

SYLLABUS

General Physics – Life Sciences II PHYS 2120 Spring 2018

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Office Hours: 11-12 am MWF, or by appointment

Prerequisites: Math 1100 or 1210 (can be taken concurrently with PHYS 2120), and PHYS 2110

Texts: (1) *Physics*, Cutnell and Johnson, currently in its tenth edition; the eighth or ninth edition are also acceptable. An electronic copy of the tenth edition is included with your WebAssign problems subscription (see below). Hard copies available from www.chegg.com for \$52.99, and textbook solutions also available from chegg, free for 4 weeks and \$14.95/month thereafter.

(2) *Laboratory Manual*, available at the campus bookstore

Credits: 4 credit hours

Lecture: MWF, BNR 102, 12:30 – 1:20 PM

Course Website: <http://canvas.usu.edu/>

Homework Website: <http://www.webassign.net/>

OUTCOMES

The primary goal of the class is to teach you how physicists view the world, and help you use the tools of physics to evaluate situations and real-life problems. We will work within a learning hierarchy of (1) facts that you know, (2) concepts you understand, and (3) tasks, such as problem solving and lab, which you are able to do.

The course will specifically address these Intended Learning Outcomes:

Students will be able to:

- Explain the laws governing waves, electromagnetic fields, and their forces on charged particles
- Calculate electric and magnetic fields from symmetric charge and current distributions
- Describe biomedical applications of these laws

CONCEPTS

Students are expected to commit certain fundamental concepts to memory, and to apply them in solving problems on homework and examinations. Concepts will be covered thoroughly in class. Note cards are not permitted during examinations.

COMPONENTS

You must be enrolled in all three components of the course: lecture, recitation, and laboratory:

I. Lecture

Lectures will be held M/W/F in BNR 102. Lectures will cover concepts and examples to prepare you for homework assignments and exams. Reading the pertinent sections of the textbook beforehand will help you prepare for each lecture.

II. Recitation

Recitations sections are held on Tuesday. A recitation section is a small group of students enrolled in the course, led by a teaching assistant. These sections give you an opportunity to ask questions and work on problems in order to deepen your understanding of the material in preparation for examinations. Recitations will begin week 2.

III. Laboratory

Eight two-hour laboratories are scheduled throughout the semester to give you hands-on experience with the material. A missed lab can be made up only during the week that it is scheduled, during another scheduled lab period that has an open slot. To make up a lab, you must obtain a note from the Physics Department office (SER 250). This note will get you into another lab section that week only. No labs are taught on Fridays. Laboratories will begin week 3.

ASSESSMENTS

Your learning will be assessed through homework assignments, lab quizzes, and examinations.

I. Homework (20% of grade)

WebAssign is used for online problem assignments. You may access your WebAssign account, or may sign up for a new one, through "Modules" in Canvas. On WebAssign, each question is worth 1 point toward your total homework score. Your homework average is the number of correct answers divided by the total number of questions. No credit will be given for problem sets completed after the deadline.

II. Lab and Lab Quizzes (15% of grade)

After completing each laboratory, you will be given a quiz consisting of three multiple-choice questions. The quizzes encourage you to participate actively in the laboratory and provide a record of this participation. Attendance and completion of the lab tasks will be graded 12 points, and then each quiz question is worth 1 point. Each lab is therefore worth 15 points. There will be 8 labs throughout the semester and you will NOT drop any scores.

III. Recitation Quizzes (5% of grade)

During the last 15 minutes of each recitation, or other time determined by the group and the TA, a sample test problem will be assigned. During this exercise, **you are encouraged to ask your TA for any help at all**. The goal is for you to **complete the problem correctly**. Each time you ask a question, the TA will give you just the information you need to continue further with the problem, until you can complete it. Though you should always complete the problem correctly, your scores on these **Recitation Quizzes** will count as 5% of your course grade and will help with similar problems on the exams. You will drop your lowest 2 recitation quiz scores.

IV. Exams (60% of grade)

There will be four exams, evenly spaced and weighted throughout the semester as shown in the schedule. You will take all exams in the testing center and may elect to take it during the class time set aside for the test or within the posted window. The final examination will not be comprehensive. You may use only a number 2 pencil and a calculator without access to the Internet during exams. Those desiring to use graphing calculators must remove all equations from them prior to the examination, and must present them to teaching assistants upon request to verify compliance. Like the homework, the exams will include both conceptual and quantitative problems. Some questions will test your knowledge of concepts identified in class. Others will be variations on homework

problems and in-class examples, while yet others will test your ability to extend concepts to new problems.

All work on exams is expected to be independent of other students and to be free of unauthorized aid. The minimum consequence for academic dishonesty on an exam is a zero on that exam.

Requests to reschedule an exam must be made prior to the exam, and must be accompanied by proof of personal illness, death in the immediate family, or a conflicting university-related event.

V. Extra Credit

I am attempting to become a better teacher and want to know what you think and how I am doing. To that end, there will be 3 opportunities for you to earn extra credit while giving me information that will guide my teaching.

1. Pre-Test: During the first 2 weeks of class a pre-test of knowledge in the concept areas of the semester will be given on Canvas.
2. Post-Test: During the last week of the semester, a post-test of knowledge gained in the concept areas of the semester will be given on Canvas.
3. Course Evaluation: A link will be provided in Canvas for you to complete the course evaluation during the standard evaluation window allowed by USU.

