

Syllabus for Modern Physics

Physics 251 and 252, Fall 2020

Lecture and Recitation Instructor

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Office hours: Thu 3:00pm-4:00pm, <https://stonybrook.zoom.us/j/7316638666>

More office hours before the exams (see schedule posted on course WEB page)

Lab TAs

TBA

TBA

Texts (required)

1. Thornton/Rex - Modern Physics for Scientists and Engineers + WebAssign
ISBN-13: 9781337919487, see more at <https://www.cengage.com/c/modern-physics-for-scientists-and-engineers-5e-thornton/9781337919456PF/>
2. “A practical Guide to Data Analysis for Physical Science Students”, L. Lyons
ISBN-13: 9780521424639

You have to get the textbook and purchase the access for the WEB-based home works. The prices may be quite different, depending on what do you get and the place you buy them from. In any case, do not buy the book without WebAssign.

The publisher offers the “Cengage unlimited” option see here <https://www.cengage.com/student/> . If you purchase that, you will have access to all Cengage products, including possibly books that are used in other courses on campus.

The Data Analysis book is not carried by Cengage, but it can be purchased from Amazon or other booksellers.

Technical requirements

For the online lectures and the online version of the recitations students need a device with Zoom installed. Camera and microphone are recommended but not required. For the homeworks, quizzes and exams the students need a device with a WEB browser capable to access WebAssign.

Course URL, Blackboard

All grades will be accessible on Blackboard. The relevant link is “**PHY 251.01 Modern Physics - Fall 2020**”. E-mail messages from the instructors will be distributed via Blackboard, too. All of the other information about the course will be posted at http://solidstate.physics.sunysb.edu/teaching/2020_fall/phy251. This includes the schedule of lectures, lab instructions, lecture and recitation notes, and solutions to exams. There is also a section with links to computer simulations, books and TV shows.

Course format

The lectures are offered online. The recitations are offered simultaneously in the classroom and online. The online version is broadcasted live during regular class time and it is also recorded for later viewing. The maximum number of students in the classroom will depend on the actual social distancing rules. It may change during the semester, and it may be reduced to zero, if necessary. *All instruction is done remotely after the thanksgiving break.*

To access an online lecture or a recitation go to the “Zoom Meeting” tab in our course page in Blackboard, look for the date and click on. You should do this at the posted time of the lecture or recitation. Previous lectures can be found under “Cloud Recordings”.

In addition to the live and recorded lectures, I will post two printable versions of each lecture and recitation. Version one is the pdf of the lecture slides or the homework problems. Some students print this out and use it for notetaking during the lecture/recitation. Version two is available after the class and it contains all the hand-written notes that were made during lecture.

It is recommended that you prepare for every class by reading the relevant chapter in the textbook before coming to class.

We will strictly adhere to the schedule outlined in the course schedule, as posted on the course WEB page. If a material is not covered in lecture, students are expected to study it from the book.

Learning objectives

Students will demonstrate mastery of physics concepts related to modern physics, including the theory of relativity, quantum mechanics, statistical physics, nuclear-, solid state- and particle-physics.

1. Students will be able to think critically and apply appropriate physics concepts in analyzing qualitative problems.
2. Students will demonstrate the ability to apply mathematical reasoning, including calculus, in solving quantitative physics problems.
3. Students will demonstrate proficiency in science process skills by designing and performing experiments to measure physical phenomena and minimize experimental error.
4. Students will demonstrate scientific communication skills through thoughtful discussion, collaborative problem solving, and dissemination of experimental results.

Learning strategies, getting help

- Be organized. Start solving new homework problems a day or two before your recitation. This way you can ask questions about it at the next recitation. Try to submit the homework right after the recitation, where the homework has been discussed. If you still have questions, join the instructor by Zoom on Thursday, during office hours.
- Be social. Organize or join a study group and discuss the homeworks with your friends. If you are one of the better students, you will learn a lot by explaining. If you are a bit behind, sometimes your peers can explain the stuff better than the instructor.
- Be active. Ask questions during the recitation. Do not be afraid of asking questions during the lectures. The instructor needs questions from the students in order to stay at the proper level in the lecture. Also, if you think the instructor made a mistake, raise your hand and correct it.
- Be engaged. Respond to multiple-choice questions whenever possible.

- Print out the lecture notes before each lecture and use the printout for note-taking. Print out the annotated lecture notes as well and use them with your own notes when you prepare for the exam.
- Before each exam, practice problems will be published on the course WEB page. Try to solve these problems before the lecture/recitation where the instructor solves them. Ask questions if you do not understand something.
- When solving homework or practice problems and quizzes use the formula sheet provided on the course WEB page. This way you will be familiar with it when the exam comes.
- If your first midterm happens to fall below 30% of the maximum score, immediately contact the instructor and discuss how can you improve.
- Be on time. Never submit lab reports late.

