

PHYS 311, Winter 2018-2019

Classical Mechanics I

Staff

1. **Instructor:** Prof. David Goldberg (goldberg@drexel.edu)

Office: Disque Hall, Room 810

Phone: (215) 895-2715

Lectures: T,Th, 10-11:50, Curtis 457

Office Hours: W 3:30-4:30, F 1-2, or by appointment *in advance*.

Webpage: <http://mimas.physics.drexel.edu/cm1>

2. **Grader:** Joe Wraga (jmw465@drexel.edu)

Office: Disque Hall, Room 809

Textbook

- *Classical Mechanics* by John R. Taylor.

Copies will be on order by the bookstore, but I strongly advise you to see if you can get a better deal online.

Course Overview

You have seen a significant amount of classical mechanics in your freshman sequence, but over this course, we're going to develop formalism and an intuition that will lead naturally into your work in quantum mechanics (through our work on the Hamiltonian), field theories (through our discussion of oscillators and the Lagrangian), astrophysics (central body motion), and much more. We will focus primarily on figuring out strategies for modeling and solving systems rather than on the more mundane foundations of kinematics and classical mechanics that you've seen in your freshman sequence.

This will be a highly interactive course, and you are expected to attend every lecture, participate in class discussion, and come to me with any conceptual or homework questions that you might have.

Evaluation

The grading scheme for this course is:

- 30% Homework
- 10% Class Participation
- 1% Completing the pre-test (Note: Your actual performance on the pre and post-test are not part of your grade)
- 1% Completing the post-test
- 24% Midterm
- 34% Final Exam

I expect to curve the final grades at the end of term, but as a baseline, you should expect that at minimum:

A: ≥ 93 , A-: 90-92

B+: 87-89, B: 83-86, B-: 80-82

C+: 77-79, D: 73-76, C-: 70-72

D+: 67-79, D: 60-66

F: < 60

I expect to curve, but the curve will be *upward*.

Homework

I will give you a homework every 1 1/2-2 weeks. Problems will be a combination of book problems and those of my own devising. A lateness penalty of 10% will be assessed for each day late, and no homeworks will be accepted after solution keys have been passed back.

You are expected and encouraged to discuss homework in a general way. However, you are to prepare your written assignment on your own. Copying or collaboration on the final submission will result in zeros for all concerned.

Midterm and Final

We will have a midterm exam during classtime in Week 6. It will be closed book, and with a limited equation sheet that will be distributed in advance. We will also have a final exam which will be cumulative.

Topics and Reading

We will cover approximately 1 chapter/topic per week, though that will obviously vary a bit:

1. Review of Newtonian Mechanics: Ch. 1,2
2. Momentum and Angular Momentum: Ch. 3
3. Energy: Ch. 4
4. Oscillations: Ch. 5
5. Calculus of Variations: Ch. 6
6. Lagrange's Equations: Ch. 7
7. Two-Body Central Force Problems: Ch 8
8. Hamiltonian Mechanics: Ch. 13
9. Collision Theory: Ch. 14

Course Policies

Unless otherwise stated, the work on all homeworks and your exams is to be your own. While discussion with your classmates is encouraged, you are to actually do the work on your own.

The instructor reserves the right to change the course as described in this syllabus at any time. Please also refer to the Drexel University policies and resources listed below.

Academic integrity, plagiarism and cheating policy:

- <http://drexel.edu/studentaffairs/community>
- http://drexel.edu/provost/policies/academic_dishonesty

Students with disability statement:

<http://www.drexel.edu/oed/disabilityResources/students/>

Course drop policy:

http://drexel.edu/provost/policies/course_drop/

Drexel Learning Priorities

- Information Literacy - Possess the skills and knowledge to access, evaluate and use information effectively, competently and creatively.
- Technology Use - Make appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning.
- Professional Practice - Apply knowledge and skills gained from a program of study to the achievement of goals in a work, clinical, or other professional setting.
- Research, Scholarship, and Creative Expression - Make meaningful contributions in their chosen field, participating in use-inspired research, scholarship or creative activity as an individual or in a collaborative effort.