

<i>DEPARTMENT OF PHYSICS</i>			<i>Value Added Course</i>				
Course Type	Course Code	Course Code Course Title	Credits	Total Contact Hours	CIA	Ext	Total
Value Added Course		Energy harvesting	2	30			

Objectives:

1. To introduce various renewable energy sources and methods of tapping those as green energy sources.

Learning Outcome:

1. Students will be able to appreciate the need to look beyond conventional energy sources like coal and oil.
2. Student learn the methods of harvesting energy from renewable sources of energy

Unit-I: Solar radiation

Solar radiation outside the earth's atmosphere- Solar radiation at the earth's surface-Instruments for measuring radiation and sunshine-Solar radiation data-Solar radiation on tilted surfaces.

Unit-II: Solar collectors

Definitions-Methods of classification-Types of concentrating collectors-Thermal analysis of concentrating collectors-Flatplate collectors with plane reflectors.

Unit-III: Solar Pond

Principle of working-Description-Performance analysis-Transmissivity based on reflection- Refraction at the air water interfaces-Transmissivity based on absorption-Temperature distribution and collection efficiency.

Unit-IV: Direct utilization of solar energy

Photovoltaic conversion-Description and principle of working-(V-I)Characteristics- Commercial solar cell-costs-Applications.

Unit-V: Indirect utilization of solar energy

Wind energy-Classification and description of wind machines-Wave energy-Devices for wave energy conversion-Ocean thermal energy conversion

Text Book

1. Solar Energy S.P Sukhatme,J.K.Nayak,3rd Edition, Tata McGraw Hill(2009)
 Unit I: Sections 3.1,3.2,3.3,3.7
 Unit II: Sections 6.1.2,6.1.3,6.1.4,6.1.5,6.2
 Unit III: Sections 8.2,8.3,8.4,8.4.1,8.4.2,8.4.3
 Unit IV : Sections 9.1,9.1.1,9.1.2,9.1.3,9.1.4,9.15.
 Unit V : Sections 9.2,9.2.1,9.2.2,9.4,9.4.1,9.5

Books for References

1. Non-conventional energy sources-G.D Rai, Khanna publishers, Newdelhi(2001).
2. The physics of Solar cells, Jenney Nelson, Imperial college, UK (2008).