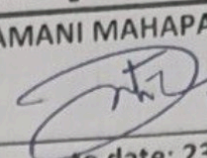


LESSON PLAN FOR RENEWABLE ENERGY SYSTEMS[Th4]

Discipline: Electrical Engineering	Semester: 6th	Name of the Teaching Faculty: CHANDRAMANI MAHAPATRA, (LECT. IN ELECTRICAL)  to date: 23-05-2023
Subject: RENEWABLE ENERGY SOURCE	Numbers of classes per week: 5	Semester from date: 14-02-2023 No. of weeks: 15
week	Class day	Theory
1st	1st	1. Introduction to Renewable energy:
	2nd	1.1. Environmental consequences of fossil fuel use.
	3rd	1.2. Importance of renewable sources of energy.
	4th	1.3. Sustainable Design and development.
	5th	Tutorial
2nd	1st	1.4. Types of RE sources
	2nd	1.5. Limitations of RE sources.
	3rd	1.6. Present Indian and international energy scenario of conventional and RE sources
	4th	1.6. Present Indian and international energy scenario of conventional and RE sources (cont.)
	5th	Tutorial
3rd	1st	2. Solar Energy: 2.1. Solar photovoltaic system-Operating principle.
	2nd	2.2. Photovoltaic cell concepts
	3rd	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).
	4th	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).(contd.)
	5th	Tutorial
4th	1st	2.3. Classification of energy Sources.
	2nd	2.3. Classification of energy Sources(contd.)
	3rd	2.4. Extra-terrestrial and terrestrial Radiation.
	4th	2.4. Extra-terrestrial and terrestrial Radiation.(contd.)
	5th	Tutorial
5th	1st	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	2nd	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.(contd.)
	3rd	2.6. Solar collectors, Types and performance characteristics,
	4th	2.6. Solar collectors, Types and performance characteristics, (cont.)
	5th	Tutorial

6th	1st	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.
	2nd	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond. (cont.)
	3rd	3. Wind Energy: 3.1. Introduction to Wind energy.
	4th	3.2. Wind energy conversion.
	5th	Tutorial
7th	1st	3.3. Types of wind turbines
	2nd	3.3. Types of wind turbines(contd.)
	3rd	3.4. Aerodynamics of wind rotors.
	4th	3.5. Wind turbine control systems; conversion to electrical power.
	5th	Tutorial
8th	1st	3.6. Induction and synchronous generators.
	2nd	3.6. Induction and synchronous generators. (cont.)
	3rd	3.7. Grid connected and self-excited induction generator operation
	4th	3.7. Grid connected and self-excited induction generator operation (cont.)
	5th	Tutorial
9th	1st	3.8. Constant voltage and constant frequency generation with power electronic control.
	2nd	3.8. Constant voltage and constant frequency generation with power electronic control. (cont.)
	3rd	3.9. Single and double output systems.
	4th	3.10. Characteristics of wind power plant.
	5th	Tutorial
10th	1st	4. Biomass Power: Introduction
	2nd	4.1. Energy from Biomass.
	3rd	4.2. Biomass as Renewable Energy Source
	4th	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	5th	Tutorial
11th	1st	4.3. Types of Biomass Fuels - Solid, Liquid and Gas. (contd.)
	2nd	4.4. Combustion and fermentation.
	3rd	4.5. Anaerobic digestion
	4th	4.6. Types of biogas digester.
	5th	Tutorial
12th	1st	4.7. Wood gassifier.
	2nd	4.8. Pyrolysis.
	3rd	4.9. Applications: Bio gas, Bio diesel
	4th	5. Other Energy Sources 5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	5th	Tutorial

13th	1st	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.(contd.)
	2nd	5.2. Ocean Thermal Energy Conversion (OTEC).
	3rd	5.2. Ocean Thermal Energy Conversion (OTEC)(contd.)
	4th	5.3. Geothermal Energy – Classification.
	5th	Tutorial
14th	1st	5.3. Geothermal Energy – Classification(contd.)
	2nd	5.4. Hybrid Energy Systems.
	3rd	5.4. Hybrid Energy Systems.(contd.)
	4th	5.5. Need for Hybrid Systems.
	5th	Tutorial
15th	1st	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	2nd	5.6. Diesel-PV, Wind-PV, Microhydel-PV(contd.)
	3rd	5.7. Electric and hybrid electric vehicles.
	4th	5.7. Electric and hybrid electric vehicles(contd.)
	5th	Tutorial

13/02/2023
HoD, Electrical

Academic Co-ordinator

13/02/2023
Principal, GP Nabarangapur

Principal
Government Polytechnic
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