

UNIVERSITY OF MADRAS
B.Sc. DEGREE PROGRAMME IN PHYSICS
 SYLLABUS WITH EFFECT FROM 2023-2024

DISCIPLINE SPECIFIC CORE ELECTIVES

COURSE	FIFTH SEMESTER –ELECTIVE – I
COURSE TITLE	ENERGY PHYSICS
CREDITS	3
COURSE OBJECTIVES	To get the understanding of the conventional and non-conventional energy sources, their conservation and storage systems.

UNITS	COURSE DETAILS
UNIT-I	INTRODUCTION TO ENERGY SOURCES: Energy Consumption as a Measure of Prosperity – World Energy Future – Energy Sources and their Availability – Conventional Energy Sources – Non-Conventional and Renewable Energy Sources – Comparison – Merits and Demerits.
UNIT-II	SOLAR ENERGY: Solar Energy Introduction – Solar Constant – Solar Radiation at the Earth’s Surface – Solar Radiation Geometry – Solar Radiation Measurements – Solar Radiation Data –Solar Energy Storage And Storage Systems – Solar Pond – Solar Cooker – Solar Water Heater – Solar Greenhouse – Types Of Greenhouses – Solar Cells.
UNIT-III	WIND ENERGY: Introduction –Nature of the Wind – Basic Principle of Wind Energy Conversion – Wind Energy Data and Energy Estimation – Basic Components of Wind Energy Conversion Systems (WECS) – Advantages and Disadvantages of WECS – Applications – Tidal Energy
UNIT-IV	BIOMASS ENERGY: Introduction – Classification – Biomass Conversion Technologies – Photosynthesis – Fermentation - Biogas Generation –Classification of Biogas Plants – Anaerobic Digestion for Biogas – Wood Gasification – Advantages & Disadvantages.
UNIT-V	ENERGY STORAGE: Importance of Energy Storage- Batteries - Lead Acid Battery -Nickel-Cadmium Battery – Fuel Cells – Types of Fuel Cells – Advantages And Disadvantages of Fuel Cells – Applications of Fuel Cells - Hydrogen Storage.
TEXT BOOKS	1. G.D.Rai, Non-Conventional Sources of Energy, Khanna Publishers, 2009, 4 th Edn. 2. S P Sukhstme, JKNayak, Solar Energy, Principles of Thermal Collection and Storage, McGraw Hill, 2008, 3 rd Edn. 3. D P Kothari, KPSingal, RakeshRajan, PHI Learning Pvt Ltd, 2011, 2 nd Edn.

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REFERENCE BOOKS	<ol style="list-style-type: none">1. John Twidell & Tony Weir, Renewable Energy Resources, Taylor & Francis, 2005, 2nd Edn.2. S.A. Abbasi and Nasema Abbasi, Renewable Energysources and their environmental impact, PHI Learning Pvt. Ltd, 2008.3. M. P. Agarwal, Solar Energy, S. Chand & Co. Ltd., New Delhi, 19824. H. C. Jain, Non-Conventional Sources of Energy, Sterling Publishers, 1986.
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