

## Lesson Plan

**Name of the Faculty :**  
**Discipline :** Electrical Engineering  
**Semester :** 6<sup>th</sup> Semester  
**Subject :** UTILIZATION OF ELECTRICAL ENERGY  
**Lesson Plan Duration :** 15-16 Week

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
Week 1 <sup>st</sup>	1	Nature of light, visibility spectrum curve of relative sensitivity of human eye and wave length of light		
	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.		
	3	Laws of illumination – simple numericals		
	4.	Different type of lamps, construction and working of incandescent lamp and discharge lamp		
	5.	Fittings required for filament lamp		
	6.	Mercury vapour sodium lamp, fluorescent lamp		
	8.	Halogen lamp, neon lamp		
	9, 10, 11	Compact filament lamp(CFL), Calculation of number of light points for interior illumination, calculation of illumination at different points, considerations involved in simple design problems. Illumination schemes; indoor and outdoor illumination levels		
Week 2 <sup>nd</sup>	12	Main requirements of proper lighting; absence of glare, contrast and shadow		
	13, 14	Awareness about time switches, street lighting, flood lighting, monument lighting and decorative lighting, light characteristics etc		
	15, 16, 17, 18	Resistance heating – direct and indirect resistance heating, electric ovens, their temperature range, properties of resistance heating elements, domestic water heaters and other heating appliances, thermostat control circuit		

	19	Induction heating; principle of core type and coreless induction furnace, their construction and applications		
	20, 21	Electric arc heating; direct and indirect arc heating, construction, working and applications of arc furnace		
	22	Dielectric heating, applications in various industrial fields Infra-red heating and its applications (construction and working of two appliances)		
	23	Microwave heating and its applications (construction and working of two appliances)		
	24	Calculation of resistance heating elements (simple problems)		
	25, 26, 27	Advantages of electric welding, Welding method, Principles of resistance welding, types – spot, projection, seam and butt welding, welding equipment		
	28, 29, 30	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 aluminum and copper		
	31, 32	Need of electro-deposition, Laws of electrolysis, process of electro-deposition - clearing, operation, deposition of metals,		
	33	polishing and buffing , Equipment and accessories for electroplating		
	34	Factors affecting electro-deposition, Principle of galvanizing and its applications		
	35	Principles of anodizing and its applications		
	36	Electroplating of non-conducting materials		
	37	Manufacture of chemicals by electrolytic process		
	38	Power supplies for electroplating		
	39	Principle of air conditioning, vapour pressure, refrigeration cycle, eco-friendly refrigerants		
	40, 41, 42	Description of Electrical circuit used in a) Refrigerator,  b) Air-conditioner, and		

		c) Water cooler		
	43	Advantages of electric drives, Characteristics of different mechanical loads		
	44, 45, 46	Types of motors used as electric drive		
	47, 48, 49	Electric braking 6.4.1 Plugging 6.4.2 Rheostatic braking 6.4.3 Regenerative braking		
	50	General idea about the methods of power transfer by direct coupling by using devices like belt drive, gears, chain drives etc.		
	51	Examples of selection of motors for different types of domestic loads		
	53, 53, 54	Selection of drive for applications such as general workshop, textile mill, paper mill, steel mill, printing press, crane and lift etc. Application of flywheel.		
	55	Specifications of commonly used motors e.g. squirrel cage motors, slip ring induction motors, AC series motors, Fractional kilo Watt(FKW) motors		
	56	Selection of motors for Domestic Appliances		
	57, 58, 59	Advantages of electric traction over other types of traction., 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		
	60	Different accessories for track electrification; such as overhead catenary wire, conductor rail system, current collector-pentagraph		
	61	Factors affecting scheduled speed		
	62	Electrical block diagram of an electric locomotive with description of various equipment and accessories used.		
	63, 64	Types of motors used for electric traction		
	65	Power supply arrangements		
	66	Starting and braking of electric locomotives		
	67	Introduction to EMU and metro railways		
	68	Train Lighting Scheme		

