



Syllabus V 1.2
PHY 2054C Section 0002
Physics 2, Spring 2015
Tuesday, Thursday 12:00 - 1:20 p.m., MSB 260

Professor: Dr. Josh Colwell
Office: Physical Sciences Building 434
Contact info: E-mail: josh@ucf.edu (this is by far the easiest way to contact me.)
Telephone: 407-823-2012
Telephone for in-class texting: 480-382-3749
AIM ID (AIM, ichat, etc): colwellastronomy. Twitter: @colwellucf
In person office hours: Tuesday 2:00 p.m. - 3:00 p.m., Wednesday 9:00 - 10:30 a.m., Friday 1:30-3:00 p.m.
Virtual office hours (using Second Life): by appointment or announced in class.

Website: Homework assignments will be completed on MasteringPhysics.com. Class notes, grades, and announcements will be made on Webcourses (accessible from myUCF).

Textbooks:

- *College Physics* (3rd edition), by Knight, Jones and Field, **and** Physics 2054 Lab Manual. The UCF Bookstore carries “Volume II” of this book for our course. This includes the access code to the masteringphysics.com website for homework. We will be covering chapters 17-28, with some exceptions.
- *In-Class Interactive Response System:* We will be using the **Learning Catalytics** Interactive Response System that comes with Mastering Physics (access with your textbook). This requires that you have a Wi-Fi-enabled device such as a smartphone, tablet, iPod Touch, or laptop computer with you in class everyday. Please contact me immediately if this is a problem so that we can find a device you can use for the semester. This will take the place of the more-familiar “clicker” devices and questions. If I refer to “clickers” or “clicker questions” it means questions answered through Learning Catalytics in class.
- *If you already have the book or alternative and do not purchase the course textbook:* At a minimum you will need to purchase access to Mastering Physics to be able to complete the homework assignments and in class questions via Learning Catalytics. This access can be purchased at masteringphysics.com, and you will need to “join” our class on line. The class ID on masteringphysics.com is: **PHY2054FALL2015COLWELL**.

Grading:

Your final grade will be based on the following:

Two in-class exams (two highest of three exams): 33%

Final exam (cumulative): 25%

Laboratory and in-lab exercises: 20%

Homework: 12%

In-Class Learning Catalytics questions: 10%

There will be three in-class exams during the semester, and a cumulative final exam. The lowest of the regular mid-terms will be dropped. **If you miss an exam for *any* reason, that will be your dropped exam.** Therefore, you should plan to make your best effort on all three mid-term exams. Because the final is cumulative, it gives you an opportunity to show you have learned material from the early part of the course where you might not have done as well on earlier exams. Therefore, if it helps your grade to do so, the final exam will count for 33% of your grade and the midterms for only 27%.

All exam grades are final 72 hours after they have been returned. Contact me before this 72-hour period is over if you have a grading dispute. See the rest of the missed work policy below. Plus and minus grades (A-, B+, etc.) will **NOT** be given. The default letter grade scale for non-exam items will be:

A: 88-100 B: 75-88 C: 60-75 D: 50-60 F: below 50

I reserve the right to adjust the grade scale, and the grade scale for exams will be posted after each exam with adjustments (a “curve”) if any. These adjustments, if made, will only help your grade.

Assignments:

First On-line Assignment:

All faculty members are required to document students' academic activity at the beginning of each course. In order to document that you began this course, please complete the Syllabus Quiz Assignment on Webcourses@UCF (Canvas) by the end of the first week of classes, or as soon as possible after adding the course. Failure to do so will result in a delay in the disbursement of your financial aid. This is the only assignment that you will complete on Webcourses. All other homework will be completed on Mastering Physics.

Meet Josh:

The class is large, but still manageable. However, without each of us making an effort, many of you will be anonymous to me. Your learning experience will be more effective if I know you and if you feel comfortable coming to my office hours for help. To establish a line of communication, I'm assigning each of you to have an individual meeting with me during the first two weeks of the course. These meetings will be only 4 minutes long (!), but this is an assignment and your attendance will be scored as a 10/10 on the assignment. This is your easiest homework assignment; do it. A web-based sign-up system will be made available to you by the start of the

semester for you to choose the 15-minute interval during which we will meet in my office. Fair warning: I will take a picture of you at this meeting so I can learn your name.

