

COURSE SYLLABUS

PHY 101- Major Concepts in Physics 1

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Course Description

By taking PHY101 you will learn something essential about how our “world” works in terms of a few fundamental laws. Note that world is in quotation marks because we will sometimes abstract away some of the intricacies of the actual world and play with an idealized world, i.e. accuracy is usurped by simplicity. So, you will learn about the basic objects of which the world is made, what rules govern their behavior, and how interplay between the rules can sometimes lead to surprising outcomes. This process will take us through some key conceptual issues in mechanics, electricity and magnetism, and thermal physics. This journey will not only help you build your scientific understanding of the world around you, it will help you hone the skills necessary for critical thinking and problem solving in general. And we all love to solve problems, don't we! :)

On a less serious note, here is my list of the top 7 reasons to take this course. The list was inspired by comedian David Letterman's Top 10 List, which has since become extinct with Letterman's retirement. Since I do not have a staff of writers backing me, I decided to stop at seven items. Perhaps all of you can fill in the rest.

(7) So you can tell your friends if the scene from *Breaking Bad* where a confiscated laptop locked up in a police station can have its potentially incriminating hard drive erased by an electromagnet sitting in a truck parked outside is actually plausible.

(6) So when you are in a room crowded with people and want to create some space between yourself and those surrounding you, you can easily start talking about acceleration, energy, Stirling engines, and other physics concepts and watch the retreat happen.

(5) In PHY101 you can watch your instructor potentially bash their nose in, lay on a bed of nails, crash into class in a rocket car, and perform many other daredevil stunts. Isn't great that an instructor is willing to put their life on the line so that you can learn some physics?

(4) So you can answer the question, “How many physicists does it take to change a lightbulb?” and many other related (and not so related) questions.

(3) For those of you who want to become doctors, you want to do well on the

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MCATs....don't you?

(2) Physics makes things such as computers and cell phones possible and, therefore apps such as Snapchat, Twitter, and Poshmark possible as well.

(1) If you are ever in a sticky situation, like Matt Damon was in *The Martian*, you will be able to "science the crap out of this" to get out of it. Problem-solving is a universal skill needed in life. Physicists are expert problem solvers

Lectures

We will meet twice a week in Stolkin (except for the weeks of Labor Day and Thanksgiving). Attending these lectures is important. Since I write the exams, attending the lectures helps you get into the mind of Professor Schwarz (that's me) so that you will be much better prepared for the exams. Another reason is that I will be taking attendance at each lecture since part of your grade will be based on your attendance record. A third reason is that the book goes into depth on many topics. I will direct you to the things you should focus on in the book, i.e. I will make your life easier by guiding you through the book.

Homework

There will be 10 or 11 homework assignments during the course. The assignments will be posted on the course website. Attending lectures will help you complete the homework since I will be taking you through practice problems in the lecture. Homework will generally be due on Wednesday's right before the beginning of class, with the exception of the first homework assignment on Chapter 1. Boxes will be available at the front of Stolkin to turn it in. Each box will list a TA name. Please learn your TAs name very soon so that you can place your homework in the appropriate box.

No late homework will be accepted for any reason. Homework submitted after the deadline will receive zero points. Your lowest homework score will be dropped. Please do not wait until the last minute to start the homework. See your TA or visit the Physics Clinic well before the homework is due if you are having problems.

Labs

Labs will begin on the third week of classes---the week of September 9.

There will be 10 labs, so most weeks will have a lab session in addition to the two lectures. You will have the opportunity to apply your knowledge to a set of experiments, as well as ask your TA about any difficult concepts encountered in class or in your homework. At the end of each week's lab you will also hand in answers to a few questions based on the lab activity of that week. It will be graded as well. Like homework, no late labs will be accepted but your lowest lab grade will be dropped. Also, anyone missing more than three lab grades will receive a lab score of zero.

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Lecture/Lab Etiquette

1. Arrange to come to class on time and stay until the end; the slamming of the auditorium doors is very annoying to your classmates.
2. No selfies in class, please.
3. Do not use your cellphones for anything else, either. Thanks.

Exams

There will be three in-class exams (approximately the dates of Oct. 1, Nov. 5, and Dec. 3). No make-up in-class exams will be given. Instead, your lowest in-class exam score will be dropped.

The final exam for the course will be held on Friday, December 14 from 5:15-7:15PM. The final exam is separate from the in-class exams and cannot be dropped. In other words, everyone must take the final exam.

