

Centre for Energy and Environment

Syllabus for written examination - PhD Admission December 2022

Introduction to energy and environment: India's energy scenario, energy and development linkage. Green House Gas emissions, impacts, mitigation; Sustainability

Solar thermal: Basics of Solar Radiation, instruments for measuring solar radiation, solar radiation geometry, solar collectors, solar cooking, solar passive architecture - psychrometry, thermal comfort, indoor environmental quality.

Solar PV: Principle of photovoltaic conversion of solar energy, types of solar cells and fabrication, Photovoltaic applications: battery charging, domestic lighting, street lighting, water pumping, SPV power generation

Wind: Wind Energy Potential, Atmospheric circulations, classification, factors influencing wind, wind shear, turbulence, wind speed monitoring, Wind Energy Conversion Systems : classification, characteristics, applications

Bio energy: Basics; Bio Energy Potential, Biogas plants, Biomass gasification; Applications

Energy storage: Electrochemical energy storage, Thermal energy storage systems, Sensible heat storage, Latent heat storage, Thermochemical storage, Hydrogen energy, Fuel cells, Hybrid energy storage systems

Energy conservation and management: Energy conservation act 2001, Bureau of Energy Efficiency, Energy consumption in industries, benchmarks for energy consumption. Energy audit, Energy audit instruments, energy performance contracting, management and organization of energy conservation programs in industries.

Energy and Environmental policy: Introduction to Energy codes and policies: Energy Conservation act, Electricity Act, Solar policy, Wind Policy, Hydro policy, Biomass policy

Grid connectivity issues of RE: grid flexibility, issues and challenges, Ancillary Services and smart grid