Online Homework: All homework (except that noted above) will be completed using the online system at masteringphysics.com. Homework plays a central role in this course. If you have understood the underlying concepts the exercises are straightforward, but if you are trying to guess the “right equation” you will fail unnecessarily. Homework will be assigned for each chapter we cover. No homework extensions will be given. Information about how to register for homework will be provided in class. Information on individual assignments will be provided in class and announced on Webcourses and via Twitter.

The online homework will allow multiple attempts. The maximum number of points you can earn for each problem will be reduced following a certain number of attempts or if you use hints that are available.

The code to enroll in this course on MasteringPhysics will be announced to you as soon as it is available. When enrolling, **make your User ID equal to your UCF NID** (usually 2 letters and 6 numbers).

Late homework will have a 25% penalty for each day past the due date. All homework will be completed on masteringphysics.com. Plan ahead to avoid the inevitable connectivity or other technical problems. One homework assignment will be dropped to handle the case where you cannot turn in an assignment for some reason.

Learning Catalytics and Attendance:

Your three lowest Learning Catalytics scores (based on percentage score, not total number of points) will be dropped to handle unavoidable absences. You must bring your device every day. If you do not have it, or it is not functioning for some reason, **check in with me at the beginning and end of class so that I can record that you were attending class even though no Learning Catalytics questions were answered.**

The policy for Learning Catalytics questions is different than that for homework and exam questions: you are encouraged to collaborate with your neighbors during the question. Frequently questions will be asked a second time, and the system will direct you to confer with specific neighbors. Thus at the start of each class you will identify where you are sitting in class using a seat map of the classroom similar to what you would use to choose a seat at a concert or on an airplane.

Laboratory:

You are each enrolled in a smaller lab section that meets for three hours each week. In your lab class you will have a different instructor and an overall lab coordinator. Information on the labs is provided to you in your laboratory syllabus. Everything done in your laboratory sections

counts for 20% of your overall course grade. The lab exercises will help you learn the material and will therefore also help you do better on your exams.

Course Description and Requirements:

PHY2054C is the second part of the two-semester sequence in introductory physics offered primarily for students majoring in information technology, the biological sciences and pre-health professions. Emphasis is placed on understanding major principles and concepts, and Algebra with simple Trigonometry is used to clarify them. Students should have a good working knowledge of Algebra and Trigonometry at the level of MAC1104 and MAC1114 or equivalent.

Information about this course (syllabus, class-notes, etc.) will be available on Webcourses (via myUCF). In addition, I will use your official UCF e-mail to send you announcements from time to time, so be sure to check your e-mail daily. The website will be frequently updated as the course progresses itself.

This is a fast-paced course. The content of this course is selected to match nation-wide standards for Physics courses, which are often used to prepare students for careers in Medicine and Life Sciences. During the course we will typically work through roughly one chapter per week. Your primary sources of information for the new concepts are your instructor, the textbook and your class notes. The syllabus shows which sections you need to read for each day of class. Here is an estimate of the effort needed for 2054C:

- Reading 20-30 pages of text each week – 3 hours.
- Web based homework & time studying concepts – 5 hours
- Laboratory – 3 hours
- Classroom time – 3 hours
- Estimated weekly effort – 14 hours

You can see that you need to plan on having enough time to do your best in this class.

It is extremely important NOT to get behind! Physics builds on itself inexorably, and once you are behind it will be very difficult to catch up with it again. And don't assume that because you read a section, you understand it. Until you can consistently do the problems successfully, you don't understand the material.

Course Objectives, Or, Why Am I Learning About Magnetic Fields?

Aside from the practical matter that UCF is presumably requiring you to take this course to get your degree, there is actually some value to you in learning the material! Physics is, in many ways, a much simpler scientific discipline than ones you may be majoring in. For that reason, it allows us to easily see fundamental principles, such as conservation of energy. It is an excellent test case for the scientific method and for quantitative thinking and reasoning. For those going into the medical profession, the experiments you perform in life sciences will be much more difficult to interpret than those we do in Physics. Thus, this is an opportunity for you to see simple quantitative reasoning applied to real-world situations and see them work at high precision.

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The mission of the course is to learn tools of critical and quantitative analysis and thinking, using Physics as a model. You do not need to memorize the formulas you encounter but you have to master a number of important concepts and know how to apply your knowledge on a broad range of problems in Science and Technology. We will be learning critical and quantitative reasoning. We will learn techniques to check our answers to make sure they are reasonable. We will learn the importance of experimentation on which our theories are built. We will learn problem-solving techniques. In addition, some of the content will have direct applications to your everyday lives as well as your future professional endeavors.

