

SYLLABUS

General Physics – Life Sciences II PHYS 2120 Spring 2016

Instructor: Dr. Boyd F. Edwards

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Office Hours: 3 – 4 pm 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 available at <http://www.webassign.net/>.

(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

After successfully completing this class, 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 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

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 (25% of grade)

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. To account for the rare homework problem that will not give you credit (when your answer is indeed correct), your raw homework average will be multiplied by 1.05 to produce your final homework average. For example, if your raw homework average is 98%, then your final homework average will be $98\% \times 1.05 = 102.9\%$.

II. 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. Each quiz is worth 5 points: 2 points for taking the quiz and 1 point for each correct answer. Your quiz average will be the number of quiz points divided by the total number possible, which is 40 points (8 quizzes \times 5 points / quiz).

III. Exams (60% of grade)

There will be four 50 minute exams, three in-class exams during the course of the semester and one at the regularly scheduled final-exam time. Each exam counts for 15% of the grade, and will cover approximately one fourth of the material in the course; the final examination will not be comprehensive. You may use only a number 2 pencil and a *non-graphing scientific calculator* (such as a Casio fx-260 SOLAR, Casio fx-300MS PLUS, Texas Instruments TI-30Xa, or Texas Instruments TI-30X IIS) during exams. Scantron forms will be provided. All other materials such as backpacks, books, note cards, equation sheets, and returned homework must remain on the floor at the front or back of the room. Each exam will have 25 multiple-choice questions. 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 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.

GRADE SCALE

The following grade scale will be used:

A \geq 93%,	B \geq 83%,	C \geq 73%,	D \geq 63%,
A- \geq 90%,	B- \geq 80%,	C- \geq 70%,	D- \geq 60
B+ \geq 87%,	C+ \geq 77%,	D+ \geq 67%,	

WEBASSIGN

Homework is online at www.webassign.net, with assignments due on Tuesday nights at 11:59 PM. The cost is \$45.95 for the homework alone, and \$90.70 for access to both the homework and an electronic copy of the textbook (eBook). Access to the homework and eBook are good for one semester.

Instructions for registering for homework:

- (1) Go to the site www.webassign.net/. Click on the **ENTER CLASS KEY** button.
- (2) Enter the class key: **USU** in the first box, **5425** in the second box, and **7950** in the third box. Click the **SUBMIT** button. If you have correctly entered the class key, the class information

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should appear. If so, click the **YES, THIS IS MY CLASS** button.

- (3) On the next webpage leave "I need to create a WebAssign account" selected and click on the **Continue** button.
- (4) Fill in the 7 boxes with the required information. **Important:** In the box that asks for your **Student ID number**, use your **A-Number, starting with a capital A**. Doing so will ensure that you receive course credit for your WebAssign homework.
- (5) Select **CREATE MY ACCOUNT**.
- (6) On the next webpage select **LOG IN NOW**.
- (7) You should now be at your **Home** page. At this point you can purchase access to the homework and/or the electronic textbook, as described above. You have a brief grace period for using the system without payment, but after that you will need to purchase access to the homework.

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.

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.

Please advise the instructor if you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class. Accommodations for ADA-documented physical, sensory, emotional, or medical impairments must be coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435) 797-2444 voice, (435) 797-0740 TTY, (435) 797-2444 VP, or toll free at 1-800-259-2966. Alternate format materials (Braille, large print or digital) are available with advance notice. Veterans may be eligible for accommodations.

SCHEDULE

Week of	Monday (lecture)	Tuesday	Wednesday (lecture)	Thursday	Friday (lecture)
Jan 11	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 18	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 25 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)
Feb 1	Exam I Review	HW 3 due 11:59 PM	EXAM I Lectures 1-8, CH 16-18, HW 1-3		9. Electric potential difference (19.1-19.2)
Feb 8 Lab 2: E Fields and Potential	10. Equipotential surfaces and E field lines (19.3-19.4)	HW 4 due 11:59 PM	11. Capacitance, dielectrics, and the E field (19.5)		12. <i>Emf</i> , resistance, and power dissipation (20.1-20.4)
Feb 15	President's Day	"Monday Lecture" 13. Wiring (20.6-20.8) HW 5 due 11:59 PM	14. Kirchoff's rules (20.10-20.11)		15. Capacitors and RC circuits (20.12-20.13)
Feb 22 Lab 3: Resistive Circuits	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 29 Lab 4: RC Circuits	Exam II Review	HW 7 due 11:59 PM	EXAM II Lectures 9-18, CH 19-21, HW 4-7		19. Induced <i>Emf</i> (22.1-22.3)
March 7	Spring Break	Spring Break	Spring Break	Spring Break	Spring Break
March 14	20. Faraday and Lenz (22.4-22.5)	HW 8 due 11:59 PM	21. Inductance and transformers (22.8-22.9)		22. Reactance (23.1-23.2)
March 21 Lab 5: LCR Circuits	23. LCR circuits and resonance (23.3-23.4)	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 28	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 4	Exam III Review	HW 11 due 11:59 PM	EXAM III Lectures 19-28, CH 22-25, HW 8-11		29. Refraction (26.1-26.4)
April 11 Lab 6: Refraction, Thin Lenses	30. Dispersion, thin lenses (26.5-26.8)	HW 12 due 11:59 PM	31. The eye and eyeglasses (26.9-26.10)		32. Multiple slits, diffraction gratings (27.1-27.2, 27.7, 27.9)
April 18 Lab 7: Diffraction	33. Thin films, single slit, resolving power (27.3, 27.5-27.6)	HW 13 due 11:59 PM	34. Waves are particles (29.1, 29.4)		35. Particles are waves (29.5-29.6)
April 25 Lab 8: Opt. Spec.	36. The hydrogen atom and its spectrum (30.1-30.3)	HW 14 due 11:59 PM	37. X-rays, Lasers (30.7-30.9)		Exam IV Review

EXAM IV (during finals week)

Lectures 29-37; CH 26, 27, 29, 30;
Homework 12-14

Monday, May 2, 2016
11:30 AM– 1:20 PM