in Transmission and Distribution Systems	Reactive power compensation
Class Test -1		In 3 rd week of March 2024
7 th (15 March-21 March)	3. Energy Conservation in Transmission and Distribution Systems	Demand Side Management in transmission and distribution system and its minimization

8 th (22 March-30 March)	4 Energy Audit	Need of Energy Audit, Types of Energy Audit: Preliminary Audit, General or Mini audit, and Comprehensive Audit,
9 th (1 April. -6 April.)	4 Energy Audit	Energy Audit methodologies/Procedure, Energy Flow Diagram and its importance.
10 th (8 April. - 18 April.)	4 Energy Audit	Measurements in energy audit, List of measuring instruments and equipment used in energy audit, Questionnaires for the energy audit
Class Test -2		In 3 rd week of April 2024
11 th (19 April-25 April.)	4 Energy Audit	Energy audit checklist, Calculation of payback period, Case studies (any Two) of Energy Audit of any Commercial building and Small Industrial installation
12 th (26 April. - 2 May.)	5 Energy and Environment	Environment and social concerns related to energy utilization, Environment impact assessment and its need
13 th (3 May-9 May)	5 Energy and Environment	Environmental impact assessment in India.
14 th (13 May-18 May.)	Revision and doubt clearance	Revision and doubt clearance
House Test		In 3 rd week of May 2024
15 th (20 May- 25 May)	Revision and doubt clearance	Revision and doubt clearance

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

Signature of Teacher/Prepared By Teacher
(Er. Divya)

Signature of HOD
(Er. Amit Attri)

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

Department of Electrical Engineering


Lesson Plan

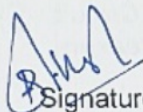
Name of Faculty	Miss Divya
Discipline	Electrical Engineering
Semester	6 th (N-17)
Subject	EPS-III (L-4 Hrs./Week)
Lesson Plan Duration	Jan- May 2024

Week	Topic	Theory
1 st (29 Jan -3 Feb.)	1. Introduction to Switchgear	1.1 Switchgear, Essential features of Switchgear 1.2 Switchgear elements and its operation 1.3 Bus-bar arrangements
2 nd (5 Feb-12 Feb.)	1. Introduction to Switchgear 2. Power System Faults	1.4 Concept of short-circuit, short circuit current 2.1 Types of faults: symmetrical faults, unsymmetrical faults
3 rd (13 Feb-19 Feb.)	2. Power System Faults	2.2 Unsymmetrical faults: Analysis of L-to-L, L-to-G and L-L-to-G faults
4 th (20 Feb. -27 Feb.)	3. Fuses	3.1 Advantages and disadvantages of fuse 3.2 Desirable characteristics of fuse element, fuse element materials 3.3 Important terms related to fuse: current rating of fuse element, fusing current, fusing factor, cut-off current, arcing time and breaking capacity 3.4 Types of fuse: LV fuse and HV fuse 3.5 LV fuse: semi-enclosed rewritable fuse and HRC fuse-their construction and working 3.6 HV fuse: cartridge type, liquid type and metal clad type-their construction & working
5 th (28 Feb-5 March.)	4. Circuit Breakers	4.1 Difference between Switch, Isolator and Circuit Breakers 4.2 Function of Isolator and Circuit breaker 4.3 Difference between Fuse and Circuit Breaker 4.4 Arc phenomenon in circuit breaker: principles and methods of arc extinction.
6 th (6 March-14 March)	4. Circuit Breakers	4.5 Terms related to circuit breaker: arc voltage, re-striking voltage and recovery voltage 4.6 Construction, working principles, types and applications of Air-Blast Circuit Breaker, Oil Circuit Breaker,
Class Test – 1		In 3 rd Week of March 2024.
7 th (15 March-21 March)	4. Circuit Breakers	Vacuum Circuit Breaker and SF6 Circuit Breaker, Comparison between various types of Circuit Breakers in terms of their features and application areas. 4.7 Circuit breaker rating: breaking capacity, making capacity and short-time rating

