

# PHY132 Classical Physics II

## Syllabus

Fall 2021

### Course Description

**PHY131/132 Classical Physics** is a fast-paced, two-semester long, survey of classical physics, primarily for students majoring in Physics, Mathematics, or Engineering. Topics for the first semester include classical mechanics, oscillations and (sound) waves, fluids, and thermodynamics. The second semester discusses electricity, DC and AC currents, magnetism and electromagnetic waves, light, optics. If time permits, we'll discuss also a few topics in modern physics. The course has three 55-minute lectures per week with quizzes and assigned homework. Homework (online) will be graded and counts towards the final grade.

Prerequisite: C or higher in PHY 131 or PHY 141 or permission of the department.

Corequisite: MAT 132 or MAT 142 or MAT 126 or MAT 171 or AMS 161.

Because the course covers all of classical physics in only two semesters, students should expect a **heavy workload**. To succeed this course, students should be well-prepared and should expect to devote about **8-12 hr/week** to homework and laboratory preparation.

### Learning Outcomes

PHY131/132 aims to train the participants in independent and cross-disciplinary fact-based reasoning about basic natural phenomena, in particular phenomena in mechanics, wave propagation, fluid motion, thermodynamics, optics, electromagnetics, and atoms and molecules. Participants should develop a feel for using units, identify the important variables in a given physical situation, and make order of magnitude estimates. Students should develop a physics intuition and be able to solve basic physics questions, not encountered before, based on acquired and internalized knowledge.

### Blackboard

Stony Brook's [Blackboard \(BB\) Website](#) is the location where course information and files are available. The course is listed under PHY132 Classical Physics II - Fall 2021. Files for lecture notes, Recitation quizzes, Formula sheets, Practice exams, etc. are posted in the BB "**Course Documents**" and its sub-directories. Lecture notes (in pdf format) will be posted a few days in advance of the lecture, beginning August 23, without the embedded quiz questions. After the lecture, the updated lecture notes (including the quiz questions&answers) will be posted.

All course information is found in this page and in the Schedule, also reachable via [Blackboard](#). All **grades** will be accessible on [Blackboard](#).

### Faculty Information

Contact information is available in the BB menu item "**Faculty Information**": Instructor: Prof. [Michael Rijssenbeek](#), email to [michael.rijssenbeek@stonybrook.edu](mailto:michael.rijssenbeek@stonybrook.edu). or [michael.rijssenbeek@gmail.com](mailto:michael.rijssenbeek@gmail.com). If you cannot reach the instructor, please email [CAS\\_Dean@stonybrook.edu](mailto:CAS_Dean@stonybrook.edu).

### Lectures & Recitations

#### Remote Teaching

The course will be **taught in person** until further notice, most likely the full semester. However, for communications and homework you should have **internet access** from a **Windows laptop/PC** or an **Apple Mac** or an **iPad**, possibly with a **microphone and webcam** for Zoom-based help.

The Lectures will be **recorded** and posted on BB with a link on the title page of the corresponding lecture notes.

Exams and Recitation Quizzes will be done in-class and in-person. The first recitation quiz is in the second week of classes.

- **Lectures:** MoWeFr 11:45am-12:40pm in Engineering 145
- **Recitations:**

Section	Time	Room	Instructor
PHY132.R01	Mo 1:00pm-1:55pm	PHYSICS P116	Averin
PHY132.R02	Th 3:00pm-3:55pm	MELVILLE LBR W4535	Lefferts
PHY132.R03	Fr 1:00pm-1:55pm	HUMANITIES 3018	Lefferts

PHY132.R04	Tu 3:00pm-3:55pm	MELVILLE LBR W4530	Lefferts
PHY132.R05	Mo 1:00pm-1:55pm	FREY HALL 222	<a href="#">Rijssenbeek, email</a>

**Quizzes** in each Lecture count towards the course grade and are given to check students' understanding and to encourage discussions and class attendance. Each quiz question is worth 3 points when answered correctly, and 1 point if answered incorrectly. Unanswered quizzes count for zero. This *includes* quiz questions missed due to absence or faulty software operation: it is your responsibility to ensure your response software is operational. For problems, consult the manufacturer or Stony Brook DoIT.

