PHYS 300 - Analytical Mechanics I
Fall 2014
Professor Jahred Adelman
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3 units, 1 section
MWF 2:00 pm - 2:50 pm, Faraday 237

Course website (for homework, syllabus and lecture notes):
http://nicadd.niu.edu/~jahreda/phys300.html

Office hours: Faraday 220, Monday and Wednesday 3-4 pm (right after class) or by appointment

Preferred method of communication: email

Required text: Classical Mechanics (Taylor)
Recommended supplemental text for those who want help with vector calculus: div, grad, curl, and all that (Schey)

Expected knowledge: Basic understanding of Newton's Laws, coordinate system, conservation of momentum, conservation of energy.
Enrollment prerequisites: MATH 232 and PHYS 250A or PHYS 252 or PHYS 253

The course will closely follow the beginning chapters of Taylor. In particular, **material to be covered** (in order):
1. Coordinate Systems and Newton's Laws
2. Projectiles and air resistance/drag, as well as charged particle motion
3. Momentum and angular momentum
4. Energy and conservative forces
5. Oscillations and Fourier analysis
6. Calculus of Variations
7. Lagrange's Equations
8. Central-Force problems
9. Mechanics in non-intertial frames
10. Rotational motion of rigid bodies (if time allows)

The central themes (and problems) should be familiar to students from previous use of Newton's Laws, though the use of additional coordinate systems, computational methods, vector calculus and differential equations will allow for more advanced problems to be tackled

Problem sets and assignments: Problem sets/assignments will be given every 1-2 weeks, as we finish up material, and will be due 1 week later. Late assignments NOT accepted without a valid doctor's note. If you have other circumstances, talk to me, but I reserve the right to not accept any assignment after class finishes on the due date. Each problem set will have equal weight in the final grade. These will include computer assignments (no prior knowledge or special equipment necessary beyond a web browser). The homework should be started early. If you have any trouble with it, come to office hours and/or ask for help.

We will briefly go over some of the homework solutions after I return them. Ask (in class or during office hours) if you have trouble understanding any of the solutions

Plagiarism in physics classes (and how to receive full credit for your hard work): I don't want to prevent you from working with others, but simply asking a fellow student for answers is a form of plagiarism. Similarly, so are finding solutions on the web. In any case, you will only receive credit on assignments if you show all your work. Also, please don't forget that this is a science class, so remember to use units and to label graph axes where appropriate, or you will not receive full credit for the assignment

Midterm: The midterm will be at the halfway point in the course, and will be take-home (and will include some computer work)

Final: Similar questions to the homework

Grading:
Problem sets/assignments: 50% of total grade
Midterm: 25% of total grade
Final: 25% of total grade

A: 85-100%
A-: 78-85%
B+: 70-77%
B: 62-69%
B-: 56-61%
C+: 48-55%
C: 40-47%
D: 25-39%
F: 25% or less

The class: I will post slides from the previous week ~once a week or so. This should **not** be considered a substitute for note-taking, but can hopefully help you in preparations for exams and homework. We will anyway closely follow Taylor, which is an excellent textbook. From time to time, I will split you into small groups of a few people for **brief** exercises. Most of the material I go over will be in the slides, but occasionally we will also work out some problems together on the (physical!) blackboard.

Food in the classroom: Please avoid food (bottles and cans of liquid are OK, but no straws!), as this is disruptive to me and to others. The class is only 50 minutes long, so hopefully this does not cause any problems. If it does, talk to me privately and we will work out an arrangement.

Phones and electronics: If your phone rings, we will know that it was you (this is a small class)! And if you are using your phone in class, I will see you, and I **will** call you out on it.

Attendance: I will **not** take attendance, but you can't hand in homework without being in class, and you will not do well if you do not follow the coursework, so you should be in every class

Disability statement: If you need an accommodation for this class, please contact the Disability Resource Center as soon as possible.The DRC coordinates accommodations for students with disabilities. It is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu. Also, please contact me privately as soon as possible so we can discuss your accommodations. The sooner you let us know your needs, the sooner we can assist you in achieving your learning goals in this course.