PHYS 212 Spring 2020 Syllabus, Mar. 30, 2020 Edition*

Prof. Zachariah Etienne

Class meets MWF 9:30AM–10:20AM on Zoom: `URLREDACTED` (see email for link)

Instructor Contact Information

- zbetienne *<at>* mix.wvu.edu
- Office hours: Wednesdays 2:00PM–3:00PM (`URLREDACTED`; see email for link) or by appointment.

Course Websites

- Official course website `http://astro.phys.wvu.edu/zetienne`
- Website for March 30 and later Google Slides Lecture notes: `URLREDACTED` (see email for link)

Prerequisites

- C- or above in PHYS 111 and 112, which have prerequisites:
  - C- or above in Calculus 1 (MATH 155 or 153/154)
- *Unofficial corequisite:* Calculus 2 (MATH 156)

Course Objectives

This course bridges introductory Physics material introduced in PHYS 111 and 112 and more advanced topics covered in later courses. We will investigate some of the applications of wave phenomena and to introduce fundamental concepts concerning the thermal properties of matter. Waves are ubiquitous in describing and understanding the physical world and are of fundamental importance. A solid grounding in thermodynamics is also essential to describe many real-world applications that physicists encounter. As we cover these concepts, my secondary goal is also to help you improve your self-studying skills that become increasingly necessary to master the physical sciences at the advanced undergraduate level. I will also introduce some more advanced mathematical techniques that will help you with these later courses.

By the end of this course, students will be able to:

1. Analyze periodic behavior in basic mechanical systems and electrical circuits;
2. Use mathematical models of waves to explain a variety of physical phenomena; and
3. Apply the laws of thermodynamics to basic problems involving heat transfer.

Textbook

- **"Sears & Zemansky's University Physics, 14th Edition"**, by Young & Freedman.

Attendance Policy *prior to March 30, 2020*

In order to fully succeed in this class, and get the most benefit from it, you are expected to attend all classes and participate in the discussions and activity. I will take attendance in each class, and use this to determine *in part* your participation grade throughout the semester. Special absences (e.g. medical emergencies, family crises etc) will be taken into consideration as needed. However any absences must be communicated to the instructor ahead of time. A simple email sent to me prior to or during class is an acceptable method of notification.

All homeworks and exams will be based on material covered in the course text and in-class exercises. **Students who cannot make it to class will need to coordinate with a classmate to obtain copies of the course notes and homeworks.** A copy of the homework may be obtained during an office hours visit, but no notes will be provided. Arriving

*Note that this syllabus is subject to revision, at the option of the instructor. If revised, the new syllabus will not become official until the instructor has distributed it to students over email.

late to class is disruptive to the normal functioning of the course, and may result in **forfeiture of significant bonus point opportunities.**

"Assume the PRT will be down!" On exam days, students should have no expectation that their normal mode of transportation will be functioning properly. Additional time will not be given for exams if a student arrives late.

Attendance Policy *starting March 30, 2020*

Upon moving to fully online instruction, attendance will no longer be taken. This is to ensure that students without reliable Internet access at the time of course meetings will not be penalized. The 15% class participation grade will therefore only apply to attendance prior to March 30, 2020.

Grading

Grading will be based on the total number of points earned by a student. The points will be divided as follows:

- Class Participation: 15%
- Homework Assignments (See **Homework Policy** below): 85%

Grading Scale

- A- to A+: 85—100%
- B- to B+: 70—84%
- C- to C+: 60—69%
- D- to D+: 50—59%
- F: Below 50%

