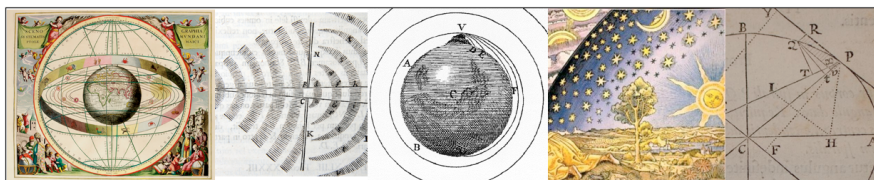


# Physics 350 · Classical Mechanics Syllabus · Fall 2016



**Professor:** Dr. Kate Brown, [kjonesm@hamilton.edu](mailto:kjonesm@hamilton.edu)

**Lecture:** 1-2:15 pm MWF, G041

**Office Hours :** Wednesday & Friday 3-5 PM, Thursday 9-10 AM, and by appointment. G051.

**Text:** Marion & Thornton, *Classical Dynamics of Particles and Systems*, 4th or 5th ed

**Course Description and Educational Goals:** In classical mechanics we are concerned with the behavior of systems that can be treated in the Newtonian regime, for which electromagnetic and microscopic interactions can generally be ignored. The primary means by which we study systems is by determining their ‘equations of motion’, which can be obtained using Newton’s Laws and conservation principles, or with the more sophisticated Lagrangian/Hamiltonian formalism. In this course we will study both approaches. Our goal in this course is to understand the analytical techniques of classical mechanics and how they fit in to other branches of physics. The topics we will cover are: dynamics of single particles and systems of particles, the variational principle and Lagrangian/Hamiltonian mechanics, celestial mechanics and central-force motion, motion in non-inertial reference frames, and oscillations. This course is a key component of an undergraduate preparation in physics as techniques from classical mechanics form the basis for analysis in other branches of physics.

**Grading Scheme:** Weekly homework is worth 20% of your total grade. There will be two exams each worth 25% and 3 presentations each worth 10%.

**Policies:** These are discussed at length on the first day of class. (1) Laptops, cell phones, tablets, etc. are not allowed in lecture. If you wish to take notes it should be on paper by hand. If this poses any difficulty for you whatsoever please let me know and we can find a solution that suits your needs. Otherwise, electronic devices should be silenced and put away during class. (2) Homework is the opportunity to learn the material thoroughly and with plenty of time. You are encouraged to work together on homework but each person’s work should be in keeping with the academic honor code. (3) Every assignment must come with a signed honor code statement. (4) You should attend class regularly and hand in all homework assignments. I am happy to accommodate absences or late work for a valid, documentable reason. Excessive absences and/or multiple missed assignments without a valid, documentable excuse provided in a timely fashion can result in an F for the course at any time during the semester.

**Presentations:** There are three presentations during the semester. The first two are presentation of a homework problem. Every week two problems on the homework will be selected as ‘potluck problems’. Two students will present those problems in class on the Friday before the homework is due. These problems are like a specially prepared dish you bring to a potluck. When it is your week to present you have to spend time preparing the problem, figuring out the solution and how to present it. The rest of the class has the benefit of being educated on how to do those two problems, and still has to hand in a written solution to those problems along with the rest of the homework. I strongly recommend meeting with me before your presentation. You should try to solve the problem in advance of our meeting. We will work through the solution so that you can prepare your presentation for Friday. Even if you do not meet with me before your presentation, you must practice your presentation to yourself or some willing audience, preferably more than once. It will make a big difference in how well your presentation goes.

The first exam will be inspired by the potluck problems so it is to everyone’s advantage to understand the potluck problems thoroughly. Your potluck problem will be graded on clarity of presentation especially with regard to the ‘narrative arc’ of the solution, and quality of written solution.

**Toy Week :** The third presentation is to explain the workings of a toy. In the department we have several fun toys which can be understood using principles from this course. In groups of 2 or 3 you will study the existing literature for your toy and prepare a presentation to be given near the end of the semester. Toy Week will be discussed in more detail after the first exam.

**Accommodations:** If the policies and expectations for this class are restrictive of your academic efforts in any way please let me know and I would be happy to work with you to find a solution. I request that anyone needing academic adjustments or accommodations speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities should also contact Allen Harrison, Associate Dean of Students for Multicultural Affairs and Accessibility Services in the Office of the Dean of Students (Elihu Root House; ext. 4021) who coordinates services for students with disabilities.