UEN002 – Energy and Environment

3 Credits

- **30 Marks – MST**
- **50 Marks – End Sem.**
- **20 Marks – Sessional (Quizzes/assignments/group presentations)**

Course Objectives:

- The exposure to this course would facilitate the students in understanding the terms, definitions and scope of environmental and energy issues pertaining to current global scenario; understanding the value of regional and global natural and energy resources; and emphasize on need for conservation of energy and environment.

Course contents…..

- **Introduction:** Natural Resources & its types, Concept of sustainability and sustainable use of natural resources, Pollution based environmental issues and case studies
- **Conventions on Climate Change:** Origin of Conference of Parties (COPs), United Nations Framework Convention on Climate Change (UNFCCC) and Intergovernmental Panel on Climate Change (IPCC); Kyoto Protocol, instruments of protocol – CDM, JI and IET; Montreal Action Plan; Paris Agreement and post-Paris scenario.

Course contents…..

- **Air Pollution:** Origin, Sources and effects of air pollution; Primary and secondary meteorological parameters; Wind roses; Atmospheric Stability; Inversion; Plume behavior; Management of air pollution: Source reduction and Air Pollution Control Devices for particulates and gaseous pollutants in stationary and mobile sources.
- **Water Pollution:** Origin, Sources of water pollution, Category of water pollutants, Physico-Chemical characteristics, Components of wastewater treatment systems, Advanced treatment technologies.
- **Solid waste management:** Introduction to solid waste management, Sources, characteristics of municipal and industrial solid waste, Solid waste management methods: Incineration, composting, Biomethanation, landfill, E-waste management, Basal convention-.

Course contents…..

- **Energy Resources:** Classification of Energy Resources; Conventional energy resources-Coal, petroleum and natural gas, nuclear energy, hydroelectric power; Non-conventional energy resources- Biomass energy, Thermo-chemical conversion and biochemical conversion route; Generation of Biogas and biodiesel as fuels; Solar energy-active and passive solar energy absorption systems; Type of collectors; Thermal and photo conversion applications; Wind energy.

Course contents…..

THAPAR INSTITUTE
OF ENGINEERING & TECHNOLOGY
(Deemed to be University)

Facilitated through Online Platforms

- **Ecology and Environment:** Concept of an ecosystem; structural and functional units of an ecosystem; Food Chain, Food Web, Trophic Structures and Pyramids; Energy flow; Ecological Succession; Types, Characteristics, Biodiversity, Biopiracy.
- **Human Population and the Environment:** Population growth, variation among nations; Population explosion – Family Welfare Programmes; Environment and human health; Human Rights; Value Education; Women and Child Welfare; Role of Information Technology in Environment and Human Health, Environmental Ethics.

Course Learning Outcomes (CLOs):

- On the completion of course, students will be able to:
- Comprehend the interdisciplinary context with reference to the environmental issues and case studies
- Assess the impact of anthropogenic activities on the various elements of environment and apply suitable techniques to mitigate their impact.
- Conceptualise and explain the structural and functional features of ecological systems
- Correlate environmental concerns with the conventional energy sources associated and assess the uses and limitations of non-conventional energy technologies

Recommended Books.....

- *Moaveni, S., Energy, Environment and Sustainability, Cengage (2018)*
- *Down to Earth, Environment Reader for Universities, CSE Publication (2018)*
- *Chapman, J.L. and Reiss, M.J., Ecology - Principles and Application, Cambridge University Press (LPE) (1999).*
- *Eastop, T.P. and Croft, D.R. Energy Efficiency for Engineers and Technologists, Longman and Harow (2006).*
- *O'Callagan, P.W., Energy Management, McGraw Hill Book Co. Ltd. (1993).*
- *Peavy H.S. and Rowe D.R. Environmental Engineering, McGraw Hill (2013).*

Evaluation Scheme:

S.No.	Evaluation Elements	Weightage (%)
1.	MST	30
2.	EST	50
3.	Sessionals/Quizzes/Group Projects	20

In this session.....

- **You had a glimpse of**
  - the course objectives;
  - the course contents;
  - the course learning outcomes;
  - the recommended books and
  - the evaluation pattern

In the next.....

- **You will be having a glimpse of episodes of historical importance that have caused environmental and health impacts of immense magnitude**