GOVT. POLYTECHNIC PANCHKULA

Lesson plan (for Even-semester as per revised curriculum and study scheme)

NameofFaculty		**Mrs. Ritika Arora**		
Discipline		**Electrical Engineering**		
Semester		**2nd(Even-semester)**		
Subject		**ELECTRICALNETWORKS**		
Workload(Theory		**(03+04)**		
Week	**Day**	**Topics**	**No.**	**Practical**
1st	1	Meshanalysis	1	Usevoltmeter,ammetertodeterminecurrentthrough the given branchofa electricnetworkbyapplyingmeshanalysis.
	2	Nodalanalysisusingvoltageandcurrent sources		
	3	Superpositiontheorem		
2nd	1	Thevenintheorem	2	Usevoltmeter,ammetertodeterminecurrentthrough the given branchofa electricnet workbyapplyingnodeanalysis.
	2	Nortontheorem		
	3	Maximumpowertransfertheorem		
3rd	1	Activeandpassivenetwork,LinearandNon Linearnetwork	3	VerificationofSuperpositionTheorem.
	2	Problemsolutionbasedonabovetheorems		
	3	GenerationofalternatingVoltageandcurrent.		
4th	1	Differencebetweenacanddc,Equationof alternatingquantity.	4	VerificationofThevenin'stheorem.
	2	ACTerminology:waveform,cycle,frequency, timeperiod,amplitude		
	3	Instantaneousvalue,alternation,andtheirimportantrelations(timeperiodand frequency,		
5th	1	Angularvelocityandfrequencyetc.)	5	VerificationofNorton'sTheorems.
	2	Valuesofalternating voltage and current:Instantaneousvalue,peakvalueaverage value,		
	3	R.M.S.value,formfactorandpeakfactor		
6th	1	Vectorrepresentationofalternatingquantities	6	VerificationofMaximumPowertransferTheorem.
	2	Conceptofphase,phasedifferenceand phasors		
	3	Representationofelectricalquantitiesthrough phasors		
7th	1	Additionoftwoalternatingquantities: parallelogrammethod,	7	Observe the wave shapeofan alternating supplyonCROandcalculateaverage,RMS value,frequencyandtimeperiod.
	2	A.Ccircuitcontainingpure Resistance,Inductance,Capacitancewiththeconceptof Componentmethodpowerconsumed,		
	3	PhaseAngle,inductiveandcapacitive reactanceetc.		
8th	1	ACseriescircuit:R-L,R-C,R-L-Calongwith theconceptofphasordiagram,	8	Measureinputcurrent,power,powerfactorofR-Lseriescircuitanddrawthepower triangle.
	2	Phaseangle,Impedance,impedance triangle,power,powertriangleetc.		
	3	ConceptofTruepower,apparentpowerand reactivepower,		
	1	Significance,disadvantagesoflowpower factor,causeoflowpowerfactor,		Measureinputcurrent,power,powerfactorofR-Cseriescircuitanddrawthepower

9th	2	Powerfactoranditsimprovementofpowerfactor.	9	triangle.
	3	Activeandreactivecomponentsofcurrent		
10th	1	ResonanceinRLCseriescircuit,Quality(Q)factor	10	Measureinputcurrent,power,powerfactorofR-L-Cseriescircuitanddrawthepowertriangle.
	2	ConceptofACparallelcircuit		
	3	Methodsof solvingparallel AC circuit: vectormethod,		
11th	1	Admittancemethod,symbolicorJ-method	11	Use variablefrequency supply to createresonanceingivenseriesR-L-Ccircuitorby usingvariableinductororvariablecapacitor.
	2	ParallelResonance,Q-factor		
	3	Comparisonofseriesandparallelresonance.		
12th	1	IntroductiontotransientandHarmonicsin A.C.circuits	12	Todeterminecurrent,p.f.,active,reactiveandapparentpowerinR-CparallelA.C. circuit.
	2	5.1 Principle ofgenerationof 3 –ø alternatingemf.		
	3	AdvantagesofPolyphasecircuitoversinglephasecircuit,PhaseSequence.		
13th	1	Typesofthreephaseconnections-Starconnectionanddeltaconnection.	13	Todeterminecurrent,p.f.,active,reactiveandapparentpowerforgivenR-L-Cparallelcircuit with seriesconnectionof resistorandinductorinparallelwithcapacitor.
	2	Conceptofbalancedandunbalancedload.		
	3	Relationbetween phase and line quantitiesofstaranddeltaconnection.		
14th	1	Poly-Phase Systems ,Advantagesof 3Øover1-Ø	14	Usevariablefrequencysupplycreateresonanceingiven parallelR-L-Ccircuitorby usingvariableinductororcapacitor.
	2	SystemStar&deltaconnectionswithphaseandline voltageandcurrentrelations.		
	3	3-phasebalancedandunbalancedcircuits		
15th	1	Powerin3-phasecircuits		
	2	Revision/Review/TestofoldHSBTEPapers		
	3	Revision/Review/TestofoldHSBTEPapers		