8 th (22 March- 30 March)	5. Protective Relays	5.1 Introduction: fundamental requirement of relay, function of relay 5.2 Electromagnetic attraction type relay 5.3 Electromagnetic induction type relays 5.4 Instantaneous relay, Inverse Time Relay, Definite Time lag relay
9 th (1 April- 6 April.)	5. Protective Relays	5.5 Relays Terminology: Pick-up Current, Current Setting, Plug Setting Multiplier (PSM), Time Setting Multiplier (TSM), Time/PSM Curve 5.6 Distance or Impedance Relay: definite-distance and time distance impedance relay
10 th (8 April . – 18 April.)	5. Protective Relays	5.7 Differential Relays: current differential and voltage balance differential relay 5.8 Brief idea of Static and Microprocessor based relays & their applications
Class Test – 2		In 3 rd Week of April 2024.
11 th (19 April-25 April.)	6. Protection Schemes in Power System	6.1 Differential Protection Scheme for Alternators 6.2 Protection Schemes for Transformer, Buchholz relay
12 th (26 April. – 2 May.)	6. Protection Schemes in Power System	6.3 Merz-price voltage balance protection scheme for bus-bar and transmission line 6.4 Earth fault or Leakage Protection
13 th (3 May-9 May)	7. Over-voltage Protection	7.1 Introduction: voltage surge, causes of overvoltage 7.2 Lightning, lightning arresters such as rod gap, horn gap, multi-gap, expulsion type and valve type arrester
14 th (13 May-18 May.)	7. Over-voltage Protection	7.3 Brief idea about surge absorber 7.4 Transmission Line and substation protection against over-voltages
House Test		In 3 rd Week of May 2024.
15 th (20 May- 25 May)	Revision & doubt clearance	Revision and doubt clearance

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(Er. Divya)


Signature of HOD
(Er. Amit Attri)

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Department of Electrical Engineering

Lesson Plan

Name of Faculty	Mr X
Discipline	Electrical Engineering
Semester	6 th
Subject	Utilization Of Electrical Energy (L-4 Hrs./Week)
Lesson Plan Duration	Jan-May 2024

Week	Topic	Theory
1 st (29 Jan -3 Feb.)	1. Electric Drives	1.1 Advantages of Electric Drives 1.2 Characteristics of different mechanical loads 1.3 Types of Motors used as electric drive
2 nd (5 Feb-12 Feb.)	1. Electric Drives	1.4 Electric braking 1.4.1 Plugging 1.4.2 Rheostatic braking. 1.4.3 Regenerative braking 1.5 Methods of power transfer by direct coupling by using devices like belt drive, gears, chain drives. 1.6 Selection of motors for different types of domestic loads 1.7 Selection of drive for applications such as general workshop, textile mill, paper mill, steel mill, printing press, cranes and lift. Applications of flywheel.
3 rd (13 Feb-19 Feb.)	2. Illumination	2.1 Nature of light, visibility spectrum curve of relative sensitivity of human eye and wave length of light. 2.2 Definition: Luminous flux, solid angle, luminous intensity, illumination, luminous efficiency, depreciation factor, coefficient of utilization, space to height ratio, reflection factor, glare, shadow, lux level. 2.3 Laws of Illumination 2.4 Different type of lamps, construction and working of incandescent and discharge lamps—their characteristics, fittings required for filament lamp,
4 th (20 Feb. -27 Feb.)	2. Illumination	mercury vapor, sodium lamp, fluorescent lamp, halogen lamp, neon lamp, Compact fluorescent lamp, LED lamps. 2.5 Main requirements of proper lighting; absence of glare, contrast, and shadow 2.6 Illumination requirement for street lighting, flood lighting, monument lighting and decorative lighting. 2.7 LED based lighting systems, advantages of LED based lighting

