Course Number and Name

BCE097 - RENEWABLE SOURCES OF ENERGY

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Dr.S. Buvaneshwari

Text Books and References

TEXT BOOKS:

- D. Yogi Goswami, Frank Kreith&Jan F. Kreider," Principles of Solar Energy Engineering", CRC Press, 2000

REFERENCES:

- John A. Duffie, William A. Beckman,"Solar Energy Thermal processes", John Wiley & Sons; 4th Edition edition (17 May 2013).
- Sukhatme K, Suhas P. Sukhatme," Solar Energy", Tata McGraw-Hill Education, 1996
- Rai G.D,"Solar Energy Utilisation",Khanna Publishers, 1987
- Shao-lee Soo,"Direct Energy Conversion", Prentice-Hall, 1968

Course Description

- To impart knowledge on sources and characteristics of various renewable source of energy and strategies for its implementation

Prerequisites	Co-requisites
Engineering Earth Science	NIL

required, elective, or selected elective (as per Table 5-1)

Course Outcomes (COs)

CO1	Have knowledge about the various renewable sources of energy
CO2	Have a well-founded knowledge about the Primary energy sources
CO3	Acquire skills in assessing the suitability of direct energy conversion
CO4	Have knowledge about bio – energy
CO5	Have knowledge about solar energy.

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k
CO1		H	H								
CO2		H	H								
CO3		H	H								
CO4		H	H								
CO5		H	H								

List of Topics Covered

UNIT I GENERAL 9

Primary energy sources -direct energy - conversion -comparison with conventional energy-conversion devices.

SOLAR ENERGY – Principles of solar energy collection – solar radiation – measurement instruments - data and estimation - types of collectors - characteristics and design principles of different types of collectors - testing of collectors.

UNIT II SOLAR ENERGY APPLICATIONS 9

Solar thermal applications – water heaters and air heaters performance and applications - simple calculations on solar cooling, solar drying, solar ponds, solar tower concepts and solar furnace.

UNIT III WIND AND TIDAL ENERGY 9

Energy from the wind – general theory of windmills – design aspects of horizontal axis and vertical axis windmills – applications. Energy from tides and waves – working principles of tidal plants and ocean thermal energy conversion plants – power from geothermal energy – principles of working of geothermal power plants.

UNIT IV BIO – ENERGY 9

Energy from bio – mass bio – gas plants – various types -design principles of bio – gas plants applications- Energy from waste burning- power plants, utilization of industrial and municipal wastes – energy from the agricultural wastes.

UNIT V DIRECT ENERGY CONVERSION 9

(Description, principle of working and basic design aspects only) Magneto hydrodynamic systems, thermo electric generators, thermionic generators fuel cells solar cells types, e.m.f. generated, power output, tosses and efficiency and applications.