Lesson plan

Name of Faculty		**Mr. Mandip Singh**		
Discipline		**Electrical Engineering**		
Semester		**2nd(Even-semester)**		
Subject		**ELECTRICALNETWORKS**		
Lesson Plan		**20 January 2025 to 02 May 2025**		
Workload(Theory		**(04)**		
Week	**Day**	**Topics**	**No.**	**Practical**
1st	1		1	Use voltmeter ,ammeter to determine current through the given branch of a electric network by applying mesh analysis.
	2			
	3			
2nd	1		2	Use voltmeter ,ammeter to determine current through the given branch of a electric network by applying nodeanaly sis.
	2			
	3			
3rd	1		3	Verification of SuperpositionTheorem.
	2			
	3			
4th	1		4	Verification of Thevenins theorem.
	2			
	3			
5th	1		5	Verification of Norton's Theorems.
	2			
	3			
6th	1		6	Verification of Maximum Power transfer Theorem.
	2			
	3			
7th	1		7	Observethewaveshapeofanalternating supplyonCROandcalculateaverage,RMS value, frequen cyandtim eperiod.
	2			
	3			
	1			Measureinputcurrent,power,powerfact

8th	2		8	orofR-Lseriescircuitanddrawthepower triangle.
	3			
9th	1		9	Measure in put current,power,power factorofR-C Series circuit and draw the power triangle.
	2			
	3			
10th	1		10	Measure in put current,power,power factor of R-L-Cseries circuit and draw the power triangle.
	2			
	3			
11th	1		11	Use variable frequency supply to createre sonan ceingiven series R-L-Ccircuitorby Using variable inductor or variable capacitor.
	2			
	3			
12th	1		12	Todeterminecurrent,p.f.,active,reac tiveandapparentpowerinR-CparallelA.C. circuit.
	2			
	3			
13th	1		13	To determine current ,p.f., active ,reactive and apparent power for given R-L-C parallel circuit with series connection of resistor and inductor in parallelwithcapacitor.
	2			
	3			
14th	1		14	Usevariablefrequencysupplycreateresona nceingivenparallelR-L-Ccircuitorby Using variable inductor or capacitor.
	2			
	3			
15th	1			
	2			
	3			

Name of Faculty		**Mr. Mandip Singh**		
Discipline		**Electrical Engineering**		
Semester		**2nd(Even-semester)**		
Subject		**NON-CONVENTIONAL SOURCES OF ENERGY**		
Workload(Practical)		**(02)**		
Week	**Day**	**Topics**	**No.**	**Practical**
1st			1	1. Visit the website of Ministry of New and Renewable Energy Sources and prepare the Datasheet of Potential, Present and Future Scenario of Renewable energy sources in India.
2nd			2	2. Familiarization with the different components used in solar PV plant (standalone and grid connected system), solar water heating system, solar cooker, solar lighting etc.
3rd			3	3. Calculate power flow of a stand-alone PV system with DC load, AC load and battery.
4th			4	4. To demonstrate "I-V Characteristics and Efficiency of 1kWp Solar PV System" with varying radiation and temperature level.
5th			5	5. Assemble the components of solar home lighting system & study the system.
6th			6	6. Assemble the components of solar water heating system system & study the system.
7th			7	7. Identify Troubleshoot solar PV panel, inverter and solar smart metering system.

