

Physics 22

Fall 2018

Instructor: Jacob Morris

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Office Hours: M 2-3, W 2-3, F 2-3, and by appointment

Course Description: This course is a calculus-based introduction to electricity, magnetism, and special relativity.
(*Prerequisites:* Physics 21 and Math 8)

Place and Time:

Lecture: MW 3:15-5:45, F 3:15-5:15 SCI 122

Text: H. Young, Roger Freedman, *University Physics*, 14th edition, Addison Wesley, 2016 (not required)

Supplementary Text: R. Resnick, D. Halliday, K. Krane, *Physics*, vol. 2, 4th edition, Wiley (not required)

Grade:

Participation	5%	
Homework	5%	
Quizzes	10%	
Lab/Tutorial	15%	
Midterm 1	10%	Wednesday 9/26
Midterm 2	15%	Wednesday 10/24
Midterm 3	15%	Wednesday 11/21
Final	25%	Friday 12/14, 3:30-6:30pm, SCI 122

Upon returning each exam I will give a breakdown of the grades for that exam.

Classroom Conduct: *Food and beverage (other than water) are forbidden in the classroom.* Please make a point of arriving to class on time; doing otherwise creates a distraction to both your classmates and me. *Disruptive behavior such as unsolicited talking or electronic gadget use may result in being sent out of class and loss of participation points.* Attendance in lecture is not mandatory, however, missing class might adversely affect your grade.

Exam Policy: *There are no make-up exams.* If you miss an exam due to an emergency or personal hardship a note from a suitable professional will be required. All exams are closed note and closed book. The midterm exams will consist of problems and *conceptual questions* based on material from the homework, class examples, text examples, tutorial problems, and laboratory. *Failure to take the final will result in a 10-point penalty to a student's curved grade.*

Lab: *There are no make-up labs.* Laboratory is mandatory to the extent that points will be given for *every* lab session regardless of whether you are required to submit written work for that session. *Missing more than three lab periods will result in a grade no higher than a D.* Arriving more than fifteen minutes late counts as a missed lab. In the event you do not receive a graded report that you submitted it is your responsibility to bring its absence to my attention.

Quizzes: *There are no make-up quizzes.* The quizzes will consist of one or two problems taken from the lecture, lab, or homework. I will drop your lowest quiz.

Homework: There will be an assignment each week consisting of roughly 35 problems and 20 questions. You are only required to submit answers to the *problems*. Each assignment will be graded on a three-point system based on completeness and clarity. You will be supplied with sets of homework problems and questions. The list of the required problems and assignment due dates can be found on my webpage. Late homework may be accepted but will receive a reduced mark.

Help: In the event that it is difficult to attend my office hours please do not hesitate to drop by any time I am in my office. There is tutoring available in the LRC located in SCI 245.

Participation: This component of your grade is based on your active participation in lecture and laboratory. I will consider the frequency that you ask and answer questions in addition to your general attentiveness. Frequently asking questions during office hours can benefit this grade.

Academic Dishonesty: The college policy regarding academic dishonesty will be strictly enforced. In particular, I will not hesitate to inform the campus disciplinarian of any student's dishonest conduct relating to the course. This includes, but is not limited to: cheating on a quiz or exam, submission of an altered exam for regrade, verbatim copying of lab activities, falsification of laboratory work/attendance, forgery of my signature/grade or forgery of any written excuse.

Learning Objectives: When presented with a physical situation and asked to solve a particular problem the student will follow a logical process based on well-established physics principles and demonstrate an ability to use basic mathematical techniques, including calculus. Also, when conducting a laboratory experiment and composing a lab analysis, the student will demonstrate an understanding of the scientific method through careful measurement, uncertainty estimation, and forming appropriate conclusions based on gathered data and scientific principles.

Tentative Schedule (Chapter Sections from Young/Freedman 14 th ed.)		
<i>Week of:</i>	<i>Sections:</i>	<i>Topics:</i>
Aug. 27	21.1-21.4	Electric Charge, Material Properties, Coulomb's Law, Electric Field, Dipoles
Sept. 3	21.5-21.7	Charge Motion, Continuous Charge Distributions, Field Lines
Sept. 10	22.1-22.5	Common Symmetries, Electric Flux, Gauss's Law, Conductors, Examples
Sept. 17	23.1-23.3	Potential Energy, Electric Potential, Continuous Distributions
Sept. 24	23.3-23.5	Equipotential Surfaces, Potential Gradient, Midterm 1 (Chs.21–22),
Oct. 1	24.1-24.6	Capacitance, Capacitor Networks, Field Energy, Dielectrics
Oct. 8	25.1-25.6	Electric Current, Resistivity, Ohm's Law, Resistance, Free Electron Model
Oct. 15	26.1-26.5	Electromotive Force, DC Circuits, Kirchhoff's Laws, RC Circuits
Oct. 22	27.1-27.5	Magnetic Field and Force, Charge Motion, Midterm 2 (Chs.23-26)
Oct. 29	27.5-28.3	Current Loop Torque, Hall Effect, Biot-Savart Law, Magnetic Circulation
Nov. 5	28.4-28.8	Ampere's Law, Examples, Magnetism, Gauss's Law for Magnetism
Nov. 12	29.1- 29.7	Induced Currents, Faraday's Law, Lenz's Law, Displacement Current
Nov. 19	30.1-30.6	Inductance, <i>RL</i> and <i>LC</i> Circuits, Magnetic Energy Midterm 3 (Chs.27-29)
Nov. 26	31.1-32.1	Phasors, AC Circuits, Resonance, Power, Filters, Maxwell's Equations
Dec. 3	32.1-32.5	Electromagnetic Waves, Wave Energy and Momentum, Relativity
Dec. 10	37.1-37.5	Relativity Principle, Time Dilation, Length Contraction Final Exam (Cumulative exam covering all topics addressed in the course)

Special Dates: Labor Day 9/3, Veteran's Day 11/12, Thanksgiving 11/22, 11/23, Last Day to drop *without* a W: 9/9, Last day to drop with a W: 11/18