**Posted lecture material should be read before class**, and each class will have a quiz early in the lecture. You cannot be excused from attendance unless absent for a valid medical reason!

### Required Materials

- **Text Book:** "Physics for Scientists and Engineers", D. Giancoli, **4th edition**, Pearson Publishers. ISBN10: 0321879724/ ISBN-13: 9780321879721. The text is available in multiple formats: **loose leaf, hard/soft cover, separate volumes (Vol I needed for PHY131, Vol II for PHY132), and eText.**  
Make sure that you also acquire the *access code* to the "Mastering Physics" tutorial and on-line homework web site: [www.MasteringPhysics.com](http://www.MasteringPhysics.com); the on-line access code (with or without eText) can be purchased separately and is valid for three semesters. Register for the homework via Blackboard. (e)Text and "Mastering Physics" access is available directly from the publisher, from (online) resellers, or in the [Campus bookstore](#).
- **Internet access** from a **Windows laptop/PC** or an **Apple Mac** or an **iPad**, with a **microphone and webcam**.
- **Mobile Polling** software from [Turning Technologies](#) for responding to the live quizzes during the lectures, with student answers transmitted via their clicker, mobile phone or laptop computers. The student must purchase a license and register his/her device on the PHY132 course page on BB, see "Tools" in the BB main menu. Available online or from the [Campus bookstore](#).
- **Scientific Calculator** (with trigonometric functions, etc.) to be used in lecture, lab, and exams.
- **Laboratory notebook**, preferably with graph paper on one side of each page; available in the [Campus bookstore](#) or elsewhere.

**Forbidden:** During Exams cell phones **MUST** be switched off and out of sight; iPhone, PDA, Pocket PC, and similar "smart" devices are **NOT** allowed!

### Homework

#### **Web Homework and Web Access**

Included with the text book comes access to [www.MasteringPhysics.com](http://www.MasteringPhysics.com). All homework (HW) problems will be assigned using this web-based system, which provides smart feedback and context-sensitive help and optional hints. If you do not purchase the textbook, then you **must** purchase the access codes separately (valid for three semesters). With your Access Code go to: <http://www.masteringphysics.com/> and Register. To let us connect your HW grade with [Blackboard](#), you **must** enter your **Stony Brook ID number** when requested. When asked for the text book, click on the book for this course (see [above](#)). The class/course code is **TBA**. If you have a valid access (MasteringPhysics access remains valid for 3 semesters), just use your existing password and register for the class. You are encouraged to discuss HW problems with your colleagues on the Homework Blog or email your professor for help.

However, *you only hurt yourself* if you simply copy answers. It is to your own benefit that we assign carefully chosen HW problems so you can exercise your knowledge and gain better understanding: true understanding only comes via solving real-world problems (as I hope you know by now), and HW problems reflect (pieces of) real-world problems. Exam problems will be *based on Clicker Quizzes, Lecture examples, and HW problems*, so fully understanding the solutions is key to passing this course. Therefore, it is crucial (even if HW only counts for a small fraction of the course grade), that you do all problems *on your own* (even after having discussed them at length with colleagues or TAs). Beware: in the past, we have seen excellent correlation between success in HW and success in the exams. There are, however, a few outliers - poor course results with almost perfect HW scores - and we strongly suspect (reviewing the other course components in these cases) that these are instances of blindly copied HW solutions.

#### **Homework Blog**

A "Homework Blog" on the main course menu on [Blackboard](#) is available for discussions/questions on Lecture, Homework, and Exams. Please consult it first in case of problems. Your instructor will monitor the site regularly and pitch in with (hopefully) helpful hints.

