

SEMESTER <i>Seventh</i>	DEPARTMENT <i>Power Engineering</i>	COURSE TITLE <i>Renewable Energy</i>
COURSE CODE <i>EP703</i>	HOURS: 3 UNITS: 3	COURSE SPECIFICATIONS <i>Theoretical Content</i>
<p>1. Introduction to Types of Energy and Energy Resources.</p> <p>Evaluate the followings:</p> <ul style="list-style-type: none"> ➤ The fuel based system. ➤ The impact of fossil based systems. ➤ The non conventional energy, variations and availability. ➤ The renewable energy sources and features. 		
<p>2. Solar Thermal Systems.</p> <p>To get familiar with:</p> <ul style="list-style-type: none"> ➤ Conduction, reflectivity, radiation and transmissivity. ➤ Solar radiation spectrum measurements technologies, data and estimation. ➤ Types of solar collectors. ➤ Performance testing of solar collectors. ➤ Solar energy storage. ➤ Applications: water heating, buildings' heating and cooling 		
<p>3. Solar Photovoltaic Systems.</p> <p>Discuss the followings:</p> <ul style="list-style-type: none"> ➤ Operating principles of photovoltaic systems. ➤ Photovoltaic cell concepts. ➤ Cell, module array. ➤ Series and parallel connections. ➤ Maximum power point tracking. ➤ Applications: battery charging, pumping, lighting, cooling. 		

4. Wind Energy.

- Role of wind as a renewable energy.
- Wind turbines
- Electrical equipment.
- Wind energy systems.
- Performance and operation management.
- Grid integration and power quality.

5. Biomass Energy.

- Biomass availability, types of its conversion and system design.
- Biogas generation.
- Energy plantation.

6. Hybrid System.

- Range and type of hybrid systems.
- Case studied of: diesel, PV, wind, biomass systems and solar.

References:

- 1- **Wind and Solar Power Systems**, Mukund R. Patel, CRC Press,1999.
- 2- **Renewable and Efficient Electric Power Systems** – Gilbert M. Masters, IEEE Press – Published by John Wiley and Sons, Inc. Hoboken, New Jersey, USA, 2004.
- 3- **Solar energy, Renewable Energy and the Environment**, Robert Foster, Majid Ghassemi, and Alma Cota, 2010 by Taylor and Francis Group, LLC

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