## Lesson Plan

**Name of the Faculty** :  
**Discipline** : Electrical Engineering  
**Semester** : 6<sup>th</sup> Semester  
**Subject** : ELECTRICAL POWER-II  
**Lesson Plan Duration** : 15-16 Week

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
	1, 2, 3, 4	Common type of faults in both overhead and underground systems, symmetrical/ unsymmetrical faults. Single line to ground fault, double line to ground fault, 3-phase to ground fault open circuit, simple problems relating to fault finding.	1, 2	Testing of the dielectric strength of transformer oil and air
	5, 6, 7	Purpose of protective gear. Difference between switch, isolator and circuit breakers. Function of isolator and circuit breaker. Making capacity and breaking capacity of circuit breaker (only definition)	3, 4, 5	Study of different types of circuit breakers and isolators
	8, 9, 10	Circuit breakers. Types of circuit breakers, bulk and minimum oil circuit breakers, air SF6 circuit breakers	6	Plot the time current characteristics of over current relay
	12, 13, 14	Principles of Arc extinction blast circuit breakers in OCB and ACB, Constructional features of OCB, ACB, and their working, Method of arc extinction	7	Power measurement by using CTs and PTs
	14, 15, 16	MCB, MCCB, ELCB	8, 9, 10	Earthing of different equipment/Main Distribution Board and Energy Meter Box
	17	Fuses; function of fuse. Types of fuses, HV and LV fuses, rewire-able, cartridge, HRC	11, 12	Perform the overload and short circuit test of MCB as per IS specifications
	18, 19, 20, 21, 22	Earthing: purpose of earthing, method of earthing, Equipment earthing, Substation earthing, system earthing as per Indian Electricity rules. Methods of reducing earth resistance.	13	Plot the time-current characteristics of Kit-Kat fuse wire
	22	Introduction - types of relays	14	Taking reading of current on any LT line with clip on meter
	23, 24, 25	Electromagnetic and thermal relays, their construction and working		
	26, 27	Induction type over-current, earth fault relays, instantaneous over current relay		

	28	Directional over-current, differential relays, their functions		
	29	Distance relays, their functions		
	30, 31	Idea of static relays and their applications		
	32, 33	Relays for generator protection		
	34, 35	Relays for transformer, protection including Buchholtz relay protection		
	36, 37, 38	Protection of feeders and bus bars, Over current and earth fault protection.		
	39	Distance protection for transmission system		
	40	Relays for motor protection		
	41, 42, 43	Protection of system against over voltages, causes of over voltages, utility of ground wire		
	44, 45, 46	Lightning arrestors, rod gap, horn gap, metal oxide type		
	47, 48, 49, 50	Transmission Line and substation protection against over-voltages and lightning		
	51, 52	Concept of Tariffs		
	53, 54	Block rate, flat rate, maximum demand and two part tariffs		
	55, 56	Simple problems		

## Lesson Plan

**Name of the Faculty** :  
**Discipline** : Electrical Engineering  
**Semester** : 6<sup>th</sup> Semester  
**Subject** : **PROGRAMMABLE LOGIC CONTROLLERS AND MICROCONTROLLERS**  
**Lesson Plan Duration** : 15-16 Week

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
	1, 2, 3, 4, 5, 6	Introduction to PLC, What is PLC, concept of PLC, Building blocks of limitations of relays. Advantages of PLCs over programming languages, PLC manufacturer etc. PLC, Functions of various blocks,	1, 2	Components/sub-components of a PLC, Learning functions of different modules of a PLC system
	7, 8	Basic operation and principles of PLC	3, 4	Practical steps in programming a PLC (a) using a Hand held programmer (b) using computer interface
	9, 10	Architectural details processor	5, 6	Introduction to step 5 programming language, ladder diagram concepts, instruction list syntax
	11, 12	Memory structures, I/O structure	7, 8	Basic logic operations, AND, OR, NOT functions
	13, 14	Programming terminal, power supply	9	Logic control systems with time response as applied to clamping operation
	15	Basic instructions like latch, master control self holding relays	10	Sequence control system e.g. in lifting a device for packaging and counting
	16	Timer instruction like retentive timers, resetting of timers	11	Use of PLC for an application( teacher may decide)
	17	Counter instructions like up counter, down counter, resetting of counters	12	Familiarization with a study of Architecture of 8085 kit, basic sub systems and input output connectors, functions keys on micro controllers kit
	18	Arithmetic Instructions (ADD,SUB,DIV,MUL etc.)	13	Familiarization of Micro Controllers (8051) kit
	19	MOV instruction	14	Testing of general input/output on Micro controller board
	20	RTC(Real Time Clock Function)	15	Development of Electrical , Instrumentation applications using 8051 micro-controller
	21, 22	Comparison instructions like equal, not equal, greater, greater than equal, less than, less than equal		

