

PHYSICS 821

CLASSICAL MECHANICS

SPRING QUARTER 2007

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Office Hours: feel free to drop in anytime
Class web page:
<http://www.physics.ohio-state.edu/~eric/teach.html>

Required text:
Goldstein, Poole, & Safko, *Classical Mechanics*, 3rd edition (Addison Wesley, 2002)

Grading: There will be one midterm examination, weekly graded homework sets, and a comprehensive final examination. Late homework sets will not be accepted except for special reasons. The grading will be apportioned as follows:

Graded homeworks	30%
Midterm ...	30%
Final...	40%

SYLLABUS

I. Survey of Elementary Principles (*G Chapter 1*)

3/27	T	Mechanics & constraints
3/29	Th	D'Alembert's principle & Lagrange's equations

II. Variational Principles & Lagrange's Eq. (*G Chapter 2*)

4/3	T	Hamilton's principle; Calculus of variations
4/5	Th	Conservation properties & symmetry

III. The Central Force Problem (*G Chapter 3*)

4/10	T	Eq. of motion and orbits
4/12	Th	Kepler problem
4/17	T	Classical elastic scattering

IV. The Kinematics of Rigid-Body Motion (*G Chapter 4*)

4/19	Th	Orthogonal transformations and Euler angles
4/24	T	Euler's theorem & finite rotations

V. Rigid-Body Equations of Motion (*G Chapter 5*)

4/26	Th	Inertial tensor and principal axes
5/1	T	Solving rigid-body problems
5/3	Th	Symmetric and asymmetric tops

VI. Oscillations (*G Chapter 6*)

5/8	T	MIDTERM EXAMINATION
5/10	Th	Formulation of the problem
5/15	T	Free and forced vibrations

VII. Hamilton Equations of Motion (*G Chapter 8*)

5/17	Th	Derivation & examples
5/22	T	Least action

VIII. Canonical Transformations (*G Chapter 9*)

5/24	Th	Examples & Poisson brackets
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IX. Hamilton-Jacobi Theory & Action-Angle Variables (*G Chapter 10*)

5/29	T	Hamilton-Jacobi equations
5/31	Th	Action-angle variables