Examinations: The exams will include problems to be worked out and multiple choice questions. You must have with you at least one number two (2) pencil, and a computer scored answer sheet (a pink scantron) at every exam. You also must know your student ID number (PID) and record it accurately in the proper location on the Test Form and on each written exam. A **non-graphing, non-programmable** calculator may be used during exams. You may be provided with an equation sheet or allowed to bring your own. Details will be announced prior to the first exam. The Office of Disabilities Services will provide reasonable accommodation to students with disabilities. A valid UCF photo ID card is required when you turn in your exam answer sheet.

Teaching Method:

Content: We will cover most of Chapters 17-28 of the textbook, though some chapters and sections may be skipped as announced in class. Classes will include demonstrations and examples of working through problems. I will post a draft version of my notes on the class website prior to class and then an “as taught” version after each class. You may also wish to share notes with other students. The reading assignments in the schedule below are to be completed before class on the day listed. The design of the classes will assume that you have completed the reading assignment.

Questions: I favor an interactive classroom environment. Be prepared to ask and answer questions. Time permitting, I will answer your questions in class. You can send in questions by text message during class to 480-3UCFPHY (this number will only be checked during class). If you are confused about a topic or would like to follow-up, please come to office hours or make an appointment for another time or for virtual office hours using Second Life. Instructions on using Second Life for virtual office hours are posted on Webcourses.

Lectures: Lectures will be a combination of demonstrations, computer slide presentations, chalkboard example problems, (given on the screen via projector from a camera recording my writing), and clicker questions. While the notes will be available online, there is no substitute for attendance. In my experience, the greatest challenge facing students is to internalize the concepts that we are covering, in other words, to truly believe that nature really does follow the (simple) laws of physics. Frequently our everyday experience, crafted as it is by a complicated environment, gives us erroneous intuition about how the universe works. The demonstrations in

class, as well as your labs, will help you see that the laws of physics truly describe the way the universe works.

Supplemental Instruction: Supplemental instruction (SI) is an academic success and retention program for historically difficult courses. SI uses regularly scheduled study sessions led by peers called SI leaders. SI leaders have taken the course before and received an “A”. They undergo continuous training in proactive strategies to conduct effective SI sessions. SI leaders attend all classes, take notes, and do all the assignments. They conduct 4 SI sessions each week. During these sessions, SI leaders help students apply study strategies to the course content. SI leaders help students work cooperatively using the textbook, lecture notes, and other materials to build accurate information, solve problems, work on sample tests and practice to prepare for exams. SI leaders do not lecture but create a comfortable atmosphere for teamwork and group study and models effective study habits. In SI sessions, students learn how to integrate course content and study skills while working together.

SI sessions are voluntary, anonymous, and free to all students enrolled in courses that offer SI. Students who attend SI have a wide range of academic backgrounds and ability. Research shows that students who attend SI sessions on a regular basis can earn on an average one half to a full letter grade higher than their peers who do not attend SI.

Missed Work Policy: It is Physics Department policy that making up missed work will only be permitted for University-sanctioned activities and bona fide medical or family reasons. Authentic justifying documentation must be provided in every case (and in advance for University-sanctioned activities). At the discretion of the instructor, the make-up may take any reasonable and appropriate form including but not limited to the following: giving a replacement exam, replacing the missed work with the same score as a later exam, allowing a dropped exam, replacing the missed work with the homework or quiz average. Note that for this class, the dropped exam is the default policy for a missed exam for **any** reason. This is also the policy for homework and clicker absences.

Golden Rule: Please read this information at the website <http://goldenrule.sdes.ucf.edu>.

UCF Creed: Please read this information at the website <http://www.campuslife.sdes.ucf.edu/UCFcreedpage.html>.

Conduct: Please don't have any sidebar conversations during class. There will be ample opportunity for you to talk during class at certain times. I encourage you to raise your hand (or text me) to ask relevant questions in class.

Disability Access Statement: As stated on the website http://www.sds.ucf.edu/Faculty_Guide, "The University of Central Florida is committed to providing reasonable accommodations for all persons with disabilities. This syllabus is available in alternate formats upon request. Students with disabilities who need accommodations in this course must contact the professor at the

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beginning of the semester to discuss needed accommodations. No accommodations will be provided until the student has met with the professor to request accommodations. Students who need accommodations must be registered with Student Disability Services, Student Resource Center Room 132, phone (407) 823-2371, TTY/TDD only phone (407) 823-2116, before requesting accommodations from the professor."

