Syllabus
Classical Mechanics
(Physics 821)
Fall Semester 2012

Instructor
Prof. Jens Oberheide, 102B Kinard Lab, Dept. of Physics and Astronomy, Clemson University, Tel. 864-656-5163, Email: joberhe@clemson.edu

Class Hours
MWF 11:15 – 12:05, 116 Kinard. If I am late for class and do not have a substitute, I do not expect students to wait more than 15 minutes.

Office Hours
MWF 1:30 – 2:30; Th 10:00 – 12:00; or simply come on an as needed basis.

Prerequisite
Undergraduate Classical Mechanics (Physics 321/322 or similar).

Required Texts
Classical Mechanics (Third Edition) by Goldstein, Poole & Safko; Addison-Wesley, ISBN 0-201-65702-3, 2002, 638 pages; List Price US$ 171.80; it is important that you have the 3rd edition. **The lecture will follow this book!**

Classical Dynamics by Jose & Saletan; Cambridge University Press, ISBN 0-521-63636-1, 1998, 670 pages; List Price US$99.00. **An approach to Classical Mechanics that makes extensive use of geometric ideas. You should read the book in parallel to the one by Goldstein, to get a broader perspective.**

Course Outline
This course on analytical mechanics covers the Lagrangian and Hamiltonian approaches for single particles, many body systems, and rigid and continuous media. The classical mechanics of the special theory of relativity will also be discussed. Differential geometry for the mathematical formulation of the Hamiltonian theory will be introduced. The course will follow Goldstein but a deeper understanding of some topics, particularly those involving differential geometry, will require the parallel reading of Jose & Saletan.

Course Objectives
1. Deepen the prerequisite knowledge of Newtonian mechanics.
2. Advance to a full understanding of constraints via Lagrangian mechanics, and Hamiltonian mechanics on phase space using symplectic geometry.
3. An understanding of special relativistic generalizations of dynamics using spacetime geometry.
4. An introduction to concepts of classical field theory.

Homework

Homework will be assigned on a weekly basis. The lowest two homework grades will be dropped at the end of the semester before the final course grade is calculated. Homework is due on the date assigned. Late homework will not be accepted without a very good excuse.

Course Grades and Weights

- 30% Homework
- 30% Mid-term exam
- 40% Final exam

A: 85-100; B: 70-85; C: 55-70; D: 40-55; F: 0-40

Attendance Policy

Attendance is required for the first class. Thereafter, it is not required but is *strongly recommended*. It is the responsibility of the student to be aware of what is announced in class, including changes to homework assignments. Please also see the general statement on attendance in the Graduate Announcements.

Class Web Page

The course web site can be accessed via Blackboard. Course announcements, assignments, instructional material etc. can be found there.

Academic Integrity Policy

The Clemson University statement on academic integrity applies, as posted in the Graduate Announcements. In addition, students may discuss homework problems with other students, but only in general terms. **Students may not look at another student's written solution before the due date, and the work the student turns in must be entirely his/her own.**

Disability Access Statement

It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation.