

Lesson Plan			
<b>Faculty</b>			
<b>Discipline</b>	Electrical Engineering		
<b>Semester</b>	4th		
<b>Subject</b>	Programmable logic controllers and Microcontrollers		
<b>Duration</b>	15 Weeks		
<b>Work Load per Week</b>	Lecture – 03 ; Practical - 04		
Week	Topic	Practical day	Topic
1st	Fundamentals of PLC Introduction,	1st	1. Introduction to PLC building blocks and Ladder Programming.
	Definition and advantage;		
	Building blocks of PLC: CPU, Memory organization,		
2nd	Input- output modules (discrete and analog), Specialty I/O Modules, Power supply; I/O module selection criteria;	2nd	2. Installation and programming using OpenPLC.
	Interfacing different I/O devices with appropriate I/O modules		
	Revision of Unit I		
3rd	Class test No.1	3rd	3. Logic operations in PLC using ladder language e.g. AND, OR, NOT etc.
	PLC Instructions and Programming,		
	PLC programming Instructions: Relay type instructions,		
4th	Timer instructions: On delay, off delay, retentive, counter instructions:	4th	4. Timers and Counters instructions in PLC using ladder language.
	Up, Down, High speed, Logical instructions		
	Comparison Instructions, Data handling Instructions,		
5th	Simple Programming examples using ladder logic:	5th	5. Sequence control system e.g. in lifting a device for packaging and counting.
	Arithmetic instructions. Language based on relay, timer counter,		
	logical, comparison, arithmetic and data handling instructions.		
6th	Class test No.02	6th	6. Use of PLC in any two applications (teacher may decide): a) Traffic Lights System b) Doorbell Operation c) Home Automation d) Sorting of Objects
	Applications of PLC		
	PLC Based Applications:		
7th	Motor sequence control, Motor in forward and reverse direction	7th	7. Demonstration and comparison of various 8051/8052 microcontrollers.
	StarDelta, DOL Starters Traffic light control,		
	, Elevator control, Conveyor system,		
8th	Stepper motor control, packaging etc.	8th	8. Introduction to 8051 programming using C.
	Class test no.03		
	Architecture of Microcontroller 8051		

9th	Difference between micro processor and micro controller,	9th	9. Testing of GPIO on Micro controller board using C
	Block diagram of 8051,		
	function of each block,		
10th	Pin diagram, function of each pin	10th	10. Interfacing of 7 segment LED with 8051 using C sensors:
	Concept of Internal memory and External memory (RAM and ROM), Internal RAM structure,		
	Reset and clock circuit, Various registers and SFRs of 8051		
11th	Class Test No 04	11th	. 11. Interfacing of 4x3/4x4 Keypad with 8051 using C.
	Microcontroller Instruction		
	Programming Instruction set		
12th	Addressing modes:	12th	12. Any three application circuits using 8051/8052 (teacher may decide): a) Car Parking with Counter b) Temperature controlled Fan c) RTC based digital clock d) Agriculture Automation using Humidity, Soil Moisture and Temperature
	Timer operation, Serial Port operation, interrupts		
	Data Transfer operations,		
13th	Input/output operations.	13th	File Checking and Viva Voice
	Design and Interface: keypad interface,		
	7- segment interface, LCD, stepper motor; applications.		
14th	Class Test No.05	14th	File Checking and Viva Voice
	Revision of PLC		
	Revision of Microcontroller 8051		
15th	Discussion of previous year HSBTE question papers	15th	Internal Practical viva voce
	Class test Discussion of previous year HSBTE question papers		
	Revision of complete syllabus		

