ELECTRICAL ENGINEERING DEPARTMENT

LESSON PLANS

(August-November 2026)

Name of the Faculty	Dr SARIKA SHARMA
Discipline	Electrical Engineering
Semester	5th Semester
Subject	Solar Panel Installation and Maintenance
Lesson Plan Duration	15-16 Week

Week	Theory		Practical	
	Lecture	**Topic (including assignment/test)**	**Practical**	**Topic**
1	1,2	Basic of PV system		
	3	PV Cell, PV panel, PV module		
2	4,5,6	PV Arrays, Photovoltaic I-V Characteristics Curves, conversion efficiency		
3	7,8,9	Selection of Site: Site assessment tools		
4	10,11	Site Location ,Climate Condition		
	12	Solar Irradiance		
5	13,14,15	Solar Insulation ,Sun Angle and PV Orientation, Shading analysis		
6	16,17,18	Tilt angle and its significance in solar panel orientation		
7	19,20,21	PV Module: Series and Parallel connection of PV		
8	22,23	Charger Controller: Function, type of charge controller		
	24	Inverter: Function ,power ratings		
9	25,26	Storage Battery: Battery parameters ,battery bank		
	27	Types of batteries used in solar system		
10	28	PV Mounting Structure :Roof mounted and ground mounted Structure		
	29	Balance of Systems: Disconnecting switches, wires and cables, combiner boxes, net meter, protection devices, earthing and grounding, Solar tracking systems etc.		
	30	Installation Tool: Hand tool ,wire strippers, crimping tools		
11	31	Nuts ,andwashers ,Leveling tools, ground anchors, multi meter		
	32	Clamp on meter ,non-contact thermometer ,angle finder etc		
	33	Types of Solar PV System: Standalone PV system ,On Grid system, Off Grid system		
12	34	Hybrid PV system, Comparison of Different types of PV system		
	35	Design Methodology for SPV system: Calculation of load, Size of solar panel		
	36	Battery sizing, Selection of inverter, Size of charge controller, Cable sizing etc		
13	37	Connection of PV system components		
	38	Operating Hazardous Tools and Equipment: Personal protective equipment(PPE),Fall protection equipment/tools, Fire protection equipment		
	39	Safety of PV system: PV module safety, Electrical Safety, Battery safety		
14	40	Marking and Labeling of PV components		
	41,42	Maintenance of Solar PV system		
15	43,44	Maintenance of Battery		
	45	Installation and Troubleshooting of Solar PV system		
16	46,47	Revision-1		
	48	Revision-2		

Name of the Faculty			Mr VIKRAM SINGH	
Discipline			Electrical Engineering	
Semester			5th Semester	
Subject			ELECTRICAL POWER –I	
Lesson Plan Duration			15-16 Week	
Week	**Theory**		**Practical**	
	Lecture	**Topic (including assignment / test)**	**Day**	**Topic**
1	1,2,3	Main resources of energy, Conventional and non-conventional	1	To measure earth resistance with the help of earth resistance tester.
2	4,5	Different types of power stations, thermal, hydro, gas	2	To study different types of line insulators, line support.
	6	Diesel and nuclear power stations	3	Visit a power generation plant to study its major parts, working and prepare detail report.
3	7,8,9	Flow diagrams and brief details of their operation, Comparison of the generating stations on the basis of running cost, site, starting, maintenance	4	Visit a 400kV/220kV/132kV transmission line and make list of all components viz line supports, conductors, insulators and other accessories and prepare detail report.
4	10,11,12	Importance of non-conventional sources of energy in the present scenario, Brief details of solar energy, bio-energy, wind energy	5	Visit to a 66kV/33kV/11kV/415V/230V distribution line make list of all components viz line
5	13, 14,15	Fixed and running cost, Load estimation, load curves, demand factor	6	To determine experimentally flash over voltage of transformer oil and hence determine the dielectric strength
6	16,17, 18	Load factor, diversity factor, power factor and their effect on cost of generation, simple problems there on	7	To measure the rating of capacitor bank installed in a sub-station for improving power factor
7	19, 20	Base load and peak load power stations, inter-connection of power stations and its advantages, concept of regional and national grid	8	Study of Indian Electricity rules as per BIS standard related to clearance of overhead transmission and distribution lines
	21	Layout of transmission system, selection of voltage for H.T and L.T lines, advantages of high voltage for Transmission of power in both AC and DC	9	Draw a layout diagram of 11kV/400V substation installed in the campus and make list of all accessories
8	22, 23	Comparison of different systems: AC versus DC for power transmission	10	To find fault in underground cables by Murray Loop Test/ Varley Loop Test.
	24	Conductor material and sizes from standard tables	11	Study of data related to conductors of different sizes/types for overhead lines as per IS 398.
9	25, 26, 27	Types of supports, types of insulators, Types of conductors, Selection of insulators, conductors, earth wire and their accessories	12	Visit to a distribution substation to study layout of major components and types of Feeders, Distributors and Service Mains and prepare detailed report.
10	28	Transposition of conductors and string efficiency of suspension type insulators, Bundle Conductors, Mechanical features of line: Importance of sag, calculation of sag		
	29	Effects of wind and ice related problems; Indian electricity rules pertaining to clearance		
	30	Electrical features of line: Calculation of resistance inductance and capacitance without derivation in a.c. transmission line, voltage regulation, and concept of corona.		
11	31, 32	Effects of corona and remedial measures, Transmission Losses, Lay out of HT and LT distribution system		

