

SYLLABUS

Physics 311 Mechanics Spring, 2002

Instructor:	Prof. Andrey V. Chubukov
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Office hours	4:30p.m - 6p.m MW
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Text: L.D. Landau, E.M. Lifshitz Mechanics, Pergamon Press, 1976.
V. Barger and M. Olsson, Classical mechanics - a modern perspective, McGraw-Hill, 1995.
Recommended text: K. Symon Mechanics, Addison-Wesley, 1971. Textbooks are available for purchase in the University Bookstore and should be on reserve at the Physics Library.

Tentative Schedule of Topics

1/22-1/31	Introduction. The principle of least action. The equations of motion. LANDAU §§ 1-5
2/3-2/7	Conservation laws. Energy, momentum and angular momentum conservation. LANDAU §§ 6-9
2/10-2/21	Integration of the equations of motion. LANDAU §§ 11, 13-15

2/24	Mid-term exam
2/23-3/5	Collisions between particles. Elastic collisions. Rutherford's formula. LANDAU §§ 16-20
3/7-3/14	Small oscillations. Free and forced oscillations. Vibration of molecules. Damped oscillations. LANDAU §§ 21-22, 24-25, 27
3/24-4/16	Motion of a rigid body. Angular velocity. The inertia tensor. The equations of motion of a rigid body. Euler angles. LANDAU §§ 31-37
4/21	Mid-term exam
4/23-5/9	The canonical equations. Hamilton equations. The action as a function of coordinates. Adiabatic variables. LANDAU §§ 40,42,43,45-50
5/12-5/16	FINAL EXAM

Three credit students

1. Exams. Each three-credit student will take a total of three exams (including the final exam). Each mid-term exam will have 3 questions, final exam will have 5 questions. Exam dates are listed on the Schedule of Topics. The dates are tentative and are subject to change. Exams will cover the assigned lectures. Approximately 2/3 of the questions will be drawn from the textbooks, others will be drawn from lectures.

2. Problem Sets. There will be 4 problem sets, each set will have 6-10 problems and will be due in two weeks.

3. Grades Each solution will be graded on the conventional (A-F) grading system. Valid grades are **A** - 5 points, **AB** - 4 points, **B** - 3 points, **BC** - 2 points, **C** - 1 points **D** - 0.5 points, and **F** - 0 points. The total grades for mid-term exams will be based on the following scheme: **A** - 15-13 points, **AB** - 12-11 points, **B** - 10-9 points, **BC** - 8-7 points, **C** - below 7 points. For the final exam, the total grades will be as follows **A** - 25-21 points, **AB** - 20-18 points, **B** - 17-15 points, **BC** - 14-12 points, **C** - below 12 points. The final grade for the course will be based on the mid-term exams (30% each), and on the final exam (40%). Besides, to get **A** or **AB**, one should present solutions for **all** four home sets and collect more than 66% of the maximum total number of points graded on the same system. To get **B**, one should collect more than 50% of the maximum total number of

points.

4. Class attendance is required.