

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 – II	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. Grasp the concept of wave formation and standing wave patterns. 2. Analyze both longitudinal and transverse waves. Explore wind energy and methods to generate electrical power from wind. 3. Evaluate the impact of conventional energy sources on climate. Appreciate how different energy sources contribute to technological development. 4. Understand the problems of global warming and its climatic consequences. 5. Develop a sense of responsibility toward sustainable energy usage.	
8	Course Outcomes: (List some of the course outcomes) After the end of this course student will be able to: 1. Gain the idea of the formation of waves and standing wave pattern, analysis of longitudinal and transverse waves, the knowledge of wind energy and the methods to tap the energy from the blowing wind to generate electrical power. 2. Understand the conventional energy sources and its impact on the climate, the different energy sources and how they are beneficial for the development of Technology. 3. Understand the problems of global warming and other climatic impact of the reckless usage of energy resources.	
9	Modules:- Per credit One module can be created	

	Module 1: Unit-II: Wind and Tidal Energy harvesting (15 Lectures)	
	1. Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies. 2. Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy.	
	Module 2: Unit-II: Geothermal and Hydroenergy (15 Lectures)	
	Geothermal Resources, Geothermal Technologies. Hydropower resources, hydropower technologies, environmental impact of hydro power sources. Carbon captured technologies, cell, batteries, power consumption.	
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11	Reference Books: - Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004, Oxford University Press, in association with The Open University. J. Balfour, M. Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich(USA). http://en.wikipedia.org/wiki/Renewable_energy	
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**