	23, 24, 25, 26, 27, 28	Programming based on basic instructions, timer, counter, sequencer, and comparison instructions using ladder program.		
	29	Assembly, Packaging, Process controls		
	30	Car parking, Doorbell operation, Traffic light control		
	31	Microwave Oven, Washing machine, Motor in forward and reverse direction		
	32	Star-Delta, DOL Starters, Paint Industry, Filling of Bottles, Room Automation		
	33, 34	Pin details		
	35, 36	I/o Port structure		
	37, 38, 39	Memory Organisation		
	40, 41, 42	Special function registers		
	43, 44	Timer operation		
	45, 46	Serial Port operation		
	47, 48	Interrupts		
	49, 50, 51	Assemblers and Compilers		
	52, 53, 54	Assemblers and Compilers		
	55, 56, 57	Keypad interface, 7- segment interface, LCD, stepper motor. A/D, D/A, RTC interface.		
	59, 60, 61, 62	Introduction of PIC Micro controllers		
	63, 64	Application of Micro controllers		

## Lesson Plan

**Name of the Faculty** :  
**Discipline** : **Electrical Engineering**  
**Semester** : **6<sup>th</sup> Semester**  
**Subject** : **ENERGY MANAGEMENT**  
**Lesson Plan Duration** : **15-16 Week**

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
	1, 2	Overview of energy management, need for energy conservation, Environmental Aspects		
	3, 4	Need for energy conservation with brief description of oil and coal crisis		
	5, 6, 7	Alternative sources of energy.		
	8	Energy efficiency- its significance		
	9, 10, 11	Energy conservation in Domestic sector- Lighting, Home appliances		
	12, 13, 14, 15, 16, 17	Energy conservation in Industrial sector-Industrial lighting, Distribution system, Motor Pumps, Fans, Blowers etc., Energy conservation in Agriculture sector Tubewell pumps,		
	18	Diesel-generating sets.		
	19	Macro Level approach for energy conservation at design stage		
	20, 21	Energy efficient technology an overview - merits, demerits, construction of LCD, LED, CFL etc		
	22	Need for energy efficient devices		
	23, 24	Initial cost versus life cycle, cost analysis on life cycle basis		
	25	Energy efficient motors as compared to standard motors		
	26, 27	BIS standards for energy efficient motors, BIS salient design features		
	28	Efficiency as a function of load, safety margins		
	29	Energy efficient lighting system different sources, lumens/watt, LEDs, role of voltage on efficiency		
	30, 31, 32, 33, 34	Distribution system- Optimum cable size, amorphous core transformer, role of power factor, use of compensating capacitors-manual and automatic, location of capacitors		
	35, 36	Calculation of size of capacitor, shunt capacitors, series capacitors		
	37, 38	Construction and design characteristics of energy efficient		



		motors. Losses in energy efficient motors		
	39, 40	Energy audit methodology		
	41, 42	Efficiency of energy conversion processes, monitoring system		
	43	Specific energy consumption –three pronged approach, fine tuning, technical up gradation, avoidable losses		
	44, 45	Case studies of energy audit of distribution system		
	46, 47	Case studies of energy audit of AC motors		
	48, 49	Case studies of energy audit of Industries		
	50, 51, 52, 53, 54	Case studies of energy audit of audit activities		
	55, 56	Need for environmental impact assessment – definition of EIA, history of EIA		
	57, 58	Standard format for assessment and its completion		
	59, 60	Evaluation of the assessment		

