School of Mathematics

Course 141 1998-99

(JF Mathematics, JF Theoretical Physics & SF Two-subject Moderatorship)

Lecturer: M.P. Fry

Requirements/prerequisites: None

Duration: 24 weeks

Number of lectures per week: 3

Assessment: Weekly assignments counting 25%

End-of-year Examination: One 3-hour exam

Description:

The following topics are covered: vectors, Newton's laws, conservation of momentum, Newtonian gravity, inertial and accelerated reference frames, Galilean transformations, motion of charged particles in electric and magnetic fields, conservative forces, conservation of energy, two-particle dynamics, conservation of angular momentum, two-body central force problem, including scattering. Students are encouraged to study nonlinear dynamics, chaos and celestial dynamics using computers.

Objectives: This course aims to present the principles of elementary classical mechanics. It also seeks to introduce at an early stage the methods of scientific reasoning and research.

Textbooks: D. Kleppner and R. Kolenkow, *An Introduction to Mechanics.* Also, C. Kittel et al., *Mechanics,* Berkeley Physics Course, Vol 1, is highly recommended.

June 10, 1998