All material taught in this class, including lectures, labs, homework, flashcard questions, and lecture demonstrations is subject to be covered on the in-class exams and the final exam.

As for exam protocol, seats will be assigned and posted in the lobby of Stolkin Auditorium before each exam. I.D.'s may be checked, so please bring your SU I.D. card. During exams you are not allowed to wear headphones, or allowed to communicate with anyone in the classroom except for the course instructors and exam proctors. Cell phones must remain off at all times during exams. All questions concerning the grading of exams should be referred to your TA.

Prerequisite

None as far as classes are concerned. Informally, no prior knowledge of physics is required, but some prior knowledge of elementary algebra and trigonometry will be useful.

Credits

4 Credits

Required Textbook

The required textbook for the course is a book with the very original title *Physics, Third Edition*, by Giambattista, Richardson, and Richardson. It has the image of a gymnast on the cover. All of the homework will be assigned from the questions in the back of each chapter so it would be in your best interest to have easy access to a copy. Also, as I lecture, I will list the relevant chapters since most of my lectures will draw on inspiration from reading this book.

If you purchased an access code from the campus store or would like to purchase the ebook directly from the publisher, you can go to:

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<http://connect.mheducation.com/class/j-schwarz-schwarz-fall-2018> and enter your email address in the appropriate spot.

Required Clicker

To fully participate in lecture you must get an electronic clicker (Turning Technologies ResponseCard RF LCD). They used to be available at the SU Bookstore for \$59.99, bundled together with 4-year license that you may need if you take any other class in which the clickers will be used. If you already have a clicker, or acquire an old one, you can purchase 1 year license separately.

The lecture hall is wired to receive signals from any seat. Your responses will be recorded and used to assign your participation grade. Each clicker has a unique Device ID (see the back of the clicker), which you will register with your name on the course website. Please be aware that this is different than registration at the manufacturer's webpage.

Please fill out the required information

<http://jmschwarztheorygroup.org/phy101/registerclicker.html> and if you do not already have a Turning Point account please visit <https://www.turningtechnologies.com/> to create a student account. Once you enter "Syracuse University" on this website, you will be given specific instructions as to how to create a student account through Blackboard. Note that creating the account will require a Device ID printed on the backside of your clicker and a subscription code.

Course Requirements and Expectations

Set aside time to study. Please set aside anywhere from 4-6 hours a week outside of lectures and labs for studying. Most lectures will build on previous material, so it is important not to fall behind.

Attend the lectures. I will be exposing you to new concepts throughout the course. They are not always simple. While the book is rather clear, I will relate the new concepts to more familiar ones when possible. These connections are important and will serve to unify the course.

Not only attend, but actively participate in lecture and lab. Ask questions, ask questions, ask questions. Need I say more?

Do the homework. Lectures will help set the stage, but only by answering questions and doing the problems effectively does the deep understanding arrive! Get help early and often.

Course Fee Information

To support the laboratory and related lecture demonstrations in the co-requisite course, PHY 101, you have been charged a course fee of \$30. This fee helps pay for (i) laboratory manuals and other handouts, (ii) supplies, small pieces of apparatus, and maintenance for laboratory equipment, (iii) supplies and small pieces of apparatus for lecture demonstrations, and (iv) undergraduate students working in the student and demonstration laboratories.

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Grading

Grades will be calculated based on your scores on various course activities in the following proportions:

Activity	Percentage
In-class exam 1	15%
In-class exam 2	15%
Final exam	30%
Homework	15%
Labs	15%
Attendance	10%

Your course grade will be determined from your total score at the end of the semester. The grade limits will not be stricter than the following:

- 60% for a C
- 80% for a B
- 90% for an A

Again, while no late homework or lab reports will be accepted, the lowest homework assignment grade and lowest lab report will be dropped. And again, anyone missing more than three lab grades will receive a lab score of zero. You will be able to access your grades throughout the semester on Blackboard.

Physics Clinic

The SU Physics clinic, located at Physics Building 112, is a place to ask your pressing physics questions. The Physics Clinic hours are Monday-Thursday 9am-9pm, Friday 9am-6pm, and is staffed by teaching assistants. See:

http://physics.syr.edu/undergraduate/physics_clinic.html for the schedule. Each PHY101 TA will be at the Physics Clinic two hours a week. You can visit your TA there at that time or visit other TAs teaching courses but can definitely help you with PHY 101 at all operating hours. It is a great resource. Please use it.

