

As Per NEP 2020

University of Mumbai



Syllabus for Basket of OE	
Board of Studies in Physics	
UG First Year Programme	
Semester	II
Title of Paper: Energy Sources – I	Credits 2
I)	
II)	
III)	
From the Academic Year	2024-25

Sr. No.	Heading	Particulars
1	Description the course : Including but Not limited to :	Introduction, relevance, Usefulness, Application, interest, connection with other courses, demand in the industry, job prospects etc.
2	Vertical :	Open Elective (Choose By √)
3	Type :	Theory
4	Credit:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	Hours Allotted :	30 Hours / 60 Hours
6	Marks Allotted:	50 Marks /100 Marks
7	Course Objectives: (List some of the course objectives) After successful completion of this course students will be able to: 1. Understand the variety of energy sources, distinguishing between renewable and non-renewable options. 2. Recognize the significance of solar energy and learn techniques for harnessing it. 3. Know the use of Fossil fuels & Nuclear energy for energy conservation.	
8	Course Outcomes: (List some of the course outcomes) After the end of this course student will be able to: 1. Comprehend the varieties of energy sources and differentiate between the renewable and non-renewable sources of energy, significance of solar energy and the different techniques to harness the solar energy 2. Understand the need of renewable energy, non-conventional energy sources, Wind Energy, Tidal Energy, Wave energy systems. 3. Gain the knowledge about Key features, its importance, Merits & demerits of solar energy and its applications.	

9	Modules:- Per credit One module can be created	
	Module 1: Unit-I: Non-Renewable energy sources	(15 Lectures)
	1. Energy concept-sources in general, its significance & necessity. Classification of energy sources: Primary and Secondary energy, Commercial and Non-commercial energy, Renewable and Non-renewable energy, Conventional and Non-conventional energy, Based on Origin-Examples and limitations. Importance of Non-commercial energy resources. 2. Fossil fuels & Nuclear energy- production & extraction, usage rate and limitations. Impact on environment and their issues& challenges. Overview of Indian & world energy scenario with latest statistics- consumption & necessity. Need of eco-friendly & green energy & their related technology.	
	Module 2: Unit-II: Renewable energy sources	(15 Lectures)
10	1. Need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity. 2. Solar Energy-Key features, its importance, Merits & demerits of solar energy, Applications of solar energy. Solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell -brief discussion of each. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems.	

11	Reference Books: 1. Non-conventional energy sources - G.D Rai - Khanna Publishers, NewDelhi 2. Solar energy - M P Agarwal - S Chand and Co. Ltd. 3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing CompanyLtd. 4. Dr. P Jayakumar, Solar Energy: Resource Assessment Handbook, 2009	
12	Internal Continuous Assessment: 40%	External, Semester End Examination Individual Passing in Internal and External Examination : 60%

13	Continuous Evaluation through: Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	
14	Format of Question Paper: for the final examination For OE: External – 30 Marks (2 Credits) Internal – 20 Marks Question Paper Format for 30 Marks Duration: One Hour	
	Attempt any Two Questions out of Four from the following.	
	1) Answer the following questions (15 Marks) i) Theory (Unit-I) (8 Marks) ii) Theory (Unit-II) (7 Marks)	
	2) Answer the following questions (15 Marks) i) Theory (Unit-I) (8 Marks) ii) Theory (Unit-II) (7 Marks)	
	3) Answer the following questions (15 Marks) i) Theory (Unit-I) (8 Marks) ii) Theory (Unit-II) (7 Marks)	
	4) Answer the following questions (15 Marks) i) Theory (Unit-I) (8 Marks) ii) Theory (Unit-II) (7 Marks)	

**Sign of the BOS
Chairman
Dr. T.N. Ghorude
Board of Studies in
Physics**

**Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science &
Technology**

**Sign of the
Offg. Dean
Prof. Shivram S. Garje
Faculty of Science &
Technology**