Syllabus: PHY 2060 - Enriched Physics 1 - Fall 2018 - Periods 6&7

## Instructor

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## Class meeting time and location

Tuesday and Thursday, Periods 6 & 7 (12:50 - 2:45 pm) in NPB 1002

## Office hours

Monday and Wednesday, Period 4 (10:40 - 11:30 pm) in NPB 2073

## 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.

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 understanding to analyze, and make quantitative predictions about, the physics of unfamiliar situations. The course should also improve your problem-solving skills.

## 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, at 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. The 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.

## Textbook

Resnick, Halliday, Krane: Physics, Volume 1 [5th Edition, Wiley, ISBN 978-0-471-32057-9].

## Reading assignments

You are expected to read the material to be covered in each lecture before coming to the class. The lectures will cover a lot of material listed in the schedule, but they are not designed to be a substitute for the text. The lectures will consist mainly of illustrating concepts with experiments and demonstrations, discussing additional material omitted in the text, pointing out subtle points and common mistakes, and asking questions to find out and clarify misconceptions. 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 an absolute point scale from 0 to 100. The letter grade assignment will be based on the students total point score. Points will be assigned for homework (max 10 points), quizzes/additional assignments at the whim of the instructor (max 10 points), and exams (max 80 points). The conversion to letter grades will be done using the following conversion table after rounding the total number of points to zero decimal places.

| | |
|---|---|
| A | $\geq 85$ |
| A- | $\geq 78$ |
| B+ | $\geq 71$ |
| B | $\geq 65$ |
| B- | $\geq 58$ |
| C+ | $\geq 51$ |
| C | $\geq 45$ |
| C- | $\geq 42$ |
| D+ | $\geq 38$ |
| D | $\geq 35$ |
| D- | $\geq 30$ |
| E | $< 30$ |

## Homework

Homework is assigned weekly, and will be communicated in class via handouts or via email. 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. Each homework set carries a maximum score of 10 points. The final homework score is calculated as an average of all homework scores, dropping the two lowest homework scores. Therefore, there will be no extensions or makeup homework assignments. The only exception is long-term illness which will be reviewed on a case by case basis.

## Quizzes

On most Tuesdays a 15-min quiz will be administered in class. The material of the quiz will correspond to the material covered in the previous week. Each quiz will carry a maximum score of 10 points. The final quiz score is calculated as an average of all quiz scores, dropping the lowest quiz score.

## Exams

In addition to the final exam, two other in-class exams will be administered. These will cover significant chunks of the class material. Each exam will carry a maximum score of 80 points. The final exam will also carry a maximum score of 80 points. The total score for exams will be computed based on the formula:

$$0.33 \times (E1 + E2 + F)$$

where $E1$, $E2$, and $F$ are the scores on the two 'midterm' exams and final, respectively.

## Course schedule (tentative)

The schedule below lists the topics planned for each lecture, cross-referenced to the text, as well as the date of each exam. This schedule is likely to evolve. It is your responsibility to be aware of any changes announced in class. Announcements will also be posted via email.

| Lecture # | Date | Topics |
|---|---|---|
| 1 | 8/23 | First class: Dimensional analysis, motion in one dimension (Secs. 2-3 to 2-6) |
| 2 | 8/28 | Force and Newton's laws (Secs. 3-2 to 3-8) |
| 3 | 8/30 | Reference frames and relative motion (Secs 3-2, 4-6)<br>Projectile motion (Secs. 4-1, 4-3) |
| 4 | 8/04 | Projectile motion (Secs 4-3 and 4-4), Uniform circular motion (Sec 4.5) |
| 5 | 9/06 | Uniform circular motion (Sec 4-5), |
| 6 | 9/11 | Tension, normal forces and frictional forces (Secs 5-2, 5-3) |
| 7 | 9/13 | Uniform circular motion (Sec 5-4), Linear momentum and impulse (Secs 6-2, 6-3) |
| 8 | 9/18 | Conservation of Momentum, One dimensional collisions (Secs 6-4, 6-5) |
| 9 | 9/20 | Many-particle Systems (Secs 7-3, 7-4) |
| 10 | 9/25 | Many-particle Systems (Secs 7-5, 7-6) |
| 11 | 9/27 | Rotational Kinematics (Secs 8-1 to 8-6) |
| Exam 1 | 10/02 | In class exam on chapters 2 to 7 |
| 12 | 10/04 | Torque and Rotational Inertia (Secs 9-1 to 9-4) |
| 13 | 10/09 | Rotational Dynamics (Secs 9-5 to 9-8) |
| 14 | 10/11 | Conservation of Angular Momentum (Secs 10-1 to 10-5) |
| 15 | 10/16 | Work, Energy and Power (Secs 11-1 to 11-3)<br>Work Done by a Variable Force (Sec 11-4) |
| 16 | 10/18 | The Work-Energy Theorem (Secs 11-6 to 11-8) |
| 17 | 10/23 | Potential Energy (Secs 12-1 to 12-5) |
| 18 | 10/25 | Conservation of Energy (Secs 13-1 to 13-5) |
| 19 | 10/30 | Gravitation (Secs 14-2 to 14-7) |
| 20 | 11/01 | Fluids (Secs 15-1 to 15-5 and 16-1 to 16-4) |
| Exam 2 | 11/06 | In class exam on Chapters 10 through 14 |
| 21 | 11/08 | Simple Harmonic Oscillations (Secs 17-1 to 17-4) |
| 22 | 11/13 | Real Harmonic Oscillations (Secs 17-5, 17-7 and 17-8) |
| 23 | 11/15 | Wave motion (Secs 18-1 through 18-10) |
| 24 | 11/20 | Sound Waves (Secs 19-1 through 19-9) |
| 25 | 11/27 | Postulates of special relativity (Sec 20-2) |
| 26 | 11/29 | Time dilation and length contraction (Sec 20-3) |
| 27 | 12/04 | The Lorentz transformation (Secs 20-4 to 20-7) |
| Final Exam | 12/12 | 5:30-7:30 pm in NPB 1002 |

## Class attendance, make-up exams, etc...

Requirements for class attendance and make-up exams, 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

## Accommodations for students with disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure 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/ugrad/current/regulations/info/grades.aspx

## Online course evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/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."

## Counseling and Wellness Center

Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 352-392-1575; and the University Police Department: 352-392-1111 or 911 for emergencies.