## Lesson Plan

**Name of the Faculty :**  
**Discipline :** Electrical Engineering  
**Semester :** 6<sup>th</sup> Semester  
**Subject :** **INSTALLATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT**  
**Lesson Plan Duration :** 15-16 Week

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
	1, 2, 3, 4, 5, 6, 7, 8	Tools, accessories and instruments required for installation, maintenance and repair work Knowledge of Indian Electricity rules, safety codes, causes and prevention of accidents, artificial respiration of an electrocuted person, workmen's safety devices		
	9	Domestic Installation- Introduction		
	10, 11, 12	Testing of electrical installation of a building Testing of insulation resistance to earth b) Testing of insulation and resistance between conductors c) Continuity or open circuit test		
	13, 14, 15, 16, 17, 18, 19, 20	Installation of transmission and Distribution Lines: Erection of steel structures, connecting jumpers, tee-off points, joints and dead ends; crossing of roads, streets, power/telecommunication lines and railway line, clearances; earthing of transmission lines and guarding, spacing and configuration of conductors: Types of arrangement for suspension and strain insulators, bird guards, anti-climbing devices and danger plates; sizes of conductor, earthwire and guy wires, Testing and Commissioning.		
	21, 22	Laying of service lines, earthing, provision of service fuses, installation of energy meters		
	23, 24, 25, 26, 27	Installation of Underground Cables: Inspection, storage, transportation and handling of cables, cable handling equipment, cable laying depths and clearances from other		

		services such as: water pipes, sewerage, gas pipes, power and telecommunication cables and coordination with these services, introduction to cable filling compounds, epoxy resins and hardeners, cable jointing and terminations, testing and commissioning.		
	28, 29, 30	Installation of Transformers Elementary idea regarding inspection and handling of transformers. Installation of power/distribution transformers. Earthing system		
	31, 32, 33, 34, 35	Installation of Substations Installation of pole mounted, plinth mounted and grid substations. Installation of different components of substations viz. busbars, isolators, CT and PT, lightning arrestors, control and relay panels, HT/LT circuit breakers.		
	36, 37, 38	Installation of Motors and Generators Handling and inspection of electric motors and generators (AC and DC), drying out medium voltage distribution panels, testing and commissioning.		
	39, 40, 41	Definition and types of maintenance, maintenance schedules, procedures		
	42	Maintenance of Transmission and Distribution System Authorized persons, danger notice, caution notice, permit to work, arranging of shutdowns personally and temporary earths cancellation of permit and restoration of supply.		
	43	Maintenance of Transmission and Distribution System Patrolling and visual inspection of lines - points to be noted during patrolling from ground; special inspections and night inspections		
	44, 45, 46, 47	Location of faults using Meggar, effect of open or loose neutral connections, provision of proper fuses on service lines and their effect on system, causes of dim and flickering lights		
	48	Maintenance of Distribution Transformers		
	49, 50, 51	Transformer maintenance and points to be attended to in respect of various items of equipment		
	52, 53,	Checking of insulation resistance,		

	54, 55	transformer oil level BDV test of oil and measurement of earth resistance		
	56	Maintenance schedule of distribution transformers		
	57, 58, 59, 60, 61	Maintenance of Grid Substations Checking and maintenance of busbars, isolating switches, HT/LT circuit breakers, LT switches. Power transformers		
	62	Maintenance schedule of grid substation		
	63, 64, 65, 66, 67, 68, 69, 70	Maintenance of Motors Over hauling of motors, preventive maintenance, trouble shooting of electric motors		
	71, 72	Maintenance schedule of AC and		

## Lesson Plan

**Name of the Faculty** :  
**Discipline** : Electrical Engineering  
**Semester** : 6<sup>th</sup> Semester  
**Subject** : EDM  
**Lesson Plan Duration** : 15-16 Week