8th			8	8. Identify the specified components of a 1 KW Small Wind Turbine (SWT) system and study them.
9th			9	9. Estimation of wind speed using anemometer.
10th			10	10. Study of charging and discharging behavior of a capacitor.
11th			11	11. Study of charging characteristics of a Ni-Cd battery using solar photovoltaic panel.
12th			12	12. Identify the prime mover /turbines used in different renewable energy sources for power generation and study them.
13th			13	13. Study the Performance of fuel cell.
14th			14	14. Identify the routine maintenance parts of the micro hydro power plant after watching a video
15th				Visit nearby renewable power plant and write specification of each components used in• that plant.

GOVT. POLYTECHNIC PANCHKULA
ELECTRICAL ENGINEERING
Lesson plan (for Even-semester as per revised curriculum and study scheme)

Name ofFaculty		**Mrs. Ritika Arora**		
Discipline		**Electrical Engineering**		
Semester		**2nd(Even-semester)**		
Subject		**Non- Conventional Energy Sources**		
Workload(Theory		**(02+02)**		
Week	**Day**	**Topics**	**No.**	**Practical**
1	1	DiscussionofCourseObjective ofNCES subject/ Syllabus,Unit :1 Introduction to Basics of Energy	1	Familiarization with the different components used insolarPVplant(standaloneandgridconnectedsystem),solar water heating system, solarcooker, solar lightingetc.
	2	Classification of Energy-primary and secondaryenergy,commercialandnon-commercialenergy		
2	1	Unit:1Importanceofnon-conventionalenergy sources, Present scenario, Future Prospectus	2	Calculate power flow of a stand-alone PV system withDC load, AC load and battery.
	2	EnergyScenario in India, Sector-wiseenergy consumption(domestic,industrial,agricultureetc)		
3	1	Unit:2IntroductiontoSolarEnergy,Principle of conversion of solar radiation into heat, photo-voltaic cell	3	To demonstrate "I-V Characteristics and Efficiency of1kWp Solar PV System" with varying radiation andtemperature level.
	2	Electricitygeneration,ApplicationofSolar Energylikesolarwaterheaters		
4	1	Unit:2SolarFurnaces,SolarCookers		
	2	Solarlighting,Solarpumping		
5	1	Unit:3Bio-energy,Bio-massconversion technologies-wetanddryprocesses	4	Assemblethecomponentsofsolarhomelighting system&studythesystem.
	2	Revisionandproblemrelatedto2ndUnit/ discussionrelatedtotopic		
6	1	Unit:3Methodsforobtainingenergy from biomass	5	Assemble the componentsofsolarwaterheating systemsystem& study thesystem.
	2	Powergenerationbyusing gasifiers		
7	1	Unit:4 IntroductiontoWindenergy,Wind EnergyConversion		
	2	Windmills,Electricitygenerationfromwind-Typesofwind mills		
8	1	Unit:4LocalControl	6	IdentifyTroubleshootsolarPVpanel,inverterandsolar smartmeteringsystem.
	2	Energystorage		
9	1	Unit:5IntroductiontoGeo-thermalandTidal Energy, Geo-thermal sources	7	Identify thespecifiedcomponentsof a1KWSmall WindTurbine(SWT)systemand study them.
	2	Ocean thermal electricconversion,Openand Closed cycles		
10	1	Unit:5Hybridcycles,Primemovers forgeo-thermalenergyconversion	8	Estimationofwindspeedusinganemometer.
	2	SteamGenerationand electricitygeneration		

11	1	Unit:-6 Introductionto MHD	9	Studyof charginganddischargingbehaviorofa capacitor.
	2	MagnetohydroDynamic(MHD)		
12	1	Unit:7FuelCells,Designandoperating Principles of a fuel cell	10	Visit nearby renewable power plant and writespecification of each components used in that plant.
	2	Conversion Efficiency		
13	1	Displayof2nd sessionalmarksand identification of weak students.	11	Study of charging characteristics of a Ni-Cdbatteryusing solar photovoltaic panel.
	2	Unit: 7 Work outputande.m.foffuel cells, Applications		
14	1	Unit:8HydroEnergy	12	StudythePerformanceoffuelcell.
	2	Mini& microhydroplants		
15	1	Revisionandproblemrelatedto8th unit		
	2	Discussion ofoldquestionpaperof HSBTE.		