Each of these activities will be worth 1% toward the final grade, for a maximum of 3%

GRADE SCALE

The following grade scale will be used:

A \geq 93%,	C \geq 73%,
A- \geq 90%,	C- \geq 70%,
B+ \geq 87%,	D+ \geq 67%,
B \geq 83%,	D \geq 60%,
B- \geq 80%,	F \leq 60
C+ \geq 77%,	

NEED HELP?

If you find yourself stuck on a particular topic or problem, you may try one or more of the following.

- Review the relevant chapter and/or class notes, and study any relevant example problems.
- Try to solve a similar problem. The solutions to odd numbered problems are given in the back of the textbook.
- Talk with other students in the class. Ask them to explain things to you rather than solving the problem for you.
- Ask for help in recitation.
- Seek help from the class instructor or one of the teaching assistants.
- Take advantage of the Physics Department help center in **SER 219**. This center is staffed during much of the business day.

SCHEDULE

ALL DATES ARE TENTATIVE AND WILL BE ADJUSTED TO MEET THE GOALS OF THE COURSE

Week of	Monday (lecture)	Tuesday (Recitation)	Wednesday (lecture)	Thursday	Friday (lecture)
Jan 8	1. Introduction to waves (16.1-16.3, 16.5)		2. Sound waves (16.7, 16.8, 16.11)		3. Superposition (17.1-17.2)
Jan 15	Martin Luther King Day	HW 1 due 11:59 PM	4. Diffraction and standing waves I (17.3-17.5)		5. Standing waves II / complex waves (17.6-17.7)
Jan 22 Lab 1: Standing Waves	6. Charge and electric force (18.1-18.4)	HW 2 due 11:59 PM	7. Coulomb's law and the E field (18.5-18.6)		8. E field lines, electric flux, and Gauss' Law (18.7-18.9)
Jan 29 Lab 2: E Fields and Potential	9. Electric potential difference (19.1-19.2)	HW 3 due 11:59 PM	10. Equipotential surfaces and E field lines (19.3-19.4)		11. Capacitance, dielectrics, and the E field (19.5)
Feb 5	Exam I Concluding concepts	HW 4 due 11:59 PM	EXAM I Lectures 1-11, CH 16-19, HW 1-4		12. <i>Emf</i> , resistance, and power dissipation (20.1-20.4)
Feb 12 Lab 3: Resistive Circuits	13. Wiring (20.6-20.8)	HW 5 due 11:59 PM	14. Kirchhoff's rules (20.10-20.11)		15. Capacitors and RC circuits (20.12-20.13)
Feb 19	President's Day	"Monday Lecture" 16. The B field and magnetic force (21.1-21.2) HW 6 due 11:59 PM	17. Magnetic force and moving charge (21.3-21.5)		18. Sources of B / magnetic materials (21.7,21.9)
Feb 26 Lab 4: RC Circuits	19. Induced <i>Emf</i> (22.1-22.3)	HW 7 due 11:59 PM	20. <i>Faraday and Lenz</i> (22.4-22.5)		21. Inductance and transformers (22.8-22.9)
March 5	Spring Break	Spring Break	Spring Break	Spring Break	Spring Break
March 12 Lab 5: LCR Circuits	22. Reactance (23.1-23.2)	HW 8 due 11:59 PM	23. <i>LCR circuits and resonance</i> (23.3-23.4)		Exam II Concluding concepts
March 19	EXAM II Lectures 12-23, CH 20-23, HW 5-8	HW 9 due 11:59 PM	24. EM waves – origin and spectrum (24.1-24.2)		25. EM waves – speed and energy (24.3-24.4)
March 26	26. EM waves, Doppler shift, polarization (24.5-24.6)	HW 10 due 11:59 PM	27. Reflection and mirrors (25.1-25.4)		28. Curved mirrors and images (25.5-25.6)
April 2 Lab 6: Refraction, Thin Lenses	29. <i>Refraction</i> (26.1-26.4)	HW 11 due 11:59 PM	30. Dispersion, thin lenses (26.5-26.8)		31. The eye and eyeglasses (26.9-26.10)
April 9	32. Multiple/single slits, resolving power (27.1-27.2, 27.5-27.7)	HW 12 due 11:59 PM	Exam III Concluding concepts		EXAM III Lectures 24-32, CH 24-27, HW 9-12
April 16 Lab 7: Diffraction	33. Special Relativity: time, length (28.1-28.4, 28.6-28.7)	HW 13 due 11:59 PM	34. Particles and waves (29.1-29.3, 29.5, 29.6)		35. The hydrogen atom and its spectrum, lasers (30.1-30.3, 30.8-30.9)
April 23 Lab 8: Opt. Spec.	36. Nuclear physics and radioactivity (31.1-31.4, 31.6)	HW 14 due 11:59 PM	37. Nuclear energy, cosmology (32.2-32.3, 32.5, 32.7)		Exam IV Concluding Concepts HW 15 due 11:59 PM Saturday

EXAM IV (during finals week)

Lectures 33-37; CH 28-32;
Homework 12-15

(Scheduled: Monday, April 30, 2018
11:30 AM– 1:20 PM)

ENVIRONMENT

We are committed to fostering a nurturing learning environment based upon open communication, mutual respect, and non-discrimination on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color, or national origin. Academic integrity is expected of all students, and is strictly enforced.

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.