	33	Constructional feature of distribution lines and their erection, LT feeders and service mains; Simple problems on AC radial distribution system, determination of size of conductor		
12	34	Preparation of estimates of HT and LT lines (OH and Cables).		
	35,36	Constructional features of LT (400 V), HT (II kV) underground cables, advantages and disadvantages of underground system with respect to overhead system		
13	37	Calculation of losses in distribution system, Faults in underground cables-determine fault location by Murray Loop Test, Faults in underground cables-determine fault location by Murray Loop Test		
	38, 39	Varley Loop Test		
14	40	Varley Loop Test, Brief idea about substations; outdoor grid sub-station 220/132 KV, 66/33 KV out door substation		
	41,42	Pole mounted substations and indoor substation, layout of 33/11 and kV/400V distribution substation and various auxiliaries and equipment associated with it		
15	43, 44, 45	Concept of power factor Reasons and disadvantages of low power factor		
16	46	Methods for improvement of power factor using capacitor banks, VAR Static Compensator (SVC)		
	47, 48	Revision of Topics already covered		

Name of the Faculty	Ms RITIKA ARORA
Discipline	Electrical Engineering
Semester	5th Semester
Subject	Electric Vehicle Technology
Lesson Plan Duration	15-16 Week

Week	Theory		Practical	
	Day	**Topic (including assignment / test)**	**Day**	**Topic**
1	1	Introduction to Electric Vehicles (EV)	1	Draw block diagram of Electric Vehicle and identify its various parts.
	2	History and evolution of Electric Vehicle		
2	3	Policies and regulations related to EV in India	2	Develop schematic diagram of hybrid electric vehicle and its parts.
	4	Needs and Importance of Electric Vehicle		
3	5	Advantages and Disadvantages of Electric Vehicles	3	Prepare a report on batteries used in EV and HEV.
	6	Types of EVs- Battery Electric Vehicle (BEV)		
4	7	PHEV (Plug in Hybrid Electric Vehicle) and Hybrid Electric Vehicle (HEV)	4	Diagnose, repair and maintenance of batteries used in Electric Vehicle.
	8	Mandatory safety precautions while handling Electric Vehicle		
5	9,10	Working principle and Control of motors used in Electric Vehicles- Brushless DC (BLDC) motor	5	Study of various types of braking system used in EV.
6,7	11	Switched Reluctance Motor (SRM)	6	Demonstration of wiring layout of Electric Vehicles using model (if available) or watching videos
	12,13	Permanent Magnet Synchronous Motor (PMSM).	7	Prepare test procedure for electrical equipment used in Electric vehicle.
	14	Advantages and disadvantages of above motors		
8	15	Electric Vehicle Charger	8	List safety procedures and schedule for handling HEVs and EVs.
	16	Main components of EV Charger, EV Charging Sockets		
9	17	Charging of Electric Vehicle	9	Case study of Electric Vehicle available in Indian market and study the technology used in it.
	18	Safety precautions for EV charging		
10, 11	19	Types of batteries used in EVs- dry batteries	10	Measurement of voltage of battery installed in Electric vehicle.
	20,21	Construction and working of Lithium Ion batteries		
	22	Charging & discharging tests of Li-Ion batteries		
12	23	Regenerative braking in EVs		
	24	Battery management system		
13	25	Battery cooling system		
	26	Overview of Hybrid Electric Vehicles		
14	27	Types of HEV (overview) like gasoline ICE & battery, diesel &battery		
	28	Battery & Fuel cell, battery capacitor, battery & flywheel		
15	29	Comparison with EV, advantages and disadvantages of HEV		

