

## Course Syllabi: UEN002: Energy and Environment (L : T : P :: 3 : 0 : 0)

1. **Course number and name:** UEN002: Energy and Environment
2. **Credits and contact hours:** 3.0 and 3
3. **Text book, title, author, and year**

### **Text Books / Reference Books**

- *Bharucha, E., Textbook of Environmental Studies, Universities Press (2005).*
- *Chapman, J.L. and Reiss, M.J., Ecology-Principles and Application, Cambridge University Press (LPE) (1999).*
- *Joseph, B., Environmental Studies, Tata McGraw-Hill (2006).*
- *Eastop, T.P. and Croft, D.R. Energy Efficiency for Engineers and Technologists, Longman and Harow (2006).*
- *Miller, G.T., Environmental Science- Working with Earth, Thomson (2006).*
- *Wright, R.T., Environmental Science-Towards a sustainable Future, Prentice Hall (2008) 9<sup>th</sup> ed.*
- *O'Callagan, P.W., Energy Management, McGraw Hill Book Co. Ltd. (1993).*
  - a. Other supplemental materials
    - Nil

### **4. Specific course information**

- a. Brief description of the content of the course (catalog description)

**Environment pollution, global warming and climate change:** Air pollution (local, regional and global); Water pollution problems; Land pollution and food chain contaminations; Carbon cycle, greenhouse gases and global warming; Climate change – causes and consequences; Carbon footprint; Management of greenhouse gases at the source and at the sinks

**Ecology, Structure and functioning of natural ecosystems:** Ecology, ecosystems and their structure, functioning and dynamics; Energy flow in ecosystems; Biogeochemical cycles and climate; Population and communities

**Natural resources:** Human settlements and resource consumption; Biological, mineral and energy resources; Land, water and air; Natural resources vis-à-vis human resources and technological resources; Concept of sustainability; Sustainable use of natural resources

**Agricultural, industrial systems and environment:** Agricultural and industrial systems vis-à-vis natural ecosystems; Agricultural systems, and environment and natural resources; Industrial systems and environment

**Energy technologies and environment:** Electrical energy and steam energy; Fossil fuels, hydropower and nuclear energy; Solar energy, wind energy and biofuels; Wave, ocean thermal, tidal energy and ocean currents; Geothermal energy; Future energy sources; Hydrogen fuels; Sustainable energy

**Group assignments:** Assignments related to Sanitary landfill systems; e-waste management; Municipal solid waste management; Biodiversity and biopiracy; Air pollution control systems; Water treatment systems; Wastewater treatment plants; Solar heating systems; Solar power plants; Thermal power plants; Hydroelectric power plants; Biofuels; Environmental status assessments; Energy status assessments etc.

### **5. Specific goals for the course**

After the completion of the course, the students will be able to:

- Correlate major local and regional environmental issues with changes in ecology and human health.
- Monitor and document the development and dynamics of ecosystems in experimental or natural microcosms.
- Define and document local resource consumption patterns and conservation strategies.
- Define opportunities available for energy conservation and for use of renewable energy resources in local and regional entities.

**6. Brief list of topics to be covered**

- Environment pollution, global warming and climate change
- Ecology, Structure and functioning of natural ecosystems
- Natural resources
- Agricultural, industrial systems and environment
- Energy technologies and environment
- Group assignments