

Department of Electrical Engineering

Rajasthan Technical University Kota

(Lecture Plan for Odd Semesters of Session 2015-16)

Name of Teacher: D. K. Yadav

Subject: Power Generation Sources

Class: I Sem., M. Tech. (Power Systems)

Scheduled Lectures: 03 per week

Lecture No.	Topics to be covered
General Concepts of Energy Systems	
1	World energy situation, Indian energy scene.
2	Comparative study of thermal, hydro, nuclear and gas power plants.
3	Selection and location of power plants, impact of thermal, hydro, nuclear and gas power plants on environment.
4	Air and water pollution, greenhouse effect, global warming.
5	Impact on land, renewable and non-renewable energy sources.
6	Conservation of natural resources and sustainable energy sources.
7	Efficiency Improvement of thermal and gas power plants, pressurized fluid bed combustion of coal.
8	Combined gas and steam plant and cogeneration.
Wind Energy	
9	Basics of wind energy conversion, efficiency of conversion, site selection.
10	Working principle of wind turbines, lift force, Betz limit.
11	Various definitions and components of WECS.
12	Electric power generation, basic components, horizontal and vertical axis wind turbines.
13	Towers, wind generators.
14	Wind generation control and monitoring components.
15	Basic electric generation schemes, constant speed constant frequency.
16	Variable speed constant frequency.
17	Variable speed variable frequency schemes, applications of wind energy.
Biomass Energy	

18	Introduction, biomass categories, bio fuels.
19	Introduction to biomass conversion technologies.
20	Biogas generation, basic biogas plants- fixed dome type.
21	Floating gasholder type, Deen Bandhu biogas plant.
22	Pragati design biogas plant, utilization of biogas.
23	Energy crops plantation, pyrolysis scheme.
24	Alternative liquid fuels- ethanol and methanol.
25	Ethanol production, biodiesel.
26	Power generation from biomass, biogas and biodiesel.
Geothermal Energy	
27	Geothermal fields, estimates of geothermal power.
28	Basic geothermal steam power plant, binary fluid geothermal power plant.
29	Geothermal preheat hybrid power plant. Advantages and disadvantages of geothermal energy.
30	Applications of geothermal energy, geothermal energy in India.
Solar Energy	
31	Solar radiation, Solar radiation geometry.
32	Solar radiation on tilted surface, solar energy collector.
33	Flat plate collector, concentrating collector (parabolic and heliostat).
34	Solar pond, basic solar power plant.
35	Solar cell, solar cell array.
36	Basic PV generating system configurations and control schemes.
37	MPPT, boost converters, inverters for PV systems.
Nuclear Fusion Energy	
38	Introduction, nuclear fission and nuclear fusion, requirements for nuclear fusion.
39	Plasma confinement- magnetic confinement and inertial confinement.
40	Basic Tokamak reactor, laser fusion reactor.
41	Advantages of nuclear fusion, fusion hybrid and cold fusion.
Note: The above schedule of lectures is tentative and may vary if students demand more explanation on a particular topic or due to unavoidable circumstances.	

D. K. Yadav

Associate Professor

EED, RTU, Kota