

PSIET, KARANDA, DHENKANAL

LESSON PLAN

Session (2022-2023)

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| Discipline: Electrical ENGG | Semester: 6 th , Summer/2023 | Name of the Teaching Faculty: Manibhadra Chand, Lecturer |
| Subject: Renewable Energy System, Theory-TH-4 | No. of Days/Week: 05 | Start Date: 15/02/2023 End Date: 23/05/2023 |

| Week | Class Day | Theory Topics |
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| 1st | 1st | Introduction to Renewable energy: Environmental consequences of fossil fuel use |
| | 2nd | Importance of renewable sources of energy.. Sustainable Design and development. |
| | 3rd | Types of RE sources. Limitations of RE sources |
| | 4th | Present Indian and international energy scenario of conventional and RE sources |
| | 5 th | Introduction to solar Energy |
| 2nd | 1st | Solar photovoltaic system-Operating principle |
| | 2nd | Photovoltaic cell concepts Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT). |
| | 3rd | Classification of energy Sources. Extra-terrestrial and terrestrial Radiation |
| | 4th | Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant. |
| | 5 th | Solar collectors Types |

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| 3rd | 1st | Solar collectors Types |
| | 2nd | Solar collectors performance characteristics |
| | 3rd | <i>Doubt Clearing class</i> |
| | 4th | Flat plate type solar collector |
| | 5th | Concentrating type solar collector |
| 4th | 1st | Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping,. |
| | 2nd | Working of solar cooker, Solar Pond |
| | 3rd | Introduction to Wind energy. Wind energy conversion. |
| | 4th | Types of wind turbines |
| | 5th | Aerodynamics of wind rotors |
| 5th | 1st | <i>Doubt Clearing class</i> |
| | 2nd | Wind turbine control systems; conversion to electrical power |
| | 3rd | <i>Assignment Evaluation & Class Test</i> |
| | 4th | <i>QUIZ Test-1</i> |
| | 5th | Main parts of wind turbines |
| 6th | 1st | Vertical and horizontal type wind turbine. |
| | 2nd | Types of winds turbine rotors |
| | 3rd | Grid connected and self excited induction generator operation. |
| | 4th | Grid connected and self excited induction generator operation. |
| | 5th | Constant voltage and constant frequency generation with power electronic control. |
| 7th | 1st | Single and double output systems. |
| | 2nd | Constant voltage and constant frequency generation with power electronic control. |
| | 3rd | Single and double output systems. |
| | 4th | Characteristics of wind power plant. |
| | 5th | <i>Doubt Clearing class</i> |
| 8th | 1st | <i>Assignment Evaluation & Class Test</i> |
| | 2nd | Energy from Biomass. Biomass as Renewable Energy Source |
| | 3rd | Types of Biomass Fuels - Solid, Liquid and Gas |
| | 4th | Combustion and fermentation in biomass |
| | 5th | Conversion of bio-gas |

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| 9th | 1st | Anaerobic digestion. |
| | 2nd | Types of biogas digester Wood gassifier |
| | 3rd | Explain Pyrolysis |
| | 4th | Applications: Bio gas, Bio diesel |
| | 5 th | Tidal Energy: Energy from the tides, Barrage and Non Barrage |
| 10th | 1st | Working of Tidal power systems |
| | 2nd | Ocean Thermal Energy Conversion (OTEC). |
| | 3rd | Ocean Thermal Energy – Classification |
| | 4th | Geothermal Energy – Classification. |
| | 5 th | Hybrid Energy Systems. |
| 11th | 1st | <i>Doubt Clearing class</i> |
| | 2nd | <i>Assignment Evaluation & Class Test</i> |
| | 3rd | Need for Hybrid Systems |
| | 4th | Explain Diesel-PV. |
| | 5 th | Explain Wind-PV |
| 12th | 1st | Explain Wind-PV |
| | 2nd | Explain Micro-hydel-PV |
| | 3rd | Case studies on wind energy |
| | 4th | <i>Doubt Clearing class</i> |
| | 5 th | <i>Assignment Evaluation & Class Test</i> |
| 13th | 1st | QUIZ Test-1 |
| | 2nd | Explain Micro-hydel energy |
| | 3rd | Explain Micro-hydel-PV |
| | 4th | Electric vehicles |
| | 5 th | hybrid electric vehicles |
| 14th | 1st | Electric and hybrid electric vehicles |
| | 2nd | Electric and hybrid electric vehicles |
| | 3rd | <i>Doubt Clearing class</i> |
| | 4th | <i>Doubt Clearing class</i> |
| | 5 th | <i>Assignment Evaluation & Class Test</i> |
| 15th | 1st | <i>Assignment Evaluation & Class Test</i> |
| | 2nd | <i>Discussion of Previous year questions</i> |
| | 3rd | <i>Discussion of Previous year questions</i> |
| | 4th | <i>Discussion of Previous year questions</i> |
| | 5 th | <i>Discussion of Previous year questions</i> |

Manibhaara Chand
Signature of the faculty

15/2/25
Signature of the Principal