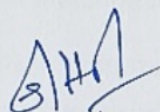
5 th (28 Feb-5 March.)	3. Electric Heating	3.1 Advantages of Electrical Heating 3.2 Electrical Heating Methods: 3.2.1 Resistance heating – direct and indirect resistance heating, electric ovens, their temperature range, properties of resistance heating elements, thermostat control circuit
6 th (6 March-14 March)	3. Electric Heating	3.2.2 Induction Heating: Principle of core type and coreless induction furnace, their construction and applications 3.2.3 Electric Arc Heating: direct and indirect arc heating, construction, working and applications of arc furnace. 3.2.4 Dielectric heating: working principle and applications in industrial fields 3.2.5 Infra-red heating and its applications 3.2.6 Microwave heating and its applications
Class Test -1		In 3 rd week of March 2024
7 th (15 March-21 March)	4. Electric Welding	4.1 Advantages of Electric Welding 4.2 Welding methods 4.2.1 Principles of resistance welding, types – spot, projection, seam and butt welding, welding equipment. 4.2.2 Principle of arc production, electric arc welding, characteristics of arc; carbon arc, metal arc, hydrogen arc welding method and their applications. Power supply requirement. Advantages of using coated electrodes, comparison between AC and DC arc welding, welding control circuits, welding of aluminium and copper materials
8 th (22 March-30 March)	5. Electrolytic Processes	5.1 Need of Electro-deposition 5.2 Laws of Electrolysis, process of electro-deposition - clearing, operation, deposition of metals, polishing and buffing 5.3 Equipment and accessories for electroplating
9 th (1 April . –6 April.)	5. Electrolytic Processes 6. Electrical Circuits used in Refrigeration, Air Conditioning and Water Coolers	5.4 Factors affecting electro-deposition. 5.5 Electroplating of non-conducting materials 6.1 Principle of air conditioning, vapor pressure, refrigeration cycle, eco-friendly refrigerants.
10 th (8 April . – 18 April.)	6. Electrical Circuits used in Refrigeration, Air Conditioning and Water Coolers	6.2 Description and Working of Electrical circuits used in 6.2.1 Refrigerator, 6.2.2 Air-conditioner 6.2.3 Water cooler
Class Test -2		In 3 rd week of April 2024

11 th (19 April-25 April.)	7. Electric Traction	7.1 Requirements of ideal Traction System, Different systems of electric traction, DC and AC systems, diesel electric system, types of services – urban, sub-urban, and main line and their speed-time curves, Advantages of Electric Traction.
12 th (26 April. – 2 May.)	7. Electric Traction	7.2 Different accessories for track electrification, such as overhead catenary wire, conductor rail system, current collector-pantograph 7.3 Electrical block diagram of an Electric Locomotive with description of various equipment and accessories used.
13 th (3 May-9 May)	7. Electric Traction	7.4 Types of motors used for electric traction. 7.5 Starting and braking of electric locomotives
14 th (13 May-18 May.)	7. Electric Traction	7.6 Introduction to EMU (Electrical Multiple Unit) and Metro Railway 7.7 Modern Electrical Traction systems, their features and advantages
House Test		In 3 rd week of May 2024
15 th (20 May- 25 May)	Revision and doubt clearance	Revision and doubt clearance

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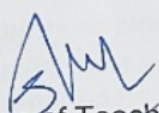
Lesson Plan

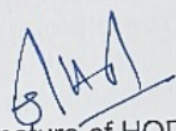
Name of Faculty	Sh Amit Attri
Discipline	Electrical Engineering
Semester	6 th
Subject	PLCM (L-4 Hrs./Week)
Lesson Plan Duration	Jan-May 2024

Week	Topic	Theory
1 st (29 Jan -3 Feb.)	1. Introduction to PLC	Relays based logic circuits, limitations of relays based logic circuit, Concept of PLC, Advantages of PLCs over electromagnetic relays based logic circuits, Different programming languages used in PLC
2 nd (5 Feb-12 Feb.)	2. Architectural Detail and Working of PLC	2.1 Basic operation and principle of working of PLC 2.2 Architectural details of PLC 2.3 Input & Output Modules in PLC 2.4 Opto-isolation Circuit in PLC and its need
3 rd (13 Feb-19 Feb.)	2. Architectural Detail and Working of PLC	2.5 Memory structures in PLC 2.6 HMI (Human Machine Interface) used in PLC system 2.7 Power supply requirements in PLC
4 th (20 Feb. -27 Feb.)	3. Instructions Set	3.1 Addressing in PLC: I/O Address 3.2 Basic instructions: Examine ON, Examine OFF, Latch/Unlatch, Output Energize, Hold ON. 3.3 Timer instructions: On delay timer, Off delay timer, retentive/non-retentive timers, resetting of timers
5 th (28 Feb-5 March.)	3. Instructions Set	3.4 Counter instructions: Up Counter, Down Counter, resetting of Counters 3.5 Comparison instructions like equal, not equal, greater, greater than equal, less than, less than equal
6 th (6 March-14 March)	4. Ladder Logic Programming	Introduction to Ladder Logic programming Ladder logic programming examples based on basic instructions, timer and counter instructions.
Class Test-1		In 3 rd week Of March
7 th (15 March-21 March)	5. Applications of PLCs	Description, I/O assignment and ladder logic program for the following applications/processes 5.1 Forward/reverse control of motor using PLC 5.2 Process Control (Stirred tank Heating Control)

