Syllabus: PHY 2060 – Enriched Physics 1 – Spring 2021

Section 5183, Class #25777 (online & F2F)
Section 5184, Class #28783 (100% online)

Instructor

Prof. Laura Blecha
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Office location & phone: NPB 2075, (352) 392-4948
(Note: I will be working remotely for most of Spring 2021. Please use email or Canvas to contact me.)

Synchronous online and HyFlex class meeting times

Tuesday, Period 6 (12:50 pm - 1:40 pm): **online class meeting for all students, via Zoom**
Thursday, Periods 6 & 7 (12:50 pm - 2:45 pm): **HyFlex class meeting**

***** Essential information about our unique learning environment *****

- Zoom connection information is available in Canvas.
- Students registered for the face-to-face component of the course may choose to attend any of the HyFlex class meetings either remotely via Zoom or in person. If possible, when attending classes in person you are strongly encouraged to bring a charged device with you that is capable of connecting to Zoom in order to fully engage in activities with your online classmates.
- Students registered for the online-only component of the course should not be physically present in the classroom at any time during class meetings.
- All students must wear masks in classrooms. Accommodations will not be granted for disability-related requests to not wear a face covering. You must have your mask on when you enter the building, in accordance with University policy, and the mask must cover your mouth and nose at all times. Do not come to the classroom if you are feeling ill, if you have been asked to isolate or quarantine, or if you are not currently cleared for on-campus status via One.UF. Responsible distancing from others should be practiced at all times while in the classroom. Failure to abide by these policies may result in dismissal from the class session or the adjournment of the entire class for the day.

Office hours (via Zoom)

- Tuesday, 1:45 - 2:45 pm (Period 7, immediately following Tuesday's class)
- Wednesday, 4:00 - 5:00 pm (Period 9)

You are always welcome to contact me via email or Canvas to set up a meeting outside of office hours.

Course objectives and goals

This is the first course in the Enriched Physics sequence PHY 2060-2061 for students with prior preparation in physics who wish to acquire a deeper understanding of the subject. The enriched sequence covers similar material to the Physics with Calculus sequence PHY 2048-2049 but treats basic topics at a faster pace, incorporates more advanced material, and places greater emphasis on instilling conceptual understanding and on developing the ability to solve more challenging problems. PHY 2060 treats concepts in classical mechanics, including kinematics, dynamics, conservation laws, oscillations, and special relativity. While this course covers more advanced topics that PHY2048, it is hoped that the small class format and hand-graded assignments with partial credit will mean that PHY2060 is not more difficult than PHY2048.

On completion of this course, you should have a sound understanding of key concepts in classical mechanics and special relativity and be able to apply this to analyze and make quantitative predictions about the physics of unfamiliar situations. The course should also improve your problem-solving skills.

Textbook

The required textbook for this course is **Resnick, Halliday, Krane: Physics, Volume 1 [5th Edition, Wiley, ISBN 978-0-471-32057-9]**. An electronic version of the text is available at a lower price via the University of Florida's opt-in program. You may also find affordable used versions or be able to borrow the book from a student who took this course previously.

Prerequisites

PHY 2060 is not designed to be a first course in physics.

- You should have studied physics at the high-school level. Completion of an AP course is helpful but not essential. However, if you have had no physics in high school, you will be at a significant disadvantage.
- You need to be proficient at algebra, geometry, and trigonometry (see page A-20 of the text), and at performing elementary vector operations (see Sec. 2-2 of the text).
- You should have successfully completed MAC 2311 Calculus 1 or equivalent and have taken or be currently be enrolled in MAC 2312 Calculus 2. This course will make extensive use of differentiation, and at several points during the semester you will be expected to complete problems involving integration. The section "Derivatives and Integrals" on page A-21 of the text contains a useful summary of the calculus results that you will need. If you are in doubt as to whether you should take PHY 2060 or one of the alternatives (such as PHY 2048), please consult me immediately.

Reading assignments

You are expected to read the material to be covered in each lecture before coming to the class. The reading assignments are listed in the class schedule date-by-date. The lectures will cover key concepts listed in the schedule, but they are not designed to be a substitute for the textbook. The lectures will consist mainly of illustrating concepts with experiments and demonstrations (when possible), discussing additional material omitted in the text, pointing out subtle points and common mistakes, and asking questions to find out and clarify misconceptions, and applying the learned concepts to solve problems. The homework and exams will be based on materials covered in lectures as well as those listed in the schedule.