Govt. Polytechnic Sector-26, Panchkula
Electrical Engineering Department
Lesson plan

Lesson Plan		
Name of Faculty	Mr. Mandip Singh	
Discipline	Electrical Engineering	
Semester	2nd	
Subject	Basic Electrical Workshop	
Lesson Plan	15-16 weeks	
Duration		
Work Load (Practical) per week	Practicals-08 hrs per group	
Week	**Practical Day**	**Practical**
1st	1	**1.1** Study safety measures while working or handing the electrical equipments.
	2	**1.2** Use of fire extinguisher during electric fire
2nd	1	**1.3** Study the methods to take restoration of person suffering from electric shock.
	2	**1.4** Identification of common electrical materials with standard ratings and specifications such as wires, cables, switches, 1-pole, 2-pole and 3-pole MCB, RCCB & ELCB, fuses, cleats, clamps and allied items, tools and accessories.
3rd	1	**1.5** Identification ,use and connections of various types of switches such as: normal/miniature toggle, slide, push button piano key, rotary, SPST, SPDT, DPST, DPDT, band selector, multi-way Master Mains Switch. **1.6** Identification of phase, Neutral and Earth wires for connection to domestic electrical appliances and their connections to three pin plugs
	2	**1.7** Identification and familiarization of following electrical wiring tools with respect to their usage: Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Screw Driver (Star Screw Driver), L-Keys, Soldering Iron, soldering wire, flux, Drilling machines and Drilling Bits, Voltage/line tester, Insulation remover, Standard Wire Gauge .

4th	1	**2.1** Soldering wire jointing of different types such as straight joint/ married joint, T joint, Western union joint, pigtail joint.
	2	**2.2** Making of extension board containing two 5A and one 15A plug points.
5th	1	**2.3** To make a single phase main distribution board with five outgoing circuits for light and fan load including main switch and fuse (only internal connection).
	2	**2.4** Fault detection and repair of domestic electric installation.
6th	1	**2.5** Fault detection and its repair in institution's workshop installations.
	2	**2.6** Carrying out house wiring circuits using fuse, switches, sockets, ceiling rose etc. in batten or P.V.C. casing-caping. Demo of conduit wiring through junctions.
7th	1	**3.1** Winding/re-winding of a fan (ceiling and table)/ motor and BLDC
	2	**3.2** Repair and maintenance of domestic electric appliances, i.e. electric iron, geyser, fan, heat convector, desert cooler, room heater, electric kettle, electric oven, electric furnace etc.
8th	1	**3.3** Dismantling and assembly of voltage stabilizers
	2	**3.4** Assembly and interchange wiring of fluorescent tube light, CFL lamp etc.
9th	1	**3.5** Earth resistance measurement and earthing processes
	2	**3.6** To carry out pipe/plate earthing for a small house and 3-phase induction motor. Testing the earthing using earth tester
10th	1	**4.1** Coil winding for small transformer or alarm bell. **4.2** Assembling small transformer cores from the given lamination plates.
	2	**4.3** Assembling small battery charger.
11th	1	**4.4** Connections of single phase and 3-phase motors, through an appropriate starter and to change their direction of rotation.
	2	**4.5** Wiring, testing and fault finding of the following contactor control circuits operating on 3-phase supply: **a)** Remote control circuits **b**) Time delay circuits **c)** Inter locking circuits **d)** Sequential operation control circuits
12th	1	**4.6** Dismantling/assembly of star-delta and DOL starter.
	2	**4.7** Design a printed circuit Board (PCB) for voltage regulator using zener diode. **4.8** Armature winding of 3 phase induction motor

13th	1	**5.1** Connecting single phase energy meter with supply and load. Reading and working out power consumption and cost of energy.
	2	**5.2** Introduction to single phase and three phase supply and wiring system. Importance of three phase supply (RYB) & its sequence and wiring system.
14th	1	**5.3** Connecting Generator and 3 phase wiring through Change over Switch.
	2	**5.4** Power cable jointing using epoxy based jointing kits. **5.5** Demonstration of laying of underground cables at worksite
15th	1	Revision
	2	Revision