Government of Maharashtra
ISMAIL YUSUF COLLEGE OF ARTS, SCIENCE & COMMERCE
(Affiliated to University of Mumbai)
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M.Sc	Sem-I& II	Classical Mechanics	At the end of the course, the learner is able to 1. Understand the principle of virtual work and the concepts of least action, the formalisms of Lagrange and Hamiltonian (CO1) 2. Describe the motion of a system in Lagrangian and Hamiltonian formalisms (CO2) 3. Understand the features of motion under central force, periodic motion, small oscillations as they appear in other areas of Physics (CO3) 4. Use the Poisson brackets in Hamiltonian dynamics and solve related problems (CO4) 5. Understand the linkages of the techniques of Classical Mechanics in solving problems in areas of Statistical Mechanics (Phase space), Molecular Physics (CO5)
		QUANTUM MECHANICS I	At the end of the course, the learner is able to 1. Understand the basic principles of Quantum mechanics and the need for its formalism (CO1) 2. Understand the Uncertainty Principle and formulation of Schrodinger equation (CO2) 3. Understand the importance of Dirac formalism, vector spaces and apply the same in solving problems of potential barrier, square well potential (CO3) 4. Apply the techniques of solving differential equations using various special functions as they appear in the solution of Schrodinger equation for Hydrogen atom problem (CO4) 5. Solve the various boundary value and potential problems using the techniques of quantum mechanics
		MATHEMATICAL METHODS IN PHYSICS	At the end of the course the learner will be able to 1. Solve eigenvalue problems using matrices as they appear in Classical and Quantum Mechanics (CO1) 2. Apply tensor analysis to understand the formulation of relativistic electrodynamics and other areas of Physics (CO2) 3. Apply residue theorem of complex variables to solve real and definite integrals (CO3) 4. Understand the emergence of special functions as solutions of differential equations and to solve problems in physics (CO4) 5. Solve partial differential equations using integral transforms in boundary value problems

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		Introduction to Programming	At the end of the course, the learner can 1. Understand the use of programming language and write simple programs for mathematical problems (CO1) 2. Develop flowcharts for analyzing a given mathematical problem and solve them numerically (CO2) 3. Apply the techniques of numerical methods in interpolation to generate difference tables of a given data set (CO3) 4. Analyze a given data set and fit them to a suitable polynomial equation and present them graphically (CO4) 5. Simulate models for a given mathematical problem by techniques of Monte Carlo and other related techniques (CO5)
		QUANTUM MECHANICS II	At the end of the course, the learner can 1. Gain understanding of the mathematical foundations of the angular momenta of a system of particles (CO1) 2. Apply the concept of non-relativistic Hamiltonian for an electron with spin and perform calculation using angular momentum techniques (CO2) 3. Apply various approximation methods in the solution of time independent and time dependent Schrodinger equations (CO3) 4. Apply the perturbation theory to various forms of Schrodinger equation in scattering theory and partial wave analysis (CO4) 5. Apply the quantum mechanical principles to
		NUCLEAR PHYSICS	se Outcome: At the end of the course, the learner 1. Gains knowledge about the nuclear properties such as mass, size, spin and the methods adopted for their estimation 2. Gains awareness of safety and regulatory norms adopted in the nuclear programme in the country 3. Understands the various nuclear models, 4. Understands the nuclear reactions with the ideas of decay mechanisms, interaction of radiation with matter and the experimental methods of analysis 5. Gains insight into the basics of Particle Physics with introductory ideas of the fields of Quantum Electrodynamics and Quantum

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