	30	Revision Class-1	
16	31,32	Revision Class-2	

Name of the Faculty			Mr AHISHEK KUMAR	
Discipline			Electrical Engineering	
Semester			5th Semester	
Subject			Industrial Electronics and Control of Drives	
Lesson Plan Duration			15-16 Week	
Week	**Theory**		**Practical**	
	Lecture	**Topic (including assignment / test)**	**Day**	**Topic**
1	1	Classification of Thyristors	1	To draw V-I characteristics of an SCR.
2	2,3,4	Construction, working principle and V-I characteristics of SCR, DIAC, TRIAC	2	To draw V-I characteristics of a TRIAC.
3	5	Two transistor analogy of SCR	3	To draw V-I characteristics of a DIAC.
	6	Selection of heat sinks for Thyristors	4	To draw uni-junction transistor characteristics.
	7,8	Methods of triggering a Thyristor and their types, dv/dt and di/dt protection.	5	To observe the output wave shape of an UJT relaxation oscillator.
4	9,10,11	Commutation of Thyristors.	6,7	To observe the output waves shape on CRO of Single phase half controlled full wave rectifier.
5	12,13,14	UJT: Construction, working principles and V-I characteristics. UJT as a relaxation oscillator	8,9	To observe the output wave shape on CRO of Single phase full controlled full wave rectifier.
6		Applications of SCR, DIACS and TRIACS such as light intensity control, speed control of DC and universal motor, fan regulator ,battery charger etc.	10	Illumination control circuit using SCR/TRIAC and observe the wave shape across load.
7	18	Single phase half wave controlled rectifier with resistive load and inductive load, concept of freewheeling diode.	11,12	Speed-control of a DC shunt motor or universal motor using SCR/TRIAC.
	19	Single phase half controlled full wave rectifier.	13	Fan speed regulator using TRIAC.
	20	Single phase full controlled full wave rectifier, Single phase full wave centre tapped rectifier.	14	To study the Construction of battery charger using Thyristor.
8	21	Three phase full wave half controlled bridge rectifier, Three phase full wave fully controlled bridge rectifier.	15	Testing and Installation of UPS.
	22	Inverters: Introduction, working principle, voltage and current driven, series and parallel inverters and applications.		
	23	Choppers: Introduction, types of choppers and their working principle and applications.		
9	24,25	Dual converters: Introduction, working principle and applications.		
	26, 27	Cyclo-converters: Introduction, types, working principle and applications.		
10	28	Concept of electric drive, Advantages of Electric drives.		
	29, 30	DC drives control: Half wave drives, Full wave drives, Chopper drives.		
11	31, 32	AC drives control: Phase control, Variable frequency a.c. drives, Constant V/f control		
	33	Cyclo convertors controlled AC drives.		
12	34, 35	Concept of Electric Braking for AC Drive.		
	36,37	Uninterrupted Power supply (UPS): Working Principle of Online and off Line UPS.		

13	38	Switch mode Power Supply (SMPS): Working Principle and use.		
	39	Power Converter for Electrical Vehicle charging.		
	40	Power Converter for Renewable Energy: solar and wind.		
14,15	41	Revision of Topics already covered		
	42	Class Test		
	43-45	Problems, Doubts & their solution		