San José State University  
School/Department  
Physics 51: Electricity and Magnetism, Section 04, Fall 2017

Instructor: Ignacio Mosqueira

Office Location: Science Building 262

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Email: Ignacio.Mosqueira@sjsu.edu

Office Hours: MW 3:00-4:30

Class Days/Time: MW 4:30-5:45

Classroom: Science Building 258

Prerequisites: PHYS 050, MATH 031, both with grades of “C” or better

GE/SJSU Studies Category: B1+B3 (Physical Science and Lab Science and Lab Science; includes required Phys 51 lab)

Course Format

Faculty Web Page

Course materials such as syllabus, handouts notes assignment instructions, etc. can be found on the Canvas Leaning Management System course login website (https://sjsu.instructure.com/courses: also accessible via MySJSU at http://my.sjsu.edu). You are responsible for regularly checking with the messaging system through Canvas to learn of any updates.

Course Description

A calculus-based introduction to electricity and magnetism, covering electric charges, electric and magnetic fields, dc and ac circuits, and electromagnetic waves.

Course Goals

GE Learning Outcomes (GELO):

Upon successful completion of this course students will:

1. have exposure to essential quantitative and qualitative skills that are necessary to understand the basic application of scientific knowledge and methods.

2. have experience incorporating scientific knowledge into the workplace and everyday life experiences. These outcomes are developed more specifically under the Course Learning Objectives below, and are satisfied by the required problem sets, exams, and associated class laboratory component.
Course Learning Outcomes (CLO):

Upon successful completion of this course students will be able to:

1. use critical thinking in the context of solving problems in physics
2. answer both qualitative and quantitative problems in electricity and magnetism involving
   a. use of algebra, vectors, and/or calculus to solve problems
   b. work with dimensionally consistent quantities and indicate appropriate units in written work
   c. use Maxwell’s equations at an introductory level
   d. correctly solve problems involving the behavior of simple electrical circuits
   e. demonstrate an understanding of the relationship between electronic charges and current and electric and magnetic fields
3. apply their knowledge to practical, theoretical and experimental problems, and specifically to:
   a. translate information between real world problems and the mathematical relationships that describe them
   b. describe the solution to problems using clear logic and/or diagrams
   c. analyze simple experimental results and draw conclusions from them

Required Texts/Readings

Textbook

Young and Freedman “University Physics, Vol 2”, custom SJSU edition for Physics 51 (this is a subset of the 14th edition of the textbook). Chapters 21-32; not all sections will be covered.
Also required: Mastering Physics access code for this volume of the text.
You will have an access code in a package of your book if you bought it new. For a used book you will have to purchase access to the online homework separately. Follow the instructions inside the package called Mastering Physics: Student Access kit for online registration. For this you need:
Your personal access code, which is beneath the pull tab inside of your package
A valid email address
The general course ID, which is MPMOSQUEIRA33025, and your student ID.

Course Requirements and Assignments

In keeping with national standards, SJSU classes are designed such that successful students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, etc. More details about the student workload can be found in University Policy S12-3.

To be successful you should expect to spend 6 hours/week on the reading and homework, and more if your math and previous physics is rusty. Lab work and class time is in addition to this.

There is often a direct correlation between time spent on the class and the final grades. More effort does not guarantee a higher grade, but low effort makes good performance unlikely.

You are strongly encouraged to form study groups to discuss the homework and reading. It is especially helpful to try to explain things to each other. However, you are strongly discouraged from splitting the work into pieces. This constitutes cheating and it will also undermine your understanding and your performance on the exams. All final homework submissions, solutions, and write-ups must be done individually all the way through (though it is fine to discuss and check results against each other).

The best approach to the homework (and course) is to:
Read the relevant part of the chapter before class; note where things are confusing so you can pay extra attention to that section and ask about it during lecture.
Go back and work through the problems that are done in lecture, or those examples worked out in the textbook; and note the approach or strategy used to set up and solve the problem. You should note that exam problems are usually drawn for such examples.

Requirements and assignments
The course will have weekly readings and homework problem sets. The problem sets are due online and serve to reinforce the concepts in the reading, provide you with practice doing actual calculations, and model some problems that will appear on exams. Supplementary word problems will give you practice with lengthier and more context-rich problems, give you practice laying out your work, and model some of the sorts of questions likely to appear on exams. Exams serve to assess your understanding as well as provide opportunities for you to review and reinforce the knowledge you have gained.