## Lesson Plan

**Name of the Faculty:**

**Discipline : Electrical Engineering**

**Semester : 4th**

**Subject : Utilisation of Electrical Energy**

**Lesson Plan Duration : 15 Weeks**

**Work load (Lecture/Practical) per week (in Hours):Lecture-03,Practical -00**

Week	Day	Topic
1	1	Introduction Of The Subject
	2	Application of UEE
	3	Scope of the Subject
2		I Illumination Introduction, terms used in illumination, laws of illumination,
		indoor and outdoor illumination levels.
3		Discharge lamps, MV and SV lamps. General ideas about time switches, street lighting, flood lighting and decorative lighting.
		Electric Heating & Electric Welding
4		Advantages and methods of electric heating,. resistance heating,
		induction heating, and dielectric heating.
5		Electric welding, resistance and arc welding electric welding equipment,
		comparison between A.C. and D.C, Welding
6		Assignment no.1 Test no.1
		Electrolytic Processes Need of electro-deposition ; Laws of electrolysis ,process of electro-deposition ; clearing, operation, deposition of metals, polishing and buffing;
8		Principle of galvanizing and its applications; Principles of anodizing and its applications;
		Electroplating of non-conducting materials,
9		Electrical Circuits used in Refrigeration & Air Conditioning and Water Coolers Assignment no.2 Test no.2
		Electric Drives Electric Drive and its part, Advantages of electric drives, Types of electric Drives, Characteristics of different mechanical loads,
12		Types of motors used in used in Industrial Drives, Factors affecting selection of motors,. Applications of Electric Drive. Introduction to Energy efficient drives Electrical Traction Advantages of electric traction, Concept of diesel electric Traction system, Systems of Track Electrification (DC & AC system)
		types of services – urban, sub-urban, and main line and their speed-time curves.
13		Electrical block diagram and accessories of an electric locomotive and different accessories for track electrification such as overhead centenary wire, conductor

		rail system, current collector / pantograph etc.
		Power supply arrangements and types of motors used for electric traction. Starting and braking of electric locomotives.
14		Introduction to EMU and metro railways
		Assignment no.3
		Test no.3
15		Revision of Unit I & Unit II
		Revision of Unit II & Unit III
		Previous HSBTE Exam Papers solved

**LESSON  
PLAN**

<b>Faculty</b>	:		
<b>Discipline</b>	:	ELECTRICAL ENGINEERING	
<b>Semester</b>	:	4th	
<b>Subject</b>	:	ECEE	
<b>Duration</b>		<b>15 Weeks</b>	
<b>Work Load (Lecture) per week (in hours)</b>	:	Theory- 03; Practical:02	
<b>Week</b>		<b>Theory</b>	
	<b>Lecture Day</b>	<b>Topic</b>	
<b>1st</b>	<b>1st</b>	Introduction to the subject and the marks distribution	Introduction to the subject and the marks distribution
	<b>2nd</b>	Essentials of Estimation and Costing	
	<b>3rd</b>	1.1 Introduction :Purpose of estimating and costing, proforma for making estimates	
<b>2nd</b>	<b>1st</b>	preparation of materials schedule, costing, price list, net price list, market survey, overhead charges, labour charges, electrical point method and fixed percentage method, contingency, profit	1. Prepare a tender notice for purchasing a transformer of 200 KVA for commercial installation.
	<b>2nd</b>	1.2 Tenders and Quotations-Type of tender, tender notice, preparation of tender document, and method of opening of tender, Quotation-quotation format, comparison between tender and quotation, Comparative statement, format comparative statement. Earnest money deposit (EMD), purchase system, orders for supply, payment of bills	
	<b>3rd</b>	Test of Chapter No. 01	
<b>3rd</b>	<b>1st</b>	Domestic Installation 2.1 Wiring and accessories: Introduction, types of wiring: Cleat, batten, casing capping and conduit wiring,	2. Prepare a quotation for purchasing different electrical material required.
	<b>2nd</b>	comparison of different wiring systems, selection and design of wiring schemes. Selection of wires and cables, wiring accessories and use of protective devices i.e. MCB, ELCB etc. Use of wire-gauge and tables (to be prepared/arranged).	
	<b>3rd</b>	2.2 Domestic installations: standard practice as per IS and IE rules	
<b>4th</b>	<b>1st</b>	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 story and multi-story buildings having similar electrical load).	3. Prepare a comparative statement for above material. Prepare purchase order for the same.
	<b>2nd</b>	Test of Chapter No. 02	
	<b>3rd</b>	Industrial Installation 3.1 Industrial installations: relevant IE rules and IS standard practices, planning, designing and estimation of installation for single phase motors of different ratings,	
<b>5th</b>	<b>1st</b>	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).	4. Prepare an estimate for a Two room residential building as per given plan.
	<b>2nd</b>	Continued	
	<b>3rd</b>	Assignment no. 01	
<b>6<sup>th</sup></b>	<b>1st</b>	3.2 Design electrical installation scheme of factory/ small industrial unit, Preparation of material schedule and detailed estimation.	Quiz No. 01 and Viva Voce
<b>6<sup>th</sup></b>	<b>2nd</b>	Continued	

