BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
INSTRUCTION DIVISION
FIRST SEMESTER 2015-2016
Course Handout (Part II)

In addition to part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No. : PHY C212/F211
Course Title : Classical Mechanics
Instructor-in-Charge : SUBHASH KARBELKAR

Course Description : This course aims at an elementary introduction to the advanced formulations of classical mechanics such as the Lagrangian and Hamiltonian formalisms.

Scope & Objectives : The course begins with the D'Alembert's principle and derives Lagrange's equations from it. The Hamiltonian formalism is introduced. Canonical transformations are discussed. Hamilton Jacobi equations and methods for solving them are covered. The course ends with canonical perturbation theory which deals with realistic problems slightly different from the exactly solvable problems.

Text Book: (1) H. Goldstein, C. Poole & J. Safko, Classical Mechanics, Third Edition, Pearson Education, Inc., 2002 (2) N. C. Rana and P. S. Joag, Classical Mechanics, Mc Graw Hill, 2006

Course Plan:

Lect. No.	Learning Objectives	Topics to be covered	Reference to Text book
1-3	Lagrange's equation	Constraints, D'Alembert's principle, Lagrange's equation	1.3,1.4
4,5	Velocity dependent potential	Velocity dependent potential	1.5
6-9	Lagrange equations	Calculus of variations, Lagrange equations from Hamilton's principles	2.1-2.3
10-12	Symmetry principle	Symmetry principle and conservation laws	2.6
13-15	Hamilton's equations	Laplace transformations and Hamilton's equation	8.1-8.2
16-17	Hamilton's equations	Hamilton's equations from variational principle	8.5
18-20	Canonical transformations	Equations of canonical transformations	9.1-9.2
21-22	Canonical transformations	harmonic oscillator	9.3
23-25	Poisson brackets	Poisson brackets and other canonical invariants	9.5
26-28	Infinitesimal canonical transformations (ICT)	ICT and angular momentum	9.6
29,30	Symmetry groups	Angular momentum, symmetry groups of mechanical system	9.8
31,32	Liouville's theorem	Liouville's theorem	9.9
33-35	Hamilton Jakobi equation	Hamilton Jakobi equation	10.1,10.2
36-40	Hamilton Jakobi equation	Separation of Hamilton Jakobi equation	10.3-10.5

Evaluation Scheme:

EC No.	Evaluation Component.	Duration.	Weightage	Date & Time	Nature of Component.
1	Midsem Test		30%	6/10 8:00 - 9:30 AM	Closed Book
3	Viva/Seminar/Tutorial/Assignment		30%		
4	Comprehensive Examination	3 Hours.	40%	3/12 FN	Open Book

Chamber Consultation Hour: To be announced in the class.
Notices: Notices concerning the course will be put up on the **PHYSICS DEPT.** notice_board only.
Make-up Policy: No Make will be granted for tutorial tests**.** Make-up for the test/s will be granted only for genuine (bedridden/fever etc but not stomach upset) cases of health problems or urgency for going out of town with prior permission. In case of medical grounds for make-ups, the students must arrange to send the application, which must mention the location of student, with their trusted friends or by email (only snkarbelkar@gmail.com) so as to reach the instructor not later than the end of that test (a personal "get well soon" visit to places/Bhavans other than Meera may be carried out! For Meera Bhavan residents a warden may be requested to convey the "get well soon" message).

Instructor-in-charge
SUBHASH KARBELKAR