


Sr.No.	Chapter	Topics	Date	Remarks
1	Introduction to PLC	Relays based logic circuits, limitations of relays based logic circuit	10 Mar 21	
2		Concept of PLC, Advantages of PLCs over electromagnetic relays based logic circuits,	12 Mar 21	
3		Different programming languages used in PLC	15 Mar 21	
4		General Discussion about unit 1	16 Mar 21	
5	Architectural Detail and Working of PLC	Basic operation and principle of working of PLC	17 Mar 21	
6		Architectural details of PLC	18 Mar 21	
7		Input & Output Modules in PL, Opto-isolation Circuit in PLC and its need	22 Mar 21	
8		Memory structures in PLC	23 Mar 21	
9	Ladder Logic Programming	HMI (Human Machine Interface) used in PLC system, Power supply requirements in PLC	24 Mar 21	
10		Simple program.	25 Mar 21	
11		Addressing in PLC: I/O Address	30 Mar 21	
12		Basic instructions xamine ON, Examine OFF, Latch/Unlatch, Output Energize, Hold ON.	31 Mar 21	
13	Applications of PLCs	Timer instructions: On delay timer, Off delay timer, retentive/non-retentive timers,	1 Apr 21	
14		Resetting of Timers. Introduction to counters	5 Apr 21	
15		Up counter ,Down counter, Programs	6 Apr 21	
16		Resetting of counter, UP down counter.	7 Apr 21	
17	Ladder Logic Programming	Comparison Instuctions, equal, not equal, greater, greater than equal, less than, less than equal	8 Apr 21	
18		Introduction to Ladder Logic programming, Ladder logic programming	12 Apr 21	
19			13 Apr 21	
20			19 Apr 21	
21	Applications of PLCs	description, I/O assignment and ladder logic applications/processes	20 Apr 21	
22			22 Apr 21	
23			26 Apr 21	
24			27 Apr 21	
25	Applications of PLCs	Forward/reverse control of motor using PLC	28 Apr 21	
26		Process Control (Stirred tank Heating Control)	29 Apr 21	
27		Car parking control	3 May 21	
28		Doorbell operation	4 May 21	
29	8051 Micro Controller – Over View	Traffic light control	5 May 21	
30		Difference between Microprocessor & Microcontroller	6 May 21	
31		Architectural Detail of 8051 microcontroller	10 May 21	
32		Pin details of 8051 microcontroller	11 May 21	
33	Assembly language programming in 8051	I/O Port Structure	12 May 21	
34		Memory Organization in 8051	13 May 21	
35		Special Function Registers	17 May 21	
36		Instructions in 8051 Microcontroller	18 May 21	
37	Design and Interface using 8051 Microcontroller	Addressing Modes in 8051 Microcontroller	19 May 21	
38		Timer operation	20 May 21	
39		Interrupts in 8051	25 May 21	
40		Structure of Assembly Language	27 May 21	
41	Design and Interface using 8051 Microcontroller	Assemblers and Compilers, Assembler Directives	31 May 21	
42		Keypad interface,	1 Jun 21	
43		7- Segment interface,	2 Jun 21	
44			3 Jun 21	
45	PIC ,Arduino board		7 Jun 21	
46			8 Jun 21	
47		Stepper Motor interface	9 Jun 21	
48			10 Jun 21	
49	PIC ,Arduino board	Introduction to PIC Microcontroller and Arduino board	16 Jun 21	
50			17 Jun 21	
51			18 Jun 21	
52			19 Jun 21	
53			21 Jun 21	
54			22 Jun 21	
55			24 Jun 21	
56			28 Jun 21	
57			29 Jun 21	
58			30 Jun 21	
59			1 Jul 21	
60	5 Jul 21			
		Review		

