PHYS 203 - Classical Mechanics
Princeton University - Fall 2006

Prof. Michael Romalis	romalis@princeton.edu, Office: Jadwin 230, Phone 8-5586
Lectures	Tuesday, Thursday, 11:00 – 12:20, Room: Jadwin A07
Homework Session (optional)	Monday, 7:30-9:30 PM, Room: Jadwin 475
Office Hours:	Monday, Tuesday, Thursday, 1:00-2:30 PM, Jadwin 230
TA: Marcus K Benna	mbenna@Princeton.edu,
TA office hours:	Thursday 3-5 pm, Jadwin 404
Website:	**www.princeton.edu/~romalis/PHYS203**

Course Structure
Lectures and homework will be the most important parts of the class. Try to follow the derivations during the lecture closely and *stop me* when something is not clear. The homework will take a substantial amount of time. On Mondays there will be an evening session lead by the TA to help you, however it is important that you start working on the homework on your own ahead of the session.

PHYS 203 vs. PHYS 205
Both classes are appropriate for Physics majors and will cover essentially the same material. Compared with PHYS 205, I will go more slowly in the beginning, assume less mathematical preparation, and focus more on problem solving skills at the expense of more abstract theoretical treatment.

Evaluation
Homework 30%, Midterm 30%, Final 40%

Homework will be assigned (almost) every week and will be due on Wednesday in my mailbox in Jadwin by 5 PM. Generally, you can work on the homework together at the problem session. Occasionally, a few problems will be designated as "independent work" and you are expected to work them out on your own. They will also carry a slightly higher weight. Late homework submission policy: 2-day grace period for the whole semester (i.e. you can submit one homework 2 days late or 2 homeworks 1 day late).

The midterm will be a 2 hour exam in the *evening* on Thursday, October 26th. The final exam will be during the examination period in January.

Books
Required textbook: *Classical Dynamics of Particles and Systems*, Thornton and Marion, 5th edition

Additional reading material:
Mathematical Methods for Physicists, Arfken and Weber
Classical Mechanics, Taylor
Mechanics, Landau and Lifshitz
Classical Mechanics, A Modern Prospective, Barger and Olsson
Classical Mechanics, Goldstein
Analytic Mechanics, Hand and Finch
Theoretical Mechanics of Particles and Continua, Fetter and Walecka

Course Content

While all of you have already taken a mechanics class, we will cover the material at a more sophisticated level and introduce new techniques that are also widely used in quantum mechanics and other advanced physics classes. The most important skill you will get from the class is the ability to use advanced mathematics to describe physical phenomena and to interpret mathematical results in physical terms.

Week 1: Review: kinematics, dynamics, oscillations, mathematical methods (Chapters 2 and 3)

Week 2: Variational methods (Chapter 6)

Week 3: Lagrangian and Hamiltonian Methods (Chapter 7)

Week 4: Lagrangian and Hamiltonian Methods Continued (Chapter 7)

Week 5: Central force motion (Chapters 5 and 8),

Week 6: Review, Midterm

Week 7: Scattering from a central potential (Chapter 9),

Week 8: Coupled oscillators (Chapter 12)

Week 9: Coupled oscillators (Chapter 12), Waves (Chapter 13)

Week 10: Non-inertial reference frames (Chapter 10)

Week 11: Rigid body motion (Chapter 11)

Week 12: Rigid body motion (Chapter 11)