Grading

Grading will be based on a scale from 0 to 100. The final grade is calculated as follows: 75% exam grades (where Exam 1, Exam 2, and the Final are each worth 25% of your total grade) and 25% homework. The conversion to letter grades will be done using the following conversion table after rounding the total number of points to zero decimal places. Your scores will be entered into Canvas in a timely manner. Below we discuss each component of your grade in more detail.

A	≥ 85
A-	≥ 78
B+	≥ 71
B	≥ 65
B-	≥ 58
C+	≥ 51
C	≥ 45
C-	≥ 42
D+	≥ 38
D	≥ 35
D-	≥ 30
E	< 30

Exams

There will be two midterm exams and a final exam. The dates and chapters covered in the exams are on the class schedule in this syllabus. All exams are closed book and will be administered via Honorlock. Calculators are allowed provided that your calculator does not have internet access and can not store pdf or other image files. There will be a review session for each exam. If you miss an exam for a documented university-sanctioned absence, there will be a make-up exam scheduled to fit both the instructor's and your schedule.

Homework

Homework will be assigned weekly and will be posted in the "Assignments" module on Canvas. **The homework will be available on Thursdays and will be due the following Thursday at 10 pm**. You can submit your work as a file (text, image or pdf file) on Canvas. Cooperation on homework is permitted and discussion of problems among students is encouraged. The instructor will not solve homework problems until after the due date for the homework assignment. The final homework score is calculated as an average of all homework scores, after dropping the two lowest homework scores. Therefore, there will be no extensions or makeup homework assignments. The only exception is long-term illness or hardship which will be reviewed on a case-by-case basis.

Computational homework problems
Roughly one problem on each homework assignment will involve a simple computer programming exercise. These exercises are designed to help you gain insight into what is going on in the physics problems, and they will provide a basic introduction to essential skills for scientific research and many STEM careers. I will provide the necessary introduction to these skills in class and via Canvas, and you will be given a short, pre-written computer program that requires you only to complete a specified part of it and run the program. We will use web-based tools to run these programs, so you will not need to install any special software on your computer.

In-class activities

In this course, we will use a combination of lecture and other interactive activities, which may include solving challenging problems in class either individually or in small groups, responding to questions in class and via online polls, and viewing physics demonstrations. In addition, in order to help gauge your learning progress between exams, we will have periodic short quizzes that will be administered online during class time. These activities will not be graded, but they will be an important component of your learning and success in this class.

Zoom policies for participation during recorded class lectures:
Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. These recordings will be posted on the Canvas site for our course. Students attending the class via Zoom are encouraged to turn their microphone and camera on as willing and able while participating in class activities. Students who participate via Zoom with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Course schedule (tentative)

The schedule below lists the topics planned for each lecture, as well as the corresponding chapters and sections in the textbook. This schedule is likely to evolve. Changes will be announced on Canvas as well as

during class time. Please check Canvas and your UF e-mail regularly for changes and class announcements. It is your responsibility to be aware of changes posted on Canvas or sent by e-mail.

Week #	Lecture #	Date	Topics
1	1	1/12	Dimensional analysis, motion in one dimension (Review Ch. 1 & 2) Introduction to Python and Jupyter notebooks
1	2	1/14	Force and Newton's laws (Secs. 3-2 to 3-8) Introduction to Python
2	3	1/19	Reference frames and relative motion (Secs 3-2, 4-6) Projectile motion (Secs. 4-1, 4.3)
2	4	1/21	Projectile motion (Secs 4-3 and 4.4); Uniform circular motion (Sec 4.5)
3	5	1/26	Tension, normal forces and frictional forces (Secs 5-2, 5-3)
3	6	1/28	Uniform circular motion (Sec 5-4), Linear momentum and impulse (Secs 6-2, 6-3)
4	7	2/2	Conservation of Momentum, One dimensional collisions (Secs 6-4, 6-5)
4	8	2/4	Many-particle Systems (Secs 7-3 to 7-6)
5	9	2/9	Review
5	Exam 1	2/11	Exam 1 on Chapters 2-7
6	10	2/16	Rotational Kinematics (Secs 8-1 to 8-6)
6	11	2/18	Torque and Rotational Inertia (Secs 9-1 to 9-4)
7	12	2/23	Rotational Dynamics (Secs 9-5 to 9-8)
7	No Class	2/25	Recharge Day – No Class
8	13	3/2	Conservation of Angular Momentum (Secs 10-1 to 10-5)
8	14	3/4	Work, Energy and Power (Secs 11-1 to 11-8)
9	15	3/9	Potential Energy (Secs 12-1 to 12-5)
9	16	3/11	Conservation of Energy (Secs 13-1 to 13-5)
10	17	3/16	Gravitation (Secs 14-2 to 14-7)
10	18	3/18	Fluids (Secs 15-1 to 15-5 and 16-1 to 16-4)
11	19	3/23	Review
11	Exam 2	3/25	Exam 2 on Chapters 10-14 (through Sec. 14-7)
12	20	3/30	Simple Harmonic Oscillations (Secs 17-1 to 17-4)
12	21	4/1	Real Harmonic Oscillations (Secs 17-5, 17-7 and 17-8)
13	22	4/6	Wave motion (Secs 18-1 through 18-10)
13	23	4/8	Sound Waves (Secs 19-1 through 19-9)
14	24	4/13	Postulates of special relativity (Sec 20-2)
14	25	4/15	Time dilation and length contraction (Sec 20-3)
15	26	4/20	The Lorentz transformation (Secs 20-4 to 20-7)
	Final Exam	4/26	Final Exam: 7:30-9:30am

