Syllabus: PHY 2060 - Enriched Physics 1
Section 291G; Class No. 19865
Fall 2020

Instructor

Prof. Laura Blecha
Email: lblecha@ufl.edu
Office location & phone: NPB 2075, (352) 392-4948
(Note: I will be working remotely for most of Fall 2020. Email or Canvas messages are by far the preferred modes of communication.)

Synchronous Class meeting times using Zoom video conference tools

Tuesday and Thursday, Periods 4 & 5 (10:40 am - 12:35 pm)
Zoom connection information is available in Canvas.

Office hours

11:00 am - 1:00 pm on Mondays via Zoom
You are always welcome to contact me via email or Canvas to set up a meeting outside of normal 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 the instructor 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 quizzes 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 80% quizzes and 20% 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

Homework

Homework will be assigned weekly and will be posted in the "Assignments" module on Canvas. **The homework will be available on Tuesday and will be due the following Tuesday by 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

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.

Quizzes

On most Thursdays, a quiz will be administered during class time. The material on the quiz will correspond to the material covered in the previous week. The final overall quiz score is calculated as an average of all quiz scores, after dropping the lowest two quiz scores. The quizzes will be administered via the Canvas Quiz tool and would require the use of the camera of your electronic device for proctoring purposes.

Exams

This course has no midterm or final exam. Student progress will be continuously evaluated throughout the semester using weekly quizzes and homework assignments.

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 you 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.

Lecture #	**Date**	**Topics**
1	9/01	Dimensional analysis, motion in one dimension (Review Chapters 1 and 2) Introduction to Python and Jupyter notebooks
2	9/03	Force and Newton's laws (Secs. 3-2 to 3-8) Introduction to Python
3	9/08	Reference frames and relative motion (Secs 3-2, 4-6) Projectile motion (Secs. 4-1, 4.3)
4	9/10	Projectile motion (Secs 4-3 and 4.4)
5	9/15	Uniform circular motion (Sec 4.5)
6	9/17	Tension, normal forces and frictional forces (Secs 5-2, 5-3)
7	9/22	Uniform circular motion (Sec 5-4), Linear momentum and impulse (Secs 6-2, 6-3)
8	9/24	Conservation of Momentum, One dimensional collisions (Secs 6-4, 6-5)
9	9/29	Many-particle Systems (Secs 7-3, 7-4)
10	10/01	Many-particle Systems (Secs 7-5, 7-6)
11	10/06	Rotational Kinematics (Secs 8-1 to 8-6)
12	10/08	Torque and Rotational Inertia (Secs 9-1 to 9-4)
13	10/13	Rotational Dynamics (Secs 9-5 to 9-8)
14	10/15	Conservation of Angular Momentum (Secs 10-1 to 10-5)
15	10/20	Work, Energy and Power (Secs 11-1 to 11-3) Work Done by a Variable Force (Sec 11-4)
16	10/22	The Work-Energy Theorem (Sec 11-6 to 11-8)
17	10/27	Potential Energy (Secs 12-1 to 12-5)
18	10/29	Conservation of Energy (Secs 13-1 to 13-5)
19	11/03	Gravitation (Secs 14-2 to 14-7)
20	11/05	Fluids (Secs 15-1 to 15-5 and 16-1 to 16-4)
21	11/10	Simple Harmonic Oscillations (Secs 17-1 to 17-4)
22	11/12	Real Harmonic Oscillations (Secs 17-5, 17-7 and 17-8)
23	11/17	Wave motion (Secs 18-1 through 18-10)
24	11/19	Sound Waves (Secs 19-1 through 19-9)
25	11/24	Postulates of special relativity (Sec 20-2)
no class	11/26	Thanksgiving
26	12/01	Time dilation and length contraction (Sec 20-3)
27	12/03	The Lorentz transformation (Secs 20-4 to 20-7)
28	12/08	Catch up

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, online class, we will be working closely together throughout the semester while navigating this new virtual format. I expect that all students will contribute to a respectful, welcoming, and inclusive environment. This includes showing respect for all questions asked by members of the class.

Campus Resources

Health and Wellness

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

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 synchronous on-line course. The course utilizes Canvas as an educational shell to organize and post course content, lectures, videos, assignments, to administer quizzes and post student grades. It is also used for announcements, e-mail communication with students as well as for student discussions. The course lectures are delivered live on Zoom during the UF assigned meeting time (Tuesday and Thursday, 4th and 5th periods).
The course is organized in 15 weekly modules. Each module consists of :

- 2 two-hour meetings using Zoom video conferencing (total of 4 contact hours a week). The Zoom meetings include lectures, discussions, work in small groups using breakout rooms (3 students per group). The Zoom 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 Tuesday by 10 pm).
- The students are assessed by weekly quizzes administered on Canvas through the Quiz tool (every Thursday).
- Weekly Zoom Office Hours. Students are also encouraged to communicate by e-mail or Canvas.

Separate modules are dedicated to:

- Homework solutions
- Quiz solutions

Graded material:

- Homework (weekly)
- Quizzes (weekly)

The final grade will be calculated as: 80% Quiz Grade + 20% Homework Grade.