

32073 RENEWABLE ENERGY SOURCES AND ENERGY CONSERVATION

DETAILED SYLLABUS

Unit I FUNDAMENTALS OF ENERGY

Introduction to Energy-Energy consumption and standard of living classification of energy resources-consumption trend of primary energy resources-importance of renewable energy sources- energy for sustainable development.

WIND ENERGY

Introduction-Basic principles of wind energy conversion: Nature of the wind, power in the wind, forces on the blades and wind energy conversion-wind data and energy estimation-site selection classification of wind energy conversion systems-components of conversion systems-Advantages and Disadvantages-Types of wind machines-Horizontal axis machine-Vertical axis machine-Generating system-Energy Storage–Application of wind energy-Safety and environmental aspects.

Unit II SOLAR ENERGY

Introduction – Solar radiation at the earth's surface-Solar Radiation measurements-Estimation of average solar Radiation.

Solar energy collectors- Classifications-Flat plate collectors concentrating collectors-performance parameter-tracking system compound parabolic concentrator-parabolic trough concentrator's concentrator with point focus-heliostats-comparisons of various collectors-efficiency of collector-selection of collector for various applications.

Solar Thermal Application: Solar water heaters-Solar industrial heating system – Solar Refrigeration and Air-Conditioning Systems Solar cookers-Solar furnaces-Solar greenhouse-Solar Distillation Solar pond Electric power plant-Distributed Collector- Solar thermal Electric power plant.

Solar thermal energy storage: sensible storage-latent heat Storage-thermo chemical storage.

Unit III Solar photovoltaic System and Design:

Solar photovoltaic a brief history of PV,PV in silicon: basic principle, crystalline PV; reducing cost and raising efficiency, thin film PV, other innovative technologies, electrical characteristics of silicon PV cells and modules, grid connected PV system,

For Notes, Syllabus, Question Papers and Many more

cost of energy from PV ,Environmental impact and safety. System design of solar photovoltaic system: Load analysis-solar array Design-Battery Design-Simple formulas. System design procedure. Case Studies: Designing solar home lighting system - Designing standalone solar PV Power plant - Designing solar PV water pumping system - Only arriving load capacity - solar array sizing - Battery sizing - Inverter capacity and mountings.

Ocean energy, Tidal & Wave energy

Ocean energy resources – principle's of ocean thermal energy conversion (OTEC) – Methods of Ocean thermal electric power generation – Energy utilisation – basic principle of tidal power – components and operations of tidal power plant – Energy and Power forms of waves – Wave energy conversion devices.

Unit IV BIO – ENERGY

Introduction – photo synthesis – usable forms of bio mass, their composition and fuel properties-Biomass resources – Biomass conversion technologies – Urban waste to energy conversion – Biomass gasification – biomass liquification – biomass to ethanol production – Biogas production from waste Biomass – types of bio gas plants - applications – Bio diesel production – Biomass energy programmer in India.

Unit V Energy Management and Audit

Conservation: Definition, Energy audit - need, Types of energy audit, Energy management (audit) approach-understanding energy costs, Bench marking, Energy performance, Matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution, Energy audit instruments

Energy Conservation Techniques- Need and importance of energy conservation - Principles of energy conservation- Methods of energy conservation-Cogeneration and its application-Combined cycle system-Concept of energy management-Study of different energy management techniques like-Analysis of input-Reuse and recycling of waste.

Economic approach of Energy Conservation-Costing of utilities like steam, compressed air, electricity and water-Ways of improving boiler efficiency-Thermal insulation, Critical thickness of insulation Waste heat recovery systems, their applications, criteria for installing unit-An introductory approach of energy conservation in compressed air, refrigeration, air conditioning, pumps and fans.