Homework Policy

1. **Red Ink**: Red ink may not be used by the student in homework assignments, or a penalty of 15% will be assessed on the entire assignment.
2. **Vague or Unclear Answers**: Presentation and discussion of results is at least as important as the results themselves—often students doing great work *fail to achieve career goals* because they did not make adequate effort to present the results of their work to others. Thus significant penalties will be assessed if a student's answers are vague or unclear on homeworks or exams. Tip: *Whenever possible, use the vocabulary we developed in class*!
3. **Late Homework Policy**
   - Full solutions will be due at the start of class on the due date; handing in parts of the assignment at different times is forbidden. Students are strongly encouraged to start early, or confusions may prevent them from handing in homeworks on time, and *the standard homework late penalty will be imposed.*
   - Keeping up with course material is essential to success in this class, as a great deal of material is covered. Therefore, late assignments will be penalized as follows:
     - Up to 48 hours late: 20% score reduction
     - 48–96 hours late: 50% score reduction
     - More than 96 hours late: 75% score reduction
4. **Electronic Submission of Homework Assignments**
   - Starting with Homework #7, all homework assignments must be completed by hand, scanned, and handed in *as a PDF file* via a direct email to the course instructor, using the MIX email address above.
   - You are strongly encouraged to use the free cellphone app Office Lens when submitting homework assignments, which is available on Google Play, Apple Store, and Microsoft Store.
   - Tips for using Office Lens:
     - Multipage PDFs: After you take a picture of the first page, in the lower left there is an "Add New" button that will allow you to record any number of additional pages. All the images will be compiled into the same PDF document.
     - After scanning all the pages, be sure to review your submission and save as a PDF file.
     - If you select "Whiteboard" as the type of document to scan, it increases the contrast and will reduce the file size.
   - **Electronic submissions that are not a single PDF file will not be accepted, and the standard late penalty will be imposed on late submissions, as outlined above. You are strongly encouraged to become comfortable with the scanning software prior to submission.**
   - It is the student's responsibility to review their PDF prior to submission, to ensure that the document was scanned properly and that all work is legible. Illegible work or corrupted PDF files will not receive credit.
5. **Bonus Credit for Professional Presentation**
   - If all problems are handed in in order for a given homework assignment THREE "In-Order Bonus" points will be awarded toward that homework. (No Appendices allowed.)

Tentative Course Schedule

The following course schedule is subject to change. Numbers in parentheses denote the corresponding sections of the book.

- Week of Jan 13: Welcome to class (11.3); Hooke's law (11.4-5); Gases/Liquids (12.1-2)
- Week of Jan 20: MLK recess; Buoyancy (12.3-4); Bernoulli (12.5-6)
- Week of Jan 27: SHM review (14.1-4); Pendula (14.5-6); Oscillations (14.7-8)
- Week of Feb 3: LC circuits (30.5); LRC circuits (30.6); A/C circuits (31.1-5)
- Week of Feb 10: Types of wave (15.1-3); Wave energy (15.4-5)
- Week of Feb 17: Wave interferences (15.6-7); Normal modes (15.8); Special functions
- Week of Feb 24: Sound waves (16.1-3); Standing waves (16.4-5); Worked examples
- Week of Mar 2: Doppler effect (16.8); Shock waves (16.9)
- Week of Mar 9: Fourier series; Fourier transforms
- Week of Mar 16: Spring recess
- Week of Mar 23: COVID-19 recess
- Week of Mar 30: Temperature (17.1-3); Thermal expansion (17.4); Heat (17.5-7)
- Week of Apr 6: Molecules (18.5-6); Equations of state (18.1-2); Spring Holiday
- Week of Apr 13: Ideal gases (18.3-4); Thermodynamics (19.1-4); Thermo processes (19.5-7)
- Week of Apr 20: Ideal gases (19.8); Heat engines (20.1-3); Refrigerators (20.4-5)
- Week of Apr 27: Carnot cycles (20.6-7); Entropy (20.7-8); Black hole radiation

Academic Dishonesty

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Campus Student Code. This Code may be found linked from the Office of Student Conduct web page:

`http://campuslife.wvu.edu/office_of_student_conduct`

Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me (the instructor) before the assignment is due to discuss the matter.

Inclusivity Statement & Accommodations

"The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me (the instructor) and make appropriate arrangements with the Office of Accessibility Services (304-293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see `http://diversity.wvu.edu`."

Students requesting special accommodations are required to inform the instructor at least 48 hours in advance of a test.

Electronic Device Policy

During lectures and exams, **cellular phones** and other electronic devices (including but not limited to tablet computers, laptops, PDAs, MP3 players, Blackberrys) are not permitted, except with the consent of the instructor. **Important exception: Scientific and 4-function calculators are permitted in lectures only.** All forbidden devices must be turned off before the beginning of the class period and placed out of sight (for example, in a backpack or handbag) until the class has concluded.

A student's first violation of this policy **during lectures** will result in a verbal warning (one verbal warning per semester), and each subsequent violation *even during the same lecture* will result in a 1% deduction in the student's overall course grade. Violations of this policy **during exams** will result in a zero grade on the exam and possible expulsion from the course.

Intellectual Property Notice

All course materials, including lectures, class notes, quizzes, exams, handouts, presentations, and other materials provided to students for this course are protected intellectual property. As such, the unauthorized purchase or sale of these materials may result in disciplinary sanctions under the Campus Student Code.