

**Title: Renewable Energy**

**Eligibility:** Bachelor's degree in any Faculty

**Objectives:** To create awareness of Environment quality

To develop skills in handling equipment's related to solar energy and Biogas

To create manpower in renewable energy

**Course Structure:**The course is equivalent to 4 credits . The course can be run in any of the foursemesters.

**Syllabus:**

**1. Basic concept of solar energy and its applications (1 credit)**

Sun as Source of Energy, Availability of Solar Energy, Nature of Solar Energy, Solar Energy & Environment. Various Methods of using solar energy –Photothermal, Photovoltaic, Photosynthesis, Present & Future Scope of Solar energy.

Wind Energy: Basic concept and component of wind energy conversion,types of wind machines, Application of wind machine,Hybrid wind energy systems wind + diesel power, wind + conventional grid, wind + Photovoltaic system etc.

**2. Assembly and maintenance (1 credit)**

Solar charging, Solar air heating and cooling system,Thermal pad, Solar water Heaters, Solar cookers, Solar drying , Solar photovoltaic system,solar energy pumps.

**3. Biogas (1 credit)**

Importance of biogas technology, Different Types of Biogas Plants. Aerobic and anaerobic bioconversion processes, various substrates used to produce Biogas (cow dung, human and other agricultural waste, municipal waste etc.) Individual and community biogas operated engines and their use. Removal of CO<sub>2</sub> and H<sub>2</sub>O, Application of Biogas in domestic, industry and vehicles. Bio-hydrogen production. Isolation of methane from Biogas and packing and its utilization, Introduction to gasifiers

**4. Case study:Bio-gas Production from Kitchen waste(1 credit)**

Case Study: Performance of Gasifire.

References

1. Biomass Renegerable Energy – D.O.hall and R.P. Overreed  
( John Wiley and Sons, New york, 1987)

2. Biomass for energy in the developing countries – D.O.Hall, G.W.barnard and P.A.Moss (Pergamon Press Ltd. 1982)

3. Thermo chemical processing of Biomass, Bridgwater A V.
4. Biomass as Fuel – L.P.White (Academic press1981)
5. Biomass Gasification Principles and Technology, Energy technology review No. 67, T.B. Read (Noyes Data Corp. , 1981)

**Methodology:** Lectures supplemented with case studies that may include visits.

**Assessment:** Final assessment by written and group discussion. Skill based assessment will be as per the case study.