Homework

To access the homework, follow the link “-PHY 251.01 Modern Physics - Fall 2020” on Blackboard and click on the “Access WebAssign” tab on the left-hand side. Students will not be penalized for multiple attempts at problems. There is a maximum of 10 submissions for each part of problem, except for the multiple choice questions where the number of attempts is 2. The deadline to submit solutions is on Fridays at 11:59pm. Try to do your homework before coming to recitation, and finish submitting it right after the recitation. The WEB site will not accept late homework.

Any requests for deadline extension should be documented and discussed with the instructor in a timely manner.

Quizzes

There will be a quiz at each recitation session. The quiz will be about 5-10 minutes long and it will be similar to one of the homework problems from the previous week. You are free to use any resources or tools, including your notes, the textbook and the internet. However, the time limit for the quiz will be set so that if you are not prepared, there will be very little time to look up things. **You may not consult with anyone, and the work should be entirely yours.** Please note that the instructor may decide to assign a different problem to each student, but in average the difficulty level of the problems will be the same.

For students participating in the recitation on the Internet, the format is similar to the homework, using WebAssign, except the number of attempts to enter to the answer(s) is reduced to 2. Students appearing in person may choose to do the WebAssign (if they have a device with the appropriate browser), or they may request a printed version of the problem.

In calculating to final quiz score the lowest quiz grade will be dropped. There is no make-up for the quizzes.

Please note that you need to participate in the live recitation (either in the classroom or on the Internet) at least during the time when the quiz is scheduled. Otherwise you will not

get credit for the quiz. You can watch a recorded version of the rest of the recitation at any time.

Multiple-choice questions (formerly “clicker questions”)

There will be a several multiple-choice questions during the lecture. The purpose of these questions is to measure the progress of the class and adjust the lecturing accordingly. These questions are graded only for participation. *Please note that if you elect not to participate in the live lecture (either in the classroom or on the Internet) you will not get credit for the multiple-choice questions.*

We are not going to use the regular clickers. Instead, we use the “Polling” feature of Zoom. You need a smartphone or a computer, with the Zoom app installed (free), even if you are in the classroom.

Exams

There will be two midterms and a final exam. The material covered in the midterms is indicated in the course schedule. The final exam covers the whole course material. A formula sheet will be provided for each exam.

The midterm exams will be held during the regular recitation hours as indicated in the course schedule published at the course WEB page. The final exam will be given remotely during exam week at the [time assigned by the University](#). All exams will be conducted using WebAssign. The exams are closed books and all of the work must be done by the student without outside help.

Practice problems will be distributed before the exams. On the week before the midterms the Thursday lecture will be dedicated to problem-solving in preparation to the midterm. Similarly, the last lecture of the course will be a preparation to the final exam. You can best use this opportunity if you try to solve the problems before they are solved in lecture.

All of the exams will be proctored. In addition, to protect the honest students, the course instructor will be pulling all kinds of tricks to capture cheaters. Cheating will be immediately reported to the Academic Judiciary and the minimum penalty will be an F in the course.

The discussion below describes the ideal circumstance for administering the exams. As the situation warrants, these arrangements might be changed.

For the midterms, students who regularly participate in in-person recitations should come to the recitation and take the exam there. The student will be responsible for bringing a laptop computer or similar device that can be used to enter the answers to the WebAssign questions. The instructor and the TAs will proctor the exam.

Off-campus students take the exam in testing centers. In these cases, each student is responsible for finding a testing center and making arrangements for the test. Look at the [National College Testing Association](#), the [SUNY Exam Proctoring Services](#), public libraries, community colleges and other higher education institutions. The proctor at these facilities must be faculty or professional staff member.

The instructor cannot participate in the process of each student making their reservations at a testing center. A list of WEB links to testing centers is published on

the course WEB page, but this should not be considered as a recommendation or endorsement.

When you contact the center, tell them that you need a proctored exam that is entirely computer-based, except for the formula sheet that they need to print and hand to you.

- You need a WEB browser, where the WebAssign answers can be entered.
- The duration of the exam (from start to finish) should be at least as long as the duration of the exam published in the class schedule. WebAssign will limit the time for the exam to the exact same value for all students.
- Try to schedule the start of your exam as close as possible to the start time given in the class schedule. In cases where this is impossible, you will take a different but equivalent exam.
- Inform your testing center that the ONLY contact they will receive from me is the formula sheet for the exam. I will send it as an attachment to an email on the day before the test.
- Once the exam is over the center should send me a certification with your name and the start/end time of the exam. This should be sent as a **response** to my email containing the formula sheet.

