

Name of Faculty Sachin Jasuja  
 Discipline Mechatronics Engineering  
 Semester 7th  
 Subject MT-425 Renewable Energy Resources  
 Lesson Plan  
 Duration 15 Weeks  
 Work Load  
 (Lecture) per  
 week: Lecture 3

Week	Theory	
	Lecture Day	Topic
1	1	Direct energy conversion, description, working principle, magneto hydrodynamic systems (MHD),
	2	thermoelectric generators
	3	thermionic generator
2	4	fuel cells,
	5	solar cells,
	6	EMF generated, power output, losses and efficiency, applications
3	7	hydrogen conversion
	8	storage systems
	9	test
4	10	Extraterrestrial solar radiation,
	11	components of radiation,
	12	geometry of earth and sun,
5	13	geometry of collector
	14	arid the solar beam
	15	effects of earth's atmosphere, measurements of solar radiation
6	16	calculation of heat balance for a solar collector
	17	type of water heaters
	18	selective surfaces, crop heaters,
7	19	space heating, space cooling
	20	water desalination, solar PONDS
	21	solar concentrators, electric power system, problems.
8	22	Introduction, the silicon p-n junction, photon absorption SOLAR RADIATION INPUT
	23	photovoltaic circuit properties and loads,
	24	limits to cell efficiency, solar cell construction
9	25	type and adaptations of photovoltaic, other types of photoelectric and thermo electric generation, problems.
	26	test

	27	Principles of hydro power, assessing the resource for small installations, an impulse turbine
10	28	reaction turbines, hydro electric systems, the hydraulic rain pump, wind turbine types and terms
	29	linear momentum and basic theory, dynamic matching
	30	steam tube theory
11	31	characteristics of the wind, power extraction by a turbine, electricity generation, mechanical power, problems.
	32	Introduction, tropic level photosynthesis,
	33	photosynthesis at the plant level, thermodynamic considerations
12	34	photosynthesis, molecularlevel photosynthesis,
	35	synthetic photosynthesis, bio fuel classification,
	36	bio-mass production for energy farming,
13	37	direct combustion for heat, pyrolysis (destructive distillation),
	38	alcoholic fermentation, anaerobic digestion for bio-gas, agrochemical fuel extractions, problems.
	39	Test
14	40	Introduction, wave motion, wave energy and power, wave patterns, devices, the causes of tides
	41	enhancement of tides flow power, tidal range power, world range power sites, problems.
	42	Principles of Ocean Thermal Energy Conversion (OTEC),
15	43	heat exchangers, pumping requirements, other practical considerations,
	44	introduction to geothermal energy, geophysics, dry rock and hot aquifer analysis,
	45	harnessing geothermal resources, problems