Total Planned Lec. = 60

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Lesson Plan

semester 6th

Estimation & Costing In Electrical Engineering

05/03/2021

Sl. No.	Chapter	Topics	Date	Remarks	
1	Introduction	Purpose of estimating and costing	10 Mar 21		
2		proforma for making estimates	12 Mar 21		
3		preparation of materials schedule, costing, price list	17 Mar 21		
4		tender document, Tenders – its constituents, finalization, specimen tender.	18 Mar 21		
5		net price list, market survey, overhead charges, contingency, profit,	20 Mar 21		
6		labour charges, electrical point method and fixed percentage method,	24 Mar 21		
7		purchase system, enquiries, comparative statements, orders for supply,	26 Mar 21		
8	Types of wiring	Cleat, batten	27 Mar 21		
9		casing capping and conduit wiring	31 Mar 21		
10		comparison of different wiring systems	1 Apr 21		
11		selection and design of wiring schemes	3 Apr 21		
12		Selection of wires and cables, wiring accessories and use of protective devices MCB, ELCB etc. Use of wire-gauge and tables (to be prepared/arranged)	7 Apr 21		
13	Estimating and Costing:	Domestic installations; standard practice as per IS and IE rules	8 Apr 21		
14		Planning of circuits, sub-circuits and position of different accessories, electrical layout, preparing estimates including cost as per schedule rate pattern and actual market rate (single storey and multi-storey buildings having similar electrical load)	9 Apr 21		
15			16 Apr 21		
16			17 Apr 21		
17			22 Apr 21		
18			23 Apr 21		
19		Industrial installations; relevant IE rules and IS standard practices,	24 Apr 21		
20	Transmission line and substations	planning, designing and estimation of installation for single phase motors of different ratings, electrical circuit diagram, starters, preparation of list of materials, estimating and costing exercises on workshop with single-phase, 3-phase motor load and the light load (3-phase supply system)	28 Apr 21		
21			29 Apr 21		
22			30 Apr 21		
23			1 May 21		
24			5 May 21		
25		Service line connections estimate for domestic and Industrial loads (over-head and Under- ground connections) from pole to energy meter.		6 May 21	
26				7 May 21	
27				12 May 21	
28				13 May 21	
29				15 May 21	
30	Transmission line and substations	Transmission and distribution lines (overhead and underground) planning and designing of lines with different fixtures, earthing etc. based on unit cost calculations	19 May 21		
31			20 May 21		
32			21 May 21		
33			22 May 21		
34			27 May 21		
35			28 May 21		
36			29 May 21		
37			2 Jun 21		
38			3 Jun 21		
39			Substation: Types of substations, substation schemes and components, estimate of 11/0.4 KV pole mounted substation up to 200 KVA rating, earthing of substations, Key Diagram of 66 KV/11KV Substation.	4 Jun 21	
40	5 Jun 21				
41	9 Jun 21				
42	10 Jun 21				
43	11 Jun 21				
44	16 Jun 21				
45	17 Jun 21				
46	Review	18 Jun 21			
47		19 Jun 21			
48		24 Jun 21			
49		25 Jun 21			
50		26 Jun 21			
51		30 Jun 21			
52		1 Jul 21			
53	2 Jul 21				
54		3 Jul 21			



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Lesson plan

Name of Faculty		Sh. Ashok Kumar
Discipline		Electrical Engineering
Semester		6Th
Subject		Utilization of Electrical Energy
Lesson Plan Duration		From 08 Mar 21 to 05 July 21
Work load (Theory + Practical) Per Week		(04+00)
Week	Theory	
	Lecture Day	Topics
1 st	04	1.1 Advantages of Electric Drives 1.2 Characteristics of different mechanical loads 1.3 Types of Motors used as electric drive *Revision of syllabus covered during week
2 nd	04	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. *Revision of syllabus covered during week
3 rd	04	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. 2.1 Nature of light, visibility spectrum curve of relative sensitivity of human eye and wave length of light *Revision of syllabus covered during week
4 th	04	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 Different type of lamps, construction and working of incandescent and discharge lamps- their characteristics, fittings required for filament lamp, mercury vapor, sodium lamp, fluorescent lamp, halogen lamp, neon lamp, Compact fluorescent lamp, LED lamps. *Revision of syllabus covered during week
5 th	04	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 *Revision of syllabus covered during week
6 th	04	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 *Revision of syllabus covered during week
7 th	04	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 *Revision of syllabus covered during week
8 th	04	3.2.5 Infra-red heating and its applications 3.2.6 Microwave heating and its applications 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 *Revision of syllabus covered during week
9 th	04	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 aluminum and copper materials *Revision of syllabus covered during week
10 th	04	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 *Revision of syllabus covered during week
11 th	04	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 *Revision of syllabus covered during week
12 th	04	6.2 Description and Working of Electrical circuits used in 6.2.1 Refrigerator, 6.2.2 Air-conditioner 6.2.3 Water cooler *Revision of syllabus covered during week
13 th	04	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 *Revision of syllabus covered during week
14 th		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

HL/F
10.03.21

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Lectures =4, Practical = -- (per week)