Class attendance

Requirements for class attendance, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Accessibility

I am committed to supporting the learning process for all students. Please contact me as soon as possible if you are having difficulties in the course. Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. (352-392-8565, https://disability.ufl.edu). It is important for students to share their accommodation letter with their instructor and discuss their access needs as early as possible in the semester.

UF grading policies

Information on current UF grading policies for assigning grade points can be found here:
https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Online course evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summary results of these assessments are available to students at https://gatorevals.aa.ufl.edu/public-results/.

The Honor Pledge

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: 'On my honor, I have neither given nor received unauthorized aid in doing this assignment.' The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class."

Learning Environment

I embrace the diversity of age, background, ethnicity, gender identity and expression, national origin, religious affiliation, sexual orientation and other visible and non visible categories that you bring with you to our shared study of physics. In this small class, we will be working closely together throughout the semester while navigating this new HyFlex format. I expect that all students will contribute to a respectful, welcoming, and inclusive environment. This includes showing patience with each other and respect for all questions asked by members of the class.

Campus Resources

Health, Wellness, & Basic Needs

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or (352) 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: https://counseling.ufl.edu/, 392-1575 (or 9-1-1 for emergencies).

Title IX Office: 427 Yon Hall, https://titleix.ufl.edu/get-help/ (Includes a list of on- & off-campus resources)

Student Health Care Center, 392-1161, https://shcc.ufl.edu

UF Aid-a-Gator Program. Provide grants to students experiencing unanticipated expenses due to an emergency situation. https://www.sfa.ufl.edu/aidagator/

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learningsupport@ufl.edu.
https://lss.at.ufl.edu/help.shtml .

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling.
https://career.ufl.edu/

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
http://teachingcenter.ufl.edu/

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
http://writing.ufl.edu/writing-studio/

Student Complaints: https://registrar.ufl.edu/writtencomplaints;
http://distance.ufl.edu/student-complaint-process/

Course Plan

This is a HyFlex course that will include both face-to-face and synchronous on-line components. The course utilizes Canvas as an educational shell to organize and post course content, lectures, videos, assignments, and student grades. It is also used for announcements, e-mail communication with students as well as for student discussions. The Tuesday lectures are delivered live via Zoom during 6th period, and the Thursday lectures are delivered in HyFlex mode during 6th & 7th periods).
The course is organized in 14 weekly modules. Each module consists of :

- One 1-hour meeting on Tuesdays using Zoom video conferencing, and one 2-hour meeting on Tuesdays using a combination of Zoom and face-to-face instruction (total of 3 contact hours a week). The class meetings will include interactive lectures as well as individual and group problem-solving exercises. Class meetings will be recorded and posted for students to access at a later time.
- Each lecture is preceded by a reading assignment listed in the Class Schedule.
- The lecture material is followed by a weekly homework assignment submitted on Canvas through the Assignment tool (every Thursday by 10 pm).
- The students are assessed by two midterm exams and one final exam.
- Weekly Zoom Office Hours (Tuesday, 1:45-2:45pm & Wednesday, 4-5pm). Students are also encouraged to communicate by e-mail or Canvas.

Separate modules are dedicated to:

- Homework solutions
- Exam solutions

Graded material:

- Homework (weekly)
- Exams (two midterms and a final)

The final grade will be calculated as: 75% Exam Grades (25% per exam) and 25% Homework Grade.