	<b>3rd</b>	Test of Chapter No. 3	
<b>7th</b>	<b>1st</b>	Street Lighting Installation 4.1 Classification of outdoor installations streetlight/ public lighting installation,	5. Design electrical installation scheme for any one factory / small industrial unit. Draw detailed wiring diagram. Prepare material schedule and detailed estimate. Prepare report and draw sheet
	<b>2nd</b>	Continued	
	<b>3rd</b>	Street light pole structures. Selection of equipments, sources used in street light installations. Cables, recommended types and sizes of cable. Control of street light installation.	
<b>8th</b>	<b>1st</b>	Continued	Continued
	<b>2nd</b>	4.2 Design, estimation and costing of streetlight, Preparation of tenders.	
	<b>3rd</b>	Continued	
<b>9th</b>	<b>1st</b>	Continued	6. Estimate with a proposal of the electrical Installation of streetlight scheme for small premises after designing.
	<b>2nd</b>	Test of Chapter No. 4.1	
	<b>3rd</b>	Test of Chapter No. 4.2	
<b>10th</b>	<b>1st</b>	Distribution Line and LT Substation	7. Prepare an estimate for service connection for residential building having connected load kW.
	<b>2nd</b>	Continued	
	<b>3rd</b>	Transmission and distribution lines (overhead and underground)	
<b>11th</b>	<b>1st</b>	Continued	Quiz No. 02 and Viva Voce
	<b>2nd</b>	Assignment no. 02	
	<b>3rd</b>	planning and designing of lines with different fixtures, earthing etc. based on unit cost calculations	
<b>12th</b>	<b>1st</b>	Service line connections estimate for domestic and industrial loads (overhead and underground connections) from pole to energy meter.	8. Estimate with a proposal of the L.T. line installation. Prepare report and draw sheet.
	<b>2nd</b>	Substation: Types of substations, substation schemes and components,	
	<b>3rd</b>	estimate of 11/0.4 kV pole mounted substation up to 200 kVA rating, earthing of substations.	
<b>13th</b>	<b>1st</b>	Test of Chapter no. 05	9. Estimate with a proposal of the 500 KVA, 11/0.433 KV outdoor substation and prepare a report. 10. Visit a nearby substation and list the components with diagram
	<b>2nd</b>	Assignment no. 03	
	<b>3rd</b>	Revision test of Chapter No. 01	
<b>14th</b>	<b>1st</b>	Revision test of Chapter No. 02	Internal assessment and Viva Voce
	<b>2nd</b>	Revision test of Chapter No. 03	
	<b>3rd</b>	Revision test of Chapter No. 4	
<b>15th</b>	<b>1st</b>	Revision test of Chapter No. 5	Internal assessment and Viva Voce
	<b>2nd</b>	Revision	
	<b>3rd</b>	Revision	