University Attendance Policy

Attendance in classes is expected in all courses at Syracuse University. Students are expected to arrive on campus in time to attend the first meeting of all classes for which they are registered. Students who do not attend classes starting with the first scheduled meeting may be academically withdrawn as not making progress toward degree by failure

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to attend. Instructors set course-specific policies for absences from scheduled class meetings in their syllabi.

It is a federal requirement that students who do not attend or cease to attend a class to be reported at the time of determination by the faculty. Faculty should use “ESPR” and “MSPR” in Orange Success to alert the Office of the Registrar and the Office of Financial Aid.

Students should also review the university’s religious observance policy and make the required arrangements at the beginning of each semester.

Syracuse University Policies

Students should review the University’s policies regarding: Diversity and Disability: <https://www.syracuse.edu/life/accessibilitydiversity/>; the Religious Observances Notification and Policy: http://supolicies.syr.edu/studs/religious_observance.htm; and Orange SSuccess: <http://orangesuccess.syr.edu/getting-started-2/>.

Disability-Related Accommodations

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu>, located in Room 309 of 804 University Avenue, or call (315) 443-4498, TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Diversity and Disability

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. My goal is to create learning environments that are useable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, I invite any student to meet with me to discuss additional strategies beyond accommodations that may be helpful to your success.

Religious Observances Notification and Policy

SU religious observances notification and policy, found at <http://hendricks.syr.edu/spiritual-life/index.html>, recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the

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second week of classes for regular session classes and by the submission deadline for flexibly formatted classes.

For fall and spring semesters, an online notification process is available for students in **My Slice / StudentServices / Enrollment / MyReligiousObservances / Add a Notification**. Instructors may access a list of their students who have submitted a notification in My Slice Faculty Center.

Academic Integrity Policy

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. For more information about the policy, see <http://academicintegrity.syr.edu>.

Course Schedule

Week/ lecture, topic for the week/lecture, and required readings and labs are in the columns below.

Week/Lecture	Topic	Required Reading Assignment/Lab
Lecture 1	Introduction	Chapter 1
Lecture 2	Introduction/Motion along a line	Chapter 1/Chapter 2
Lecture 3	Motion along a line	Chapter 2
Lecture 4	Motion along a line/Motion in the plane	Chapter 2/Chapter 3, Section 5; Lab 1
Lecture 5	Motion in the plane	Chapter 3, Section 5: Lab 1

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Week/Lecture	Topic	Required Reading Assignment/Lab
Lecture 6	Forces	Chapter 4, Excluding Sections 9 and 10; Lab 2
Lecture 7	Forces	Chapter 4, Excluding Sections 9 and 10; Lab 2
Lecture 8	Energy	Chapter 6; Lab 3
Lecture 9	Energy/Review	Chapter 6: Lab 3
	First in-class exam	No lab
Lecture 10	Energy	Chapter 6; No lab
10/8: Lecture 11	Energy and Oscillations	Chapter 10 (excluding Sec. 8 and 9); Lab 4
10/10: Lecture 12	Elasticity and Oscillations	Chapter 10 (excluding Sec. 8 and 9); Lab 4
10/15: Lecture 13	Elasticity and Fluids	Chapter 9: Sections 1-3/Chapter 16: Sections 1-5; Lab 5
10/17: Lecture 14	Electric Forces and Fields	Chapter 16: Sections 1-5; Lab 5
10/22: Lecture 15	Electric Forces and Fields	Chapter 16: Sections 1-5; Chapter 17: All sections except for 6; No lab
10/24: Lecture 16	Electric Forces and Fields/Electric Potential	Chapter 17: All sections except for 6; No lab
10/29: Lecture 17	Electric Potential/Circuits	Chapter 18: Sections 1-7; Lab 6
10/31: Lecture 18	Catch-up	Chapter 18: Sections 1-7: Lab 6
11/5	Second in-class exam	Chapter 19: Sections 1,8; Lab 7
11/7: Lecture 19	Circuits/ Magnetic Fields	Chapter 20: Sections 3,4,7; Lab 7
11/12: Lecture 20	Magnetic Fields/ Electromagnetic Induction	Chapter 20: Sections 3,4,7; Lab 8
11/14: Lecture 21	Electromagnetic Induction	Chapter 13: Sections 1-6; Chapter 14: Sections 1-5; Lab 8
11/26: Lecture 22	Electromagnetic Induction/Temperature/Heat	Chapter 14: Sections 1-5; Chapter 15; Lab 9