Collaboration Policy: You may not collaborate on exams. Exams will be of the usual closed-book, closed-notes type. Some clicker questions may be answered individually (at the beginning of class, to check reading comprehension), while in general they will encourage group discussion.

Email: It is very likely that I will need to send email to you regarding class logistics or material. These e-mails will go to the e-mail address on record at UCF. In addition, announcements will be posted on Webcourses. If you write an email to me, please identify yourself in it, and **please include PHY2054 in the subject line**. Send e-mail to my UCF e-mail (josh@ucf.edu). Do not send me messages within Webcourses or masteringphysics.

Calculators and Laptops: Calculators may be used for exams and for clicker questions. You may take notes on a laptop. However, **you may not use your laptop for facebook, web surfing, or other activities not directly related to class.**

Schedule:

We will cover chapters 20 through 26 in order, followed by chapters 17 and 18, We will do some of chapters 19, 27, and/or 28, schedule permitting.

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| Aug. 25 | 20.1-20.2 | Introduction. Charges and Atoms. |
| Aug. 27 | 20.3-20.5 | Coulomb's Law. |
| Sep. 1 | 20.6-20.7 | Forces and Torques in an Electric Field. |
| Sep. 3 | NO CLASS | CAMPUS CLOSSES AT NOON: FOOTBALL |
| Sep. 8 | 21.1-21.3 | Electric Potential and Electric Potential Energy. |
| Sep. 10 | 21.4-21.6 | Connecting Electric Potential and Electric Field. |
| Sep. 15 | 21.7-21.8 | Capacitors, Dielectrics and Energy. |
| Sep. 17 | Chapters 20-21 | Review and catch up on Chapters 20-21. |
| Sep. 22 | Exam 1 | Chapters 20-21 |
| Sep. 24 | 22.1-22.3 | Electrical Current and Batteries |
| Sep. 29 | 22.4-22.6 | Ohm's Law, Energy and Power. |
| Oct. 1 | 23.1-23.3 | Series and Parallel Circuits and Kirchhoff's Laws. |
| Oct. 6 | 23.4-23.7 | More Complex Circuits. |
| Oct. 8 | 23.8 | Electricity in the Nervous System, and Catch up. |
| Oct. 13 | 24.1-24.3 | Magnetic Field. |
| Oct. 15 | 24.4-24.6 (skip 24.7-24.8) | Magnetic Fields and Currents and Review. |
| Oct. 20 | Exam 2 | Chapters 22-24.7 |
| Oct. 22 | 25.1-25.3 | Magnetic Flux and Induced Currents. |
| Oct. 27 | 25.4-25.5 | Faraday's Law. Electromagnetic Waves. |
| Oct. 29 | 25.6-25.7 | Photons and the Electromagnetic Spectrum. |
| Nov. 3 | 26.1-26.4 (<i>possibly skip 26.2-26.3</i>) | AC Electricity and Transformers. |
| Nov. 5 | 26.5-26.7 | Capacitor and Inductor Circuits. |
| Nov. 10 | 17.1-17.3 | Wave Nature of Light and Diffraction. |

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| Nov. 12 | 17.4-17.6 | Interference, Diffraction Slit, Circular Aperture. |
| Nov. 17 | Chapters 25, 26, 17 | Review and Catch up on Chapters 25, 26, 17. |
| Nov. 19 | Exam 3 | Chapters 25, 26, 17. |
| Nov. 24 | 18.1-18.3 and Quiz | Ray Optics, Reflection and Refraction. |
| Dec. 1 | 18.4-18.6 | Images with Lenses and Mirrors. |
| Dec. 3 | Catch up and Review | Catch up and Review. |
| Dec. 10 10:00 a.m. - 12:50 p.m. | Final Exam | Cumulative Final Exam |

We may adjust the schedule according to how long it takes us to cover each chapter.

Reminder: if you have questions, please ask. If you don't understand the material: see me in office hours; make an appointment if you cannot make office hours; take advantage of the Supplemental Instruction; study with your peers.

One Last Item:

This syllabus is subject to change. The latest version will always be available on the class web site.

Version 1.0: Initial Version. July 20, 2015.

Version 1.1: Added Mastering Physics course ID. Amend schedule for football class cancelation on September 3. August 4, 2015.

Version 1.2: Added date and time of final exam.