

## MLD - Energy in Everyday Life

Credits - 3

### Course objectives

To teach the importance of energy in life

To sensitise the human pattern of energy consumption

To sensitise the energy consumption and related environmental issues

To sensitise the other possible hostile free energy technologies

To sensitise the energy related economic impacts

### Course Outcome:

Understand the importance of energy

Understand the human pattern of energy consumption Understand the energy related environmental problems

Learn about the possible hostile-free alternative energy sources Understand the relevance between energy and economy

### Unit I. Energy

Introduction to Energy, atoms, energy - atom interaction, energy consumption, units of energy - Energy sources: solar energy, geothermal energy and nuclear energy - bioenergy - wind energy- ocean energy and fossil fuels - human patterns of energy consumption: internal consumption and external consumption, Global energy cycle

### Unit- II Fossil Fuel and Energy conversion

Energy sources: Fossil fuels and their types, energy content and energy potential, energy capacity measurement, energy conversion, conversion efficiency, Global potentials of fossil fuels and supply chain - origin of pollution - types of pollution and their impact on daily life  
- nexus between energy, environment and sustainable development.

### Unit II. Ecology and Environment

Concept and theories of ecosystems, - energy flow in natural and man-made ecosystems. Examples of natural and manmade ecosystems - agricultural, industrial and urban ecosystems  
- sources of pollution from energy technologies and its impact on atmosphere: air, water and soil - environmental laws on pollution control.

### Unit-IV - Pollution free renewable energy Technologies

**Solar Energy:** potential, energy conversion through photosynthesis, Photovoltaic conversion and solar thermal energy conversion. **Wind Energy:** potential and energy conversion systems. **Ocean Energy:** potential and energy conversion principles **Bioenergy:** resources and types.

## **Unit V. Energy and Economy**

Energy and Economics: gross domestic product (GDP) and energy- energy market and society - energy efficiency - exergy - exergy and economics - energy: security- equity - environmental sustainability index and global measure

### **References**

1. Energy and Environment, (Eds.) Loulou, Richard; Waaub, Jean- Philippe; Zaccour, Georges (2005).
2. Energy and the Environment, Ristinen, Robert A. Kraushaar, Jack J. AK.raushaar, Jack P. Ristinen, Robert A., 2nd Edition, John Wiley, (2006)
3. Energy and the Challenge of Sustainability, World Energy assessment, UNDP, N York, (2000).
4. Solar Energy: principles of Thermal Collection and Storage, S.P. Sukhatme, Tata McGraw-Hill (1984).
5. Y. Goswami, F. Kreith and J. F. Kreider, Principles of Solar Engineering, Taylor and Francis, Philadelphia (2000).
6. Wind Energy Conversion Systems, L.L. Freris, Prentice Hal 1990.
7. Geothermal Energy: From Theoretical Models to Exploration and Development by Ingrid Sober and Kurt Bucher, Springer, 2013.
8. Ocean Energy: Tide and Tidal Power by R. H. Charlier and Charles W. Finkl, Springer 2010
9. Energy Economic by Peter M. Schwarz, Routledge publications (2018).