Sr.No.	Chapter	Topics	Date	Remarks
1	Review of Various Energy Sources	Brief overview of present energy scenario in India and worldwide	8 Mar 21	
2		Brief overview of share (in %age) of various energy sources in present energy scenario in India	9 Mar 21	
3		Brief overview of share (in %age) of various energy sources in present energy scenario worldwide	10 Mar 21	
4		Basic concept and importance of Energy Management.	15 Mar 21	
5	Energy Conservation	Energy Conservation and its Need	16 Mar 21	
6		Energy Conservation opportunities & energy efficient technologies in domestic and industrial sectors	17 Mar 21	
7		Energy Efficient lighting: Methods/Technologies of energy efficient lighting systems	18 Mar 21	
8		Energy Efficient lighting: Methods/Technologies of energy efficient lighting systems	22 Mar 21	
9		Heating: Energy efficient Methods/Technologies for energy savings in Furnaces	23 Mar 21	
10		Heating: Energy efficient Methods/Technologies for energy savings in Furnaces	24 Mar 21	
11		Heating: Ovens, Boilers, Heat Exchangers, Cooling Towers, and Pumps	25 Mar 21	
12		Heating: Ovens, Boilers, Heat Exchangers, Cooling Towers, and Pumps	30 Mar 21	
13		Cooling Systems : Methods/Technologies for Energy Savings in Ventilating systems	31 Mar 21	
14		Cooling Systems : Methods/Technologies for Energy Savings in Ventilating systems	1 Apr 21	
15		Energy Efficient Motors, Soft Starters, and Variable Frequency Drives	5 Apr 21	
16		Energy Efficient Motors, Soft Starters, and Variable Frequency Drives	6 Apr 21	
17		Power Factor improvement devices and their significance in energy conservation	7 Apr 21	
			Power Factor improvement devices and their significance in energy conservation	
18	Energy Conservation in Transmission and Distribution Systems	Amorphous Core Transformers	8 Apr 21	
19		Reactive power compensation	12 Apr 21	
20		Reactive power compensation	13 Apr 21	
21		Demand Side Management	19 Apr 21	
22		Demand Side Management	20 Apr 21	
23		Losses in transmission and distribution system	22 Apr 21	
24		Losses in transmission and distribution system and its minimization	26 Apr 21	
25	Losses in transmission and distribution system and its minimization	27 Apr 21		



26		Need of Energy Audit, Types of Energy Audit	28 Apr 21	
27		Types of Energy Audit: Preliminary Audit, General or Mini audit	29 Apr 21	
28		Types of Energy Audit: Comprehensive Audit	3 May 21	
29		Energy Audit methodologies/Procedure	4 May 21	
30		Energy Audit methodologies/Procedure	5 May 21	
31		Energy Flow Diagram and its importance	6 May 21	
32		Energy Flow Diagram and its importance	10 May 21	
33		Measurements in energy audit	11 May 21	
34		List of measuring instruments and equipment used in energy audit	12 May 21	
35		List of measuring instruments and equipment used in energy audit	13 May 21	
36		Questionnaires for the energy audit	17 May 21	
37		Questionnaires for the energy audit	18 May 21	
38		Energy audit checklist	19 May 21	
39		Calculation of payback period	20 May 21	
40	Energy Audit	Case studies (any Two) of Energy Audit of any Commercial building	24 May 21	
41		Case studies (any Two) of Energy Audit of any Commercial building	25 May 21	
42		Case studies (any Two) of Energy Audit of any Commercial building	27 May 21	
43		Case studies (any Two) of Energy Audit of any Commercial building	31 May 21	
44		Case studies (any Two) of Energy Audit of any Small Industrial installation	1 Jun 21	
45		Case studies (any Two) of Energy Audit of any Small Industrial installation	2 Jun 21	
46		Case studies (any Two) of Energy Audit of any Small Industrial installation	3 Jun 21	
47		Case studies (any Two) of Energy Audit of any Small Industrial installation	7 Jun 21	
48		Energy and Environment	Environment and social concerns related to energy utilization	8 Jun 21
49			Environment impact assessment	9 Jun 21
50	Environment impact assessment and its need		10 Jun 21	
51	Environmental impact assessment in India		14 Jun 21	
52	Review		15 Jun 21	
53			16 Jun 21	
54			17 Jun 21	
55			21 Jun 21	
56			22 Jun 21	
57			23 Jun 21	
58			28 Jun 21	
59			29 Jun 21	
60			30 Jun 21	
61			1 Jul 21	
62	5 Jul 21			

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Lesson Plan
Electrical Engineering Department
Electrical Power System-III

Lectures =4, Practical = 4 (2*2 per week)