8 th (22 March-30 March)	5. Applications of PLCs	5.3 Car parking control 5.4 Doorbell operation 5.5 Traffic light control
	6. 8051 Micro Controller – Over View	6.1 Difference between Microprocessor & Microcontroller
9 th (1 April . –6 April.)	6. 8051 Micro Controller – Over View	6.2 Architectural Detail of 8051 microcontroller 6.3 Pin details of 8051 microcontroller 6.4 I/O Port Structure 6.5 Memory Organization in 8051
10 th (8 April . – 18 April.)	6. 8051 Micro Controller – Over View	6.6 Special Function Registers 6.7 Instructions in 8051 Microcontroller 6.8 Addressing Modes in 8051 Microcontroller 6.9 Timer operation 6.10 Interrupts in 8051
Class Test-2		In 3 rd week Of April 2024
11 th (19 April-25 April.)	7. Assembly language programming in 8051 Microcontroller	7.1 Structure of Assembly Language 7.2 Assemblers and Compilers 7.3 Assembler Directives
12 th (26 April. – 2 May.)	8. Design and Interface using 8051 Microcontroller	Keypad interface, 7- Segment interface
13 th (3 May-9 May)	8. Design and Interface using 8051 Microcontroller	7- Segment interface, Stepper Motor interface
14 th (13 May-18 May.)	9. Introduction to PIC Microcontroller and Arduino board	Introduction to PIC Microcontroller and Arduino board
House Test		In 3 rd week of May 2024
15 th (20 May- 25 May)	Revision & Doubt Clearance	Revision & Doubt Clearance

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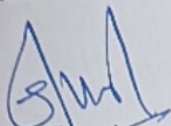
Lesson Plan

Name of Faculty	Sh Amit Attri
Discipline	Electrical Engineering
Semester	6th
Subject	Estimating & Costing in Electrical Engineering (L-4 Hrs./Week)
Lesson Plan Duration	Jan-May 2024

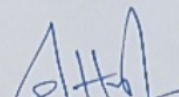
week	Topic	Theory
1st (29 Jan -3 Feb.)	1.Introduction	Estimating, Purpose of estimating and costing, proforma for making estimates, catalogue, costing, price list, tender document
2nd (5 Feb-12 Feb.)	1. Introduction	Net price list, market survey, overhead charges, labor charges, electrical point method and fixed percentage method, contingency
3rd (13 Feb-19 Feb.)	1. Introduction	Profit, purchase system, enquiries, comparative statements, orders for supply, payment of bills. Tenders – it's constituents, types and procedure
4th (20 Feb. -27 Feb.)	2. Wiring Systems and Protection Devices	Cleat, batten, casing capping and conduit wiring, comparison of different wiring systems.
5th (28 Feb-5 March.)	2. Wiring Systems and Protection Devices	Selection and design of wiring schemes for particular situation (Domestic and Industrial). Selection of wires and cables, wiring accessories.
6th (6 March-14 March)	2. Wiring Systems and Protection Devices	Use of protective devices such as fuse, MCB, ELCB and their selection. Use of wire-gauge and tables.
Class Test-1		In 3rd week of March 2024
7th (15 March-21 March)	3. Estimating and Costing of Domestic & Industrial Electrical Installations	Domestic installations: Standard practices as per IS and IE rules. Planning of circuits, sub-circuits and position of different accessories.

