



VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

[Re-accredited with 'A' Grade by NAAC]

Virudhunagar – 626 001.

Course Name : **Bachelor of Science**

Discipline : **Physics**

(For Those who Join in 2015 and AFTER)

**Self Learning Course:**

Subject	Credit	Ext =Tot	Subject Code
Renewable Energy Sources	5	100 = 100	U1PHSL1

COURSE : B.Sc. PHYSICS **RENEWABLE ENERGY SOURCES** Credit : 5

**Subject Code: U1PHSL1**

**TOTAL MARKS: 100**

### **Objectives**

- To get knowledge about Sun as a source of energy
- To study about solar thermal and photovoltaic devices
- To understand the basic concepts of Wind, Biomass and Geothermal energy sources

### **Unit I**

Solar Energy Basics – Introduction – The Sun as a source of energy – The earth – Extraterrestrial and Terrestrial radiations – Spectral distribution of solar radiation – Depletion of solar radiation – Measurements of solar radiation – Solar collectors – Classification – Liquid flat plate collector – Evacuated tube collector – Solar water heater – Box type solar cooker

### **Unit II**

Solar photo voltaic systems – Semiconductors – Solar cell classification – solar cell, Module, Panel and array construction – Solar PV systems – Solar PV applications.

### **Unit III**

Wind energy – Introduction – Global winds – Local winds – nature of winds – Wind turbine siting – Major applications of wind power – Horizontal axis wind turbine – Environmental aspects – Wind energy programme in India

### **Unit IV**

Biomass Energy – Introduction – useful forms of biomass, their composition and fuel properties – Biomass resources – Biomass gasification – Downdraft type – Updraft type – Biogas production from waste biomass – Availability of raw materials and gas yield - Biomass energy programme in India

### **Unit V**

Geothermal energy – Introduction – Applications – Origin and distribution of geothermal energy – Tidal energy - Origin and nature of tidal energy – Limitations of tidal energy – Ocean thermal energy – Origin and characteristics of resource - Ocean thermal energy conversion technology.

### **Book for study:**

Non-Conventional Energy resources, B.H.Khan, McGraw Hill, 2<sup>nd</sup> edition, 2009

Unit I : Section 4.1, 4.2, 4.4 – 4.7, 5.1, 5.1.1, 5.1.4, 5.1.7, 5.2 & 5.6.1

Unit II : Section 6.1, 6.3, 6.4, 6.8 & 6.9



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Unit III: Section 7, 7.1.1, 7.1.2, 7.2, 7.2.1, 7.3, 7.4, 7.7.1, 7.12 & 7.13

Unit IV: Section 8, 8.2, 8.3, 8.6, 8.6.1, 8.6.2, 8.9, 8.9.6 & 8.11

Unit V : Section 9, 9.1, 9.2, 10.1, 10.1.1, 10.1.2, 10.3, 10.3.1, 10.3.2

**Books or reference:**

1. Non Conventional energy sources, G.D. Roy, Khanna publications
  2. Solar energy utilization, G.D.Roy, Khanna publications
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