Syllabus
Classical Mechanics
(Physics 821)
Fall Semester 2013

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 Text
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!**

Recommended Text
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. Quite interesting and particularly students with a theoretical physics orientation should read the book in parallel to the one by Goldstein, to get a broader perspective and for intellectual merit.**

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. Symplectic geometry for the mathematical formulation of the Hamiltonian theory will be introduced. The course will follow Goldstein.

Course Objectives
1. Advance to a full understanding of Lagrangian mechanics, and Hamiltonian mechanics on phase space, including constraints.
2. A full understanding of small oscillations as an eigenvalue problem.

3. An theoretical understanding of the concept of canonical transformations and its applications.
4. An understanding of special relativistic generalizations of dynamics using spacetime geometry.
5. An introduction to concepts of classical field theory.

Homework
Homework is very important to practice the theoretical concepts discussed in class. It 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. Each student will make an oral presentation of his/her written homework at least twice per semester in my office. The oral presentations count toward the final grade

Course Grades and Weights
- 25% Written Homework
- 10% Oral Homework Presentation
- 25% 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. **Copying homework solutions from the web is strictly forbidden!**

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.