# Physics 100

Syllabus · Fall 2016

Edgerton, H. *Back Dive*, 1954

**Instructor:** Dr. Kate Brown, kjonessm@hamilton.edu
**Lecture:** 9-9:50 AM MWF Science Center G041
**Office Hours:** Wednesday & Friday 3-5 PM; Thursday 9-10 AM, and by appointment
**Lab:** 1-4pm Tuesday-Thursday G032
**Text:** *Physics*, James S. Walker. 4th edition. This is a required text and is your primary resource for the course. Additionally, the Blackboard site will be an important resource which you should check regularly.

**Grading Scheme:** Homework: 20 %
Two Exams: 20 % each
Lab: 20%
Final: 20%

**Topics Covered:** We will cover the standard material for a first semester introductory course on classical mechanics: order-of-magnitude estimates and dimensional analysis, vectors, kinematics in one and two dimensions, Newton's laws of motion and gravitation, rotational dynamics, fluid dynamics and thermodynamics. See attached itinerary for approximate dates of coverage and tentative lab schedule.

**Educational Goals & Purpose:** Physics is a problem-solving discipline, and physicists are very good at solving problems; for example it was physicists who finally determined the double helix structure of DNA, and that the mass extinction which killed of the dinosaurs was the result of an asteroid impact. This class is about introductory physics but also how to think like a physicist. Even if you are going to solve problems in some context that does not directly involve concepts or equations from physics, the analytical skills developed in the context of introductory physics are useful in many different disciplines, as well as everyday life. Thus the goals for the class are not just to cover the topics identified above, but to learn how to think like a physicist.

**Policies & Expectations:** Note: These were discussed at length on the first day of class.

(i) *Attendance:* Attendance in lecture is recommended. Attendance is lab is required; if you need to miss a lab you must attend another lab section that week. There are no make-up labs at the end of the semester. Missing more than one lab (i.e. without attending another section)

can result in an F for the course.

(ii)*Laptops, etc:* 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 please let me know and we can find a solution that suits your needs. Please note that my lecture notes are available on Blackboard shortly after class. Attempts to use technology surreptitiously are obvious from the front of the class, and are not appreciated. Please refrain from use or do not come to class.

(iii)*Academic Integrity and Manifesto on Solutions Manuals:* Hamilton has an academic honor code to which you have pledged allegiance in order to be a student here. You must include a signed statement on each homework assignment declaring that your work is consistent with said code; for example 'I have adhered to the honor code on this assignment. *Your Name*'.
Collaboration on problem sets is highly encouraged and you do not need to cite the names of the people you work with if they are fellow students. However each person must submit their own assignment and it should reflect their own efforts and understanding. *Do not blithely copy someone else's work or solutions from the internet/solutions manual.* Doing so is considered a violation of the academic honor code.
My policy on the use of solutions obtained from the internet or the solutions manual is as follows (and was discussed in detail on the first day of class): you are free to use any book, website, or person to help you solve a problem, but you must cite your sources. This includes the solutions manual if you have used it. You do not need to cite the book, me, your lecture notes, my lecture notes, tutors at the QSR Center, or anything that is commonly known. Keep in mind that you will not be able to use outside resources on exams. My assumption is whatever resources you employ, your focus will be on learning how the problem is solved analytically. The point of doing homework problems is to develop problem-solving skills; having equations memorized or knowing how to use google will do you no good when it comes to taking exams. To best prepare yourself and get the most out of this course, you should complete all homework assignments with veracity.
Finally, if you are stuck on a problem, please come see me during office hours or make an appointment! I would be happy to help you with it. There are also excellent tutoring services available at the QSR Center in Christian Johnson Hall.

**Advanced Track:** With each assignment I will identify extra problems or readings that you can do if you are interested. They will not count towards your grade but if you are looking for extra fun / challenge these will be a good option. If you think you might ask me for a letter of recommendation down the line it is a good idea to consider doing the advanced track.

**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 who anticipates needing academic adjustments or accommodations let me know of the circumstances 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.

# Itinerary*

| Week & Dates | Topics Covered | Lab |
|---|---|---|
| 1: Aug 25 | Syllabus & Logistics | None /Partial Week |
| 2: Aug 29 | Fermi Problems, 1-D Kinematics | Uncertainty |
| 3: Sept 5-9 | Vectors & 2-D Kinematics | Acceleration |
| 4: Sept 12-16 | Newton's Laws of Motion | Projectile Motion |
| 5: Sept 19-23 | Newton's Laws & Circular Motion | Newton's 2nd Law |
| 6: Sept 26-30 | Gravity & Orbital Motion | None/ Exam 1 |
| 7: Oct 3-7 | Work and Energy | Energy Conservation |
| 8: Oct 10-14 | Momentum | None / Fall Break |
| 9: Oct 17-21 | Center of Mass , Rotation Basics | Ballistic Pendulum |
| 10: Oct 24-28 | Rotational Motion | Rotational Motion |
| 11: Oct 31-Nov 4 | Statics, Equilibrium & Fluids | Equilibrium |
| 12: Nov 7-11 | Pressure & Fluid Flow | None/ Exam 2 |
| 13: Nov 14-18 | Vibrations & Waves | Fluids |
| 14: Nov 21-25 | Thanksgiving Break | None /Thanksgiving Break |
| 15: Nov 28- Dec 2 | Thermodynamics I : Temperature & Heat | Hidden Object |
| 16: Dec 5-9 | Thermodynamics II: Entropy & The 2nd Law | Standing Waves |

*Subject to minor changes.