Date: 05/03/2021

No.	Chapter	Topics	Date	Remarks
1	Introduction to Switchgear	Switchgear, Essential features of Switchgear		
2		Switchgear elements and its operation	8 Mar 21	
3		Switchgear elements and its operation	9 Mar 21	
4		Bus-bar arrangements	12 Mar 21	
5		Concept of short-circuit, short circuit current	15 Mar 21	
6		Types of faults: symmetrical faults, unsymmetrical faults	16 Mar 21	
7	Power System Faults	Unsymmetrical faults: Analysis of L-to-L	19 Mar 21	
8		Unsymmetrical faults: Analysis of L-to-L	20 Mar 21	
9		Unsymmetrical faults: Analysis of L-to-G	22 Mar 21	
10		Unsymmetrical faults: Analysis of L-to-G	23 Mar 21	
11		Unsymmetrical faults: Analysis of L-L-to-G faults	26 Mar 21	
12		Unsymmetrical faults: Analysis of L-L-to-G faults	27 Mar 21	
13		Advantages and disadvantages of fuse	30 Mar 21	
14	Fuses	Desirable characteristics of fuse element, fuse element materials		
15		Important terms related to fuse: current rating of fuse element, fusing current fusing factor	3 Apr 21	
16		Important terms related to fuse: current rating of fuse element, fusing current fusing factor	5 Apr 21	
17		Important terms related to fuse: Cut-off current, arcing time and breaking capacity	6 Apr 21	
18		Important terms related to fuse: Cut-off current, arcing time and breaking capacity	9 Apr 21	
19		Types of fuse: LV fuse and HV fuse	12 Apr 21	
20		LV fuse: semi-enclosed rewritable fuse and HRC fuse-their construction and working	13 Apr 21	
21		LV fuse: semi-enclosed rewritable fuse and HRC fuse-their construction and working	16 Apr 21	
22		HV fuse: cartridge type, liquid type their construction & working	17 Apr 21	
23		HV fuse: metal clad type-their construction & working	19 Apr 21	
24		Circuit Breakers	Difference between Switch, Isolator and Circuit Breakers	20 Apr 21
25	Function of Isolator and Circuit breaker		23 Apr 21	
26	Difference between Fuse and Circuit Breaker		24 Apr 21	
27	Arc phenomenon in circuit breaker: principles and methods of arc extinction		26 Apr 21	
28	Arc phenomenon in circuit breaker: principles and methods of arc extinction		27 Apr 21	
29	Terms related to circuit breaker: arc voltage, re-striking voltage		30 Apr 21	
30	Terms related to circuit breaker: recovery voltage		1 May 21	
31	Construction, working principles: types and applications of Air-Blast Circuit Breaker		3 May 21	
				4 May 21

32		Construction, working principles: types and applications of Air-Blast Circuit Breaker	7 May 21
33		Construction, working principles :Oil Circuit Breaker	10 May 21
34		Construction, working principles :Oil Circuit Breaker	11 May 21
35		Construction, working principles :Vacuum Circuit Breaker	15 May 21
36		Construction, working principles :SF6 Circuit Breaker	17 May 21
37		Comparison between various types of Circuit Breakers in terms of their features and application areas	18 May 21
38		Circuit breaker rating: breaking capacity, making capacity and short-time rating	21 May 21
39	Protective Relays	Introduction: fundamental requirement of relay, function of relay	22 May 21
40		Electromagnetic attraction type relay	24 May 21
41		Electromagnetic induction type relays	25 May 21
42		Instantaneous relay, Inverse Time Relay	28 May 21
43		Definite Time lag relay, Relays Terminology: Pick-up Current, Current Setting, Plug Setting Multiplier (PSM)	29 May 21
44		Time Setting Multiplier (TSM), Time/PSM Curve, Distance or Impedance	31 May 21
45		Definite-distance and time distance impedance relay	1 Jun 21
46		Differential Relays: current differential and voltage balance differential relay	4 Jun 21
47		Brief idea of Static and Microprocessor based relays & their applications	5 Jun 21
48		Protection Schemes in Power System	Differential Protection Scheme for Alternators
49	Protection Schemes for Transformer, Buchholz relay		8 Jun 21
50	Merz-price voltage balance protection scheme for bus-bar and transmission line		11 Jun 21
51		Earth fault or Leakage Protection	14 Jun 21
52	Over-voltage Protection	Introduction: voltage surge, causes of overvoltage	15 Jun 21
53		Lightening, lightening arresters such as rod gap, horn gap, multi-gap, expulsion type and valve type arrester	18 Jun 21
54		Brief idea about surge absorber	19 Jun 21
55		Transmission Line and substation protection against over-voltages	21 Jun 21
56	Review		22 Jun 21
57			25 Jun 21
58			26 Jun 21
59			28 Jun 21
60			29 Jun 21
61			2 Jul 21
62			3 Jul 21
63			5 Jul 21

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