### Exams and Grading

**Three exams** are scheduled; see the "Exams" directory in the "Documents" menu item. The exams will consist of Word Problems similar to problems discussed in class and assigned in the Homework. Exams are cumulative, but relatively more problems will be from the newer material. Exam information (Formula sheets, practice exams, solutions, grade distributions) is available in the "EXAMS" directory of the BB menu "Course Documents".

All grades will be accessible via the [Blackboard](#) site for this course.

Exam	Relative Weight
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<b>Midterm I</b>	<b>20%</b>
<b>Midterm II</b>	<b>20%</b>
<b>Final</b>	<b>30%</b>
<b>Lecture Quizzes</b>	<b>5%</b>
<b>WebHW</b>	<b>15%</b>
<b>Recitation Quizzes</b>	<b>10%</b>

Grading will **NOT** be on a curve.

Letter grade correspondence to numerical grade: A(80%<Grade<100%), A- (75%<Grade<80%), B+ (70%<Grade<75%), B (65%<Grade<70%), B- (60%<Grade<65%), C+ (55%<Grade<60%), C (45%<Grade<55%), D+ (40%<Grade<45%), D (35%<Grade<40%), F (Grade<35%).

During Exams telephones MUST be switched off and put away; iPhone, PDA, or Pocket PC devices are NOT allowed! Only bring: scientific calculator, pencils, scrap paper, and a ruler. The Formulae sheet is provided well before the exam.

## **Help and Other Information**

A "**Homework Blog**" is provided for each HW set and each Exam on BB. The instructor's "Office" hours and contact information are found in the "Faculty Information" menu on BB.

The [Society of Physics Students](#) may be contacted for tutoring information.

Course administration and grading issues need to be discussed with the teacher. For problems with registration, contact the teacher or contact Mrs. Diane Diaferia in the Main Office, Physics Building. For mediation or for general questions regarding Physics courses, please contact the Physics and Astronomy Department Office P-110, Phone 2-8110.

## **Academic Integrity**

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 is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at [http://www.stonybrook.edu/commcms/academic\\_integrity/index.html](http://www.stonybrook.edu/commcms/academic_integrity/index.html).

## **Electronic Communication**

Email to your University email account is an important way of communicating with you for this course. For most students the email address is 'firstname.lastname@stonybrook.edu'. **It is your responsibility to read your email received at your University account**; if you choose to forward your University email to another account, we are not responsible for any undeliverable messages.

## **Religious Observances**

See the policy statement regarding religious holidays at <http://www.stonybrook.edu/registrar/forms/RelHolPol%20081612%20cr.pdf>. Students are expected to notify the course professors by email of their intention to take time out for religious observance. This should be done as soon as possible but definitely before the end of the 'add/drop' period. At that time they can discuss with the instructor(s) how they will be able to make up the work covered.

## **Student Accessibility Support Center Statement**

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, 128 ECC Building, (631) 632-6748, or at [sasc@stonybrook.edu](mailto:sasc@stonybrook.edu). They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

## **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 University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty are required to follow school-specific procedures as described in [http://www.stonybrook.edu/commcms/emergency/critical\\_incident.shtml](http://www.stonybrook.edu/commcms/emergency/critical_incident.shtml)

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## Schedule

Please note: this schedule of lecture topics and homework assignments is **tentative**; the schedule will be **updated as the course progresses**.

The **online homework** is listed in the week that it becomes accessible on [www.MasteringPhysics.com](http://www.MasteringPhysics.com); it is typically **due the following week on Friday at 9 PM**. Note, that doing homework problems well, and understanding the solutions in detail, is the best way to succeed in the course. Get help in the PHY132/142 Help Room (PHYSICS A-Level) or on the "Homework Blog" in the Blackboard course menu. For instructions on the Homework assignments, see the Homework section of the Syllabus.

NO recitation in the first week of classes: recitation sections start meeting in the week of Aug 30.