**Name of the Faculty:**

**Discipline : Electrical Engineering**

**Semester : 4th**

**Subject : Electrical Machines-II**

**Duration : 15 Weeks**

**Work load (Lecture/Practical) per week (in Hours):Lecture-03,Practical -04**

<b>Week</b>	<b>Day</b>	<b>Topic</b>	<b>Practical</b>
1	1	Introduction Of The Subject, Its Need, Applications	1. To Plot relationship between no load terminal voltage and excitation current in a synchronous generator at constant speed
	2	Synchronous Machines	
	3	1.1 Main constructional features of synchronous machine including commutator	
2	4	1.2 Generation of three phase emf	2. Determination of the relationship between the terminal voltage and load current of an alternator, keeping excitation and speed constant.
	5	1.3 Production of rotating magnetic field in a three phase winding	
	6	1.4 E.M.F. Equation, Concept of distribution factor and coil span factor	
3	7	1.5 Operation of single synchronous machine independently supplying a load, voltage regulation by synchronous impedance method	3. Determination of the efficiency of alternator from the open circuit and short circuit test.
	8	1.6 Need and necessary conditions of parallel operation of alternators, synchronizing an alternator (Synchroscope method) with the bus bars	
	9	1.7 Operation of synchronous machine as motor, Starting methods of Synchronous Motor	
4	10	1.8 Concept and Cause of hunting and its prevention	4. Parallel operation of three phase alternators.
	11	1.9 Specification of Synchronous Machine	
	12	1.10 Cooling of synchronous machines	
5	13	1.11 Application of synchronous machines (as a synchronous condenser)	5. Study of ISI/BIS code for 3-phase induction motors.
	14	Assignment No 01	
	15	Test No.01	
6	16	Three Phase Induction Motors 2.13 Cogging and Crawling in Induction Motors.	6. Perform at least two tests on a 3-phase induction motor as per BIS code.
	17	2.1 Salient constructional features of 3 phase squirrel cage and slip ring induction motors	

	18	2.2 Principle of operation, slip and its significance	
7	19	2.3 Locking of rotor and stator fields	7. To reverse the direction of rotation of three phase induction motor.
	20	2.4 Rotor resistance, inductance, EMF and current	
	21	2.5 Relationship between copper loss and the motor slip	
8	22	2.6 Power flow diagram of an induction motor	8. To control speed of three phase induction motor.
	23	2.7 Factors determining the torque	
	24	2.8 Torque-slip curve, stable and unstable zones	
9	25	2.9 Effect of rotor resistance upon the torque slip relationship	9. Determination of efficiency of three-phase induction motor by (a) No load test and blocked rotor test. (b) Direct loading (refer BIS code).
	26	2.10 Starting of 3-phase induction motors by DOL, star-delta and auto transformer starter	
	27	2.11 Causes of low power factor of induction motors	
10	28	2.12 Speed control of induction motor	10. Determination of effect of rotor resistance on torque speed curve of an induction motor.
	29	Assignment No 02	
	30	Test No.02	
11	31	Single Phase Induction Motors:	
	32	3.1 Single phase induction motors; Construction characteristics and applications	11. To Plot Torque-Slip Characteristics of three-phase induction Motor.
	33	3.2 Nature of field produced in single phase induction motor	
12	34	3.3 Split phase induction motor: Capacitors start and run motor, Shaded pole motor and Reluctance start motor	12. Study of performance of a ceiling fan with and without capacitor
	35	3.4 Alternating current series motor and universal motors	
	36	Assignment No.03	
13	37	Special Purpose Machines	.13. Study the effect of change in capacitor on the performance of single phase induction motor
	38	4.1 Working principle of Linear induction motor, Stepper motor and Servomotor	
	39	4.2 Introduction to Energy efficient Motors.	
14	40	Test No. 03	.
	41	Revision of Unit I	14. To reverse the direction of rotation of single phase induction motor
	42	Revision of Unit II	
15	43	Revision of Unit III	
	44	Revision of Unit IV	File Checking and Viva
	45	Previous HSBTE Exam Papers Solved	File Checking and Viva