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
	1	<b>UNIT-1.</b> Introduction to EDM		
	2	Concept /Meaning and its need		
	3	Qualities and functions of entrepreneur and barriers in entrepreneurship		
	4	Sole proprietorship and partnership forms of business organisations		
	5	Schemes of assistance by entrepreneurial support agencies at National, State		
	6	SFC's TCO, KVIB, DIC, Technology Business Incubator (TBI)		
	7	Science and Technology Entrepreneur Parks (STEP).		
	8	District level: NSIC, NRDC, DC:MSME, SIDBI		
	9	NABARD, Commercial Banks		
	10	Assessment of demand and supply in potential areas of growth		
	11	<b>UNIT-2.</b> Market Survey and Opportunity Identification		
	12	Scanning of business environment		
	13	Salient features of National and State industrial policies and resultant business opportunities		
	14	Considerations in product selection Types and conduct of market survey		
	15	<b>Sessional Test-1</b>		
	16	Identifying business opportunity		
	17	Types of market survey		
	18	Conduct of market survey		
	19	<b>UNIT-3.</b> Preliminary project report		
	20	Project report Preparation		
	21	Detailed project report including technical, economic and market feasibility		
	22	Common errors in project report preparations		
	23	Exercises on preparation of project		

		report		
	<b>24</b>	<b>UNIT-4. Introduction to Management</b>		
	<b>25</b>	Definitions and importance of management Functions of management: Importance and Process of planning, organising, staffing, directing and controlling		
	<b>26</b>	Types of industrial organizations: Line organization, Line and staff organization, Functional Organisation		
	<b>27</b>	Principles of management (Henri Fayol, F.W. Taylor) Concept and structure of an organisation		
	<b>28</b>	<b>UNIT-5: Leadership and Motivation</b> Leadership: Definition and Need		
	<b>29</b>	Qualities and functions of a leader, Motivation: Definitions and characteristics		
	<b>30</b>	<b>Sessional Test- 2</b>		
	<b>31</b>	Factors affecting motivation		
	<b>32</b>	Manager Vs leader		
	<b>33</b>	Types of leadership		
	<b>34</b>	Theories of motivation (Maslow, Herzberg, McGregor)		
	<b>35</b>	<b>UNIT-6: Management Scope in Different Areas</b> Human Resource Management : Introduction and objective, Introduction to Man power planning, recruitment and selection Introduction to performance appraisal methods		
	<b>36</b>	Material and Store Management: Introduction functions, and objectives,		
	<b>37</b>	ABC Analysis and EOQ		
	<b>38</b>	Marketing and sales: Introduction, importance, and its functions		
	<b>39</b>	Physical distribution, Introduction to promotion mix, Sales promotion		
	<b>40</b>	Financial Management :Introductions, importance and its functions		
	<b>41</b>	Elementary knowledge of income tax, sales tax, excise duty, custom duty and VAT		
	<b>42</b>	<b>UNIT-7: Miscellaneous Topics</b> Customer Relation Management (CRM), Definition and need, Types of CRM		
	<b>43</b>	Total Quality Management (TQM) :Statistical process control, Total employees Involvement, Just in time (JIT)		
	<b>44</b>	Intellectual Property Right (IPR) :Introductions, definition and its		

		importance, Infringement related to patents, copy right, trade mark		
	<b>45</b>	<b>Sessional Test-3</b>		

## Lesson Plan

**Name of the Faculty** :  
**Discipline** : Electrical Engineering  
**Semester** : 6<sup>th</sup> Semester  
**Subject** : EMPLOYABILITY SKILLS - II  
**Lesson Plan Duration** : 15-16 Week

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
	1	Mock Interview concept, benefits		
	2	Holding Mock interview		
	3	How to face interview		
	4	Preparing for meeting, agenda preparation		
	5	Holding meeting, preparing minute of meeting		
	6	Preparation for group discussion, Taking turns		
	7	Group discussion – concept, types of group discussion		
	8	Holding group discussion		
	9	Seminar preparation		
	10	Holding seminars		
	11	Presentation : Elements of good presentation		
	12	Structure and tools of presentation		
	13	Paper reading		
	14	Power point presentation		
	15	Viva voce and evaluation		