8 th (22 March-30 March)	3. Estimating and Costing of Domestic & Industrial Electrical Installations	Electrical layout, preparing estimates including cost as per schedule rate pattern and actual market rate. Industrial installations: relevant IE rules and standard practices, planning, designing.
9 th (1 April . -6 April.)	3. Estimating and Costing of Domestic & Industrial Electrical Installations	Estimation of installation for single phase motors of different ratings, electrical circuit diagram, starters, preparation of list of materials
10 th (8 April . - 18 April.)	3. Estimating and Costing of Domestic & Industrial Electrical Installations	Estimating and costing exercises on workshop with single-phase, 3-phase motor load and the lighting load (3phase supply system). Service line connections estimate for domestic and Industrial loads (overhead and Under- ground connections) from pole to energy meter.
Class Test-2		In 3 rd week of April
11 th (19 April-25 April.)	3. Estimating and Costing of Domestic & Industrial Electrical Installations	Earthing Systems Estimation: IS specifications regarding earthing, types of earthing, List of materials required for earthing Design of earth wire/strip and electrode for domestic and industrial installation.
12 th (26 April. - 2 May.)	4. Estimating of Transmission/Distribution Lines & Substations	Transmission & distribution lines (overhead & underground) planning & designing of lines with different fixtures, based on unit cost calculations.
13 th (3 May-9 May)	4. Estimating of Transmission/Distribution Lines & Substations	Substation: Types of substations, substation schemes and components. estimate of 11/0.4 kV pole mounted substation up to 200 kVA rating
14 th (13 May-18 May.)	4. Estimating of Transmission/Distribution Lines & Substations	Earthing of substations, Key Diagram of 66 kV/33kV/11kV Substation
House Test		In 3 rd week of May 2024
15 th (20 May- 25 May)	Revision and doubt clearance	Revision and doubt clearance.

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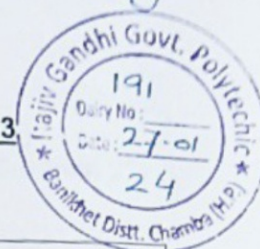
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Lesson Plan



Name of Faculty	Mr X
Discipline	Electrical Engineering
Semester	6 th
Subject	Energy Management (L-4 Hrs./Week)
Lesson Plan Duration	Jan-May 2024

Week	Topic	Theory
1 st (29 Jan -3 Feb.)	1. Review of Various Energy Sources	Brief overview of present energy scenario in India and worldwide, brief overview of share (in %) of various energy sources in present energy scenario in India & worldwide
2 nd (5 Feb-12 Feb.)	1. Review of Various Energy Sources 2. Energy Conservation	Basic concept and importance of Energy Management Energy Conservation and its Need Energy Conservation opportunities & energy efficient technologies in domestic and industrial sectors:
3 rd (13 Feb-19 Feb.)	2. Energy Conservation	- Energy Efficient lighting: Methods/Technologies of energy efficient lighting systems
4 th (20 Feb. -27 Feb.)	2. Energy Conservation	Heating: Energy efficient Methods/Technologies for energy savings in Furnaces, Ovens, Boilers, Heat Exchangers, Cooling Towers, and Pumps. - Cooling Systems : Methods/Technologies for Energy Savings in Ventilating systems and Air Conditioners (HVAC Systems)
5 th (28 Feb-5 March.)	2. Energy Conservation	Energy Efficient Motors, Soft Starters, and Variable Frequency Drives. - Power Factor improvement devices and their significance in energy conservation. Amorphous Core Transformers
6 th (6 March-14 March)	3. Energy Conservation in Transmission and Distribution Systems	Reactive power compensation
Class Test -1		In 3 rd week of March 2024
7 th (15 March-21 March)	3. Energy Conservation in Transmission and Distribution Systems	Demand Side Management in transmission and distribution system and its minimization

8 th (22 March-30 March)	4 Energy Audit	Need of Energy Audit, Types of Energy Audit: Preliminary Audit, General or Mini audit, and Comprehensive Audit,
9 th (1 April . -6 April.)	4 Energy Audit	Energy Audit methodologies/Procedure, Energy Flow Diagram and its importance.
10 th (8 April . - 18 April.)	4 Energy Audit	Measurements in energy audit, List of measuring instruments and equipment used in energy audit, Questionnaires for the energy audit
Class Test -2		In 3 rd week of April 2024
11 th (19 April-25 April.)	4 Energy Audit	Energy audit checklist, Calculation of payback period, Case studies (any Two) of Energy Audit of any Commercial building and Small Industrial installation
12 th (26 April. - 2 May.)	5 Energy and Environment	Environment and social concerns related to energy utilization, Environment impact assessment and its need
13 th (3 May-9 May)	5 Energy and Environment	Environmental impact assessment in India.
14 th (13 May-18 May.)	Revision and doubt clearance	Revision and doubt clearance
House Test		In 3 rd week of May 2024
15 th (20 May- 25 May)	Revision and doubt clearance	Revision and doubt clearance

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