Date	(e)Book Sections	Lecture: MWF 11:45am-12:40pm Engineering 145	Homework
23-Aug	21.1-11	<a href="#">Electric Charge</a>	read: <a href="#">Differentiation and Integration</a> "
25-Aug		<a href="#">The Electric Field</a>	<a href="#">WebHW01</a>
27-Aug		<a href="#">Electric Charge Distributions</a>	
30-Aug	22.1-4	<a href="#">Electric Flux and Gauss' Law</a>	<a href="#">WebHW02</a>
01-Sep		<a href="#">Electric Field Calculations</a>	
03-Sep	23.1-9	<a href="#">Electric Potential and Potential Distributions</a>	
08-Sep		<a href="#">Electric Field and Potential in 3D</a>	<a href="#">WebHW03</a>
10-Sep	24.1-6	<a href="#">Introduction to Capacitors</a>	
13-Sep		<a href="#">Capacitor Circuits and Dielectrics</a>	<a href="#">WebHW04</a>
15-Sep	25.1-8	<a href="#">Electric Current</a>	
17-Sep	26.1-7	<a href="#">DC Circuits</a>	
20-Sep	26.1-7	<a href="#">DC Circuit Analysis</a>	<a href="#">WebHW05</a>
22-Sep		<a href="#">RC Circuits</a>	
24-Sep	21-26	<a href="#">Review</a>	
27-Sep			<a href="#">WebHW06</a>
<b>TBA</b>	<b>21-26</b>	<b>Midterm 1 (TBA)</b>	
29-Sept			
01-Oct	27.1-9	<a href="#">Magnetic Field</a>	
04-Oct		<a href="#">Magnetic Field</a>	<a href="#">WebHW07</a>
06-Oct	28.1-4	<a href="#">Magnetic Forces</a>	
08-Oct	28.5	<a href="#">Applications of Magnetic Force</a>	
11-12-Oct		<b>Fall Break</b>	
13-Oct	28.6	<a href="#">Ampere's Law and Biot-Savart's Law</a>	<a href="#">WebHW08</a>
15-Oct	28.7-10	<a href="#">Magnetic Materials</a>	
18-Oct	29.1-8	<a href="#">Induction and Faraday's and Lenz' Laws</a>	<a href="#">WebHW10</a>
20-Oct	30.1-4	<a href="#">Inductance</a>	
22-Oct	30.5-9	<a href="#">RCL and AC Circuits</a>	
25-Oct			<a href="#">WebHW11</a>
27-Oct	31.1-5	<a href="#">Maxwell's Equations and the Wave Equation</a>	
29-Oct	31.6-10	<a href="#">Electromagnetic Spectrum and Light</a>	
01-Nov	27-31	<a href="#">Review</a>	<a href="#">WebHW12</a>
<b>TBA</b>	27-31	<b>Midterm 2 (TBA)</b>	
03-Nov			
05-Nov	32.1	<a href="#">Geometric Optics</a>	
08-Nov	32.4-8	<a href="#">Refraction and Lenses</a>	<a href="#">WebHW13</a>

10-Nov	33.1-4	<a href="#">Optical Instruments</a>	
12-Nov	33.5-10	<a href="#">Optical Applications</a>	
15-Nov	34.1-7	<a href="#">Interference</a>	<a href="#">WebHW14</a>
17-Nov		<a href="#">Interference</a>	
19-Nov	35.1-6	<a href="#">Diffraction and Applications</a>	
22-Nov	35.7, 11	<a href="#">Diffraction Gratings and Polarization</a>	<a href="#">WebHW15</a>
24-28-Nov		<b>Thanksgiving Break</b>	
29-Nov		Relativity	
01-Dec		Quantum Mechanics	
03-Dec	21-40	<a href="#">Review Part1</a>	
06-Dec	21-40	<a href="#">Review Part2</a> - Last day of class	
09-Dec	21-40	<b>Final Exam (11:15am - 1:45pm)</b>	

Michael Rijssenbeek, 26 July 2021