Reserve your seat for the exam as soon as possible, because testing centers can get very busy. Once a testing center has been identified, you should register the center in Blackboard (go to the “Assignments” section and look for “testing center” or similar). You need to enter the name of the center, its email and WEB page address, phone number and the start/end times of the exam. TYPE CAREFULLY! If the email address has a typo, you will not be able to take the exam.

There will be no make-ups for the midterms. Instead, if proper medical or other explanation is provided, the weight factor of the missed midterm will be reduced to zero and the weight factor of the other midterm will be doubled. In the absence of explanation, the midterm grade will be counted as zero with the full weight factor.

The final exam will be similar to the midterms, except there will be no option for coming to campus. According to current plans, the University will contract with a company that will conduct the final exam in testing centers. (For the mindterms there will be no university-provided option.) Students missing the final exam will get an “incomplete” grade, if proper medical or other explanation is provided. These students take the written exam later, followed by an oral examination. In the absence of explanation, the grade will be F.

Grading

Your final PHY251 course grade will be determined by weighting the various portions of the course as follows:

- 20% quizzes
- 5% multiple-choice questions during lectures (participation)

- 40% midterm exams (20% each midterm)
- 5% homework
- 30% final exam

It is obvious from the weight factors that you can get a good grade even if you do not do the homeworks. Nevertheless, it would be a **huge mistake** to skip home-works, because you cannot get a decent score on the quizzes and the exams if you do not practice. The problems on the quizzes and the exams will be similar to homework problems.

Grades: The course is graded “on the curve”. The average score (S) and the standard deviation of the scores (δ) will be calculated (students who did not do the final exam will be excluded from the calculation). Students with scores larger than $S + 0.5\delta$ will get an A grade. The lower cut-offs for the rest of the grades are: $A^- : S + 0.3\delta$, $B^+ : S + 0.1\delta$, $B : S - 0.2\delta$, $B^- : S - 0.5\delta$, $C^+ : S - 0.8\delta$, $C : S - 1.4\delta$. These numbers are not final and may change depending on the actual distribution of the grades.

Laboratory

PHY 252 (the lab) is a separate course from PHY 251 (the lecture and the recitation), but the same instructor supervises both and several elements of PHY 251 and 252 are “synchronized”. For example, there will be no labs during the week of the midterm exams.

Most students take the lecture/recitation and the lab concurrently. The labs are listed in the course schedule at the end of this document. The labs will be set up so that students can maintain social distancing as necessary. There is no online version for the labs.

The lab grades will be posted on Blackboard; follow the link to your lab section. Some documents related to the labs will be also posted there.

Lab reports must be submitted in electronic form by using the “Assignment” tab in your Blackboard lab section. The deadline is the beginning of the next lab on the date specified in the course schedule. If a lab report is late by less than 24 hours the penalty is 20 points (out of 100). Beyond that, if the lab report is late by less than 48 hours, the penalty is 40 points. No credit is assigned if the report is submitted 48 hours after your scheduled lab start time. Nevertheless, all lab reports must be submitted by the last day of classes. If one or more reports are missing, the lab grade cannot be better than D.

These penalties are strictly enforced unless there is a valid excuse and you notify us sufficiently in advance of the deadline and the lateness is approved.

More information about the lab reports is here:

<http://solidstate.physics.stonybrook.edu/teaching/2019/phy251/lab.pdf>

Labs are graded on an absolute scale. 100 points corresponds to all labs completed perfectly. The points are converted to letter grades as follows:

A: 91-100, A⁻:86-90, B⁺:81-85, B:76-80, B⁻:71-75, C⁺:66-70, C:61-65, C⁻:56-60, e.t.c.

Religious Holidays: If the schedule of home works, exams or other assignments is in conflict with your religion's Holidays, please let me know in an email by the end of the first week of instructions and I will do my best to accommodate your needs. Please note that I cannot make changes in the course schedule after the first week of classes. No consideration will be made if someone approaches me in this matter at a time close to the due date or the exam date.

Americans With Disability Act: If you have a physical, psychological, medical or learning disability that may impact your ability to carry out assigned course work, contact the staff in the Disabled Student Services office (DSS), 128 Educational Communications Center, 632-6748/9. DSS will review your concerns and determine with you what accommodations are necessary and DSS will advise me. All information and documentation of disability is confidential.

University Academic Integrity Statement: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at: <http://www.stonybrook.edu/uaa/academicjudiciary/>

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.