

As Per NEP 2020

University of Mumbai



Syllabus for Basket of OE	
Board of Studies in Physics	
UG First Year Programme	
Semester	I
Title of Paper: Wonders of Physics – 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 $\sqrt{\quad}$)
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. Comprehend SI units for physical quantities and investigate time measurement using atomic clocks. 2. Explore time constants and their role in physics and astronomy. 3. Understand matter-energy relationships, wave-particle duality and logical foundations. 4. Explore the wonders of the universe and practical applications.	
8	Course Outcomes: (List some of the course outcomes) At the end of this course, student will able to, 1. Demonstrate Knowledge of SI Units and Their Relevance in Scientific Measurements, Time-Related Concepts to Solve Practical Problems 2. Evaluate Philosophical Implications of Materialism. Connect Physics Concepts to Real-World Applications	

9	Modules: - Per credit One module can be created	
	Module 1: Unit-I: Time	(15 Lectures)

10	1. A Physical quantity: The International System (SI) of measurement for physical quantities, The unit of time, Measuring time with atomic clocks, Determining position with the aid of precise time measurements, Shortest and longest time-span, Time constants and periods, Time constants and oscillation periods in physics, Time in astronomy, Time in biological systems, Other aspects of physical time. 2. An anthropological quantity: Introduction, Attributes of time, application of information science in interpreting time, the five levels of time, eternity, ideas of eternity among people, sense of eternity among people.	
	Module 2: Unit-II: Matter and Love of Physics (15 Lectures)	
	1. Matter: Properties of matter, Matter and energy, wave particle duality, logic and physics, materialism, the equation of life and death, Erwin Schrödinger and the birth of information science. 2. Love of Physics: Powers of ten, from nucleus to deep space; measurements, uncertainties and stars, bodies in motion, the rainbow, harmonies of strings and winds, wonders of electricity, mysteries of magnetism, energy conservation, physical phenomena in living systems, inventions that conquered the world, discoveries that revolutionized the world, physics in our daily life.	

11	Reference Books: 1. Concepts of Matter in Science Education. (2013). Netherlands: Springer Netherlands. 2. Lewin, W., Goldstein, W. (2011). For the Love of Physics: From the End of the Rainbow to the Edge of Time - A Journey Through the Wonders of Physics. India: Free Press.	
12	Internal Continuous Assessment: 40%	External, Semester End Examination: 60% Individual Passing in Internal and External Examination
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**