

# Physics 521 – Theoretical Mechanics

Fall 2008

Phys 521 Theoretical Mechanics is a capstone course in the theory of classical mechanics. We will cover in detail the motion of particles and rigid bodies, with an emphasis on problem-solving techniques.

**Instructor:** Cass Sackett

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**Office:** Physics 155

**Phone:** 434-924-6795

**Class Hours:** TR 9:30-10:45 AM, Physics 210

**Office Hours:** Wednesday 3-5 PM

**Webpage:** <http://www.people.virginia.edu/~cas8m/classes/phys521/>

Includes links to lecture notes, the homework assignments, and homework solutions.

**Text:** Fetter and Wallecka, *Theoretical Mechanics of Particles and Continua*

Additional resources:

Landau and Lifshitz, *Mechanics*

Goldstein, *Classical Mechanics*

Marion and Thornton, *Classical Dynamics of Particles and Systems*.

## Course Outline:

- I. Newtonian dynamics and conservation laws (Chapter 1)
- II. Lagrangian dynamics (Chapter 3)
- III. Small oscillations and normal modes (Chapter 4)
- IV. Accelerated coordinate systems (Chapter 2)
- V. Rigid bodies (Chapter 5)
- VI. Hamiltonian dynamics (Chapter 6)
- VII. Continuous media (Chapter 7)

## Grading:

*Homework* 40%

Your lowest homework score will be dropped when you complete the course evaluation at the end of the semester

*Qualifier Packet problems* 5%

*Midterm exam* 25%

*Final exam* 30%

## Homework:

Assignments will be due weekly, normally on Thursdays. Students are encouraged to work together, but should write up their solutions independently. Assignments are due at the beginning of class. Late assignments will be assessed a 10% penalty, and will be accepted until the solutions are posted, typically on the following Tuesday. Assignments turned in after that will require approval from the instructor and will likely suffer a significant penalty.

## Qualifier Packet problems:

Most of the regular homework problems will be taken from the text. However, I will also be assigning problems from the study guide for the Classical Mechanics qualifying exam. I will not provide solutions to these problems, and they will be graded on a credit/no credit basis.

## Exams:

There will be a midterm and a final exam. The midterm will be held in class on October 9, and the final exam will be on Wednesday December 10 from 2:00 to 5:00 PM.