Online Homework: Weekly problem sets; due dates online. Most will be due at 11:59 pm on Mondays.

Word problems requiring written solutions will be assigned.

Preliminary exam dates are indicated in the schedule below.

Final Examination
There will be a cumulative final exam at the scheduled time. Every student must take this exam without exception. The final exam is on Tuesday, December 19 at 2:45 in the same classroom.

Grading Information
Homework: Weekly online homework will be assigned via Mastering Physics (MPMOSQUEIRA33025) and account for 25% of the grade.

Lab: Each student must enroll in one section of the Physics 51 Laboratory. The lab grade will be based on your lab reports and quizzes as assigned by the lab instructor. You MUST pass the Laboratory portion of this class to pass this course even though the lab grade counts for 10% of the overall grade.

Exams: There will be three exams in total, two midterms and one final exam. The final exam is cumulative.

<table>
<thead>
<tr>
<th>Tests, etc.</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Lab</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm #1</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm #2</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Homework/ quizzes</td>
<td>30%</td>
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</tbody>
</table>

The course will be graded on a curve, so no specific point total is required for an A, B, etc. The class median score is typically around 70% (usually a C+/B-) while 'A' grades usually require about 85% of the available points.

Classroom Protocol
There is no record of class attendance. However, frequent in-class assignments will be handed-out.

You should always feel free to ask questions during the lecture or after class. As far as I'm concerned, there is no such thing as a silly or stupid question - if something is unclear to you, ask me! In my experience, there are usually 5 other people in the room wondering the same thing. We will all get more out of the class if there is plenty of discussion.

University Policies
Academic Integrity: Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the University's Academic Integrity Policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://sa.sjsu.edu/student_conduct

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**College policy in compliance with the Americans with Disabilities Act:** If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Disabilities Resource Center (DRC) to establish a record of their disability.

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/”

### Phys 51/Electricity and Magnetism, Fall 2017, Course Schedule

<table>
<thead>
<tr>
<th>Week beginning:</th>
<th>Topics</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td>Aug. 21</td>
<td>Charge</td>
<td>Chapter 21</td>
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<tr>
<td>Aug. 28</td>
<td>Electric Field</td>
<td>Chapter 21</td>
</tr>
<tr>
<td>Sept. 4 (Monday Labor day)</td>
<td>Gauss’s Law</td>
<td>Chapter 22</td>
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<tr>
<td>Sept. 11</td>
<td>Electric potential</td>
<td>Chapter 23</td>
</tr>
<tr>
<td>Sept. 18</td>
<td>Electric Potential/Capacitance</td>
<td>Chapter 23/24</td>
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<tr>
<td>Sept. 25</td>
<td>Capacitors/Review</td>
<td>Chapter 24</td>
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<tr>
<td>Oct. 2</td>
<td>Midterm 1/current and resistance</td>
<td>Chapter 25</td>
</tr>
<tr>
<td>Oct. 9</td>
<td>Electromotive force/Kirchhoff’s laws</td>
<td>Chapter 25/26</td>
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<tr>
<td>Oct. 16</td>
<td>RC circuits</td>
<td>Chapter 26</td>
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<tr>
<td>Oct. 23</td>
<td>Magnetic fields</td>
<td>Chapter 27</td>
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<tr>
<td>Oct 30</td>
<td>Sources of magnetic fields: Biot-Savart law</td>
<td>Chapter 28</td>
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<tr>
<td>Nov. 6 (Friday Veteran’s day)</td>
<td>Sources of magnetic fields: Ampere’s law/Review</td>
<td>Chapter 28</td>
</tr>
<tr>
<td>Nov. 13</td>
<td>Midterm 2/Faraday’s law; induction</td>
<td>Chapter 29</td>
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<tr>
<td>Nov. 20 (22-24 holiday)</td>
<td>Maxwell’s equations/Inductance</td>
<td>Chapter 29/30</td>
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<tr>
<td>Nov. 25</td>
<td>RLC circuits/AC circuits</td>
<td>Chapter 30/31</td>
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<tr>
<td>Dec. 4</td>
<td>Transformers/Electromagnetic waves</td>
<td>Chapter 31/32</td>
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<tr>
<td>Dec. 19 (Tuesday)</td>
<td>Final Exam 2:45-</td>
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