San José State University
Department of Physics and Astronomy
PHYS 51, General Physics II:
Electricity & Magnetism
Fall 2018

Course and Contact Information

<table>
<thead>
<tr>
<th>Instructor:</th>
<th>Dr. Ranko Heindl</th>
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<tbody>
<tr>
<td>Office Location:</td>
<td>SCI 264</td>
</tr>
<tr>
<td>Telephone:</td>
<td>408-924-5259</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:ranko.heindl@sj-su.edu">ranko.heindl@sj-su.edu</a></td>
</tr>
<tr>
<td>Help Sessions:</td>
<td>Mondays &amp; Wednesdays 2:45-3:45pm, SCI 264</td>
</tr>
<tr>
<td>Class Time:</td>
<td>Mondays &amp; Wednesdays 1:30-2:45 pm</td>
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<tr>
<td>Classroom:</td>
<td>SCI 253</td>
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<tr>
<td>Prerequisites:</td>
<td>Grade of C- or better in Phys 50</td>
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<tr>
<td>Final Exam:</td>
<td>Wednesday, December 12, 12:15-2:30 pm</td>
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Course Description

Physics is the study of the natural laws that govern all matter and energy. It is the oldest and most fundamental of all the sciences. Every student of scientific and technical disciplines, from aerospace engineering to zoology, must have a solid understanding of physics. Physics 51 is a calculus-based introduction to electricity and magnetism, which is the branch of physics that covers electric and magnetic phenomena, electric circuits and electromagnetic waves. This course is a pre-requisite for all of the upper-division courses in your major.
Course Goals and Learning Outcomes

Upon successful completion of this course, you will:

1. Be familiar with basic concepts of electrostatics and electrodynamics.
2. Be able to calculate electric and magnetic fields and forces due to these fields.
3. Be familiar with circuit elements such as resistors, capacitors, inductors, battery.
4. Be able to use Ohms and Kirchhoff’s rules to analyze DC electric circuits.
5. Be able to analyze basic AC electric circuits.
6. Be familiar with Maxwell’s equations and electromagnetic waves.

Topics covered:

- Ch. 21: Electric Charge and Electric Field
- Ch. 22: Gauss’s Law
- Ch. 23: Electric Potential
- Ch. 24: Capacitance and Dielectrics
- Ch. 25: Current, Resistance, and Electromotive Force
- Ch. 26: Direct-Current Circuits
- Ch. 27: Magnetic Field and Magnetic Forces
- Ch. 28: Sources of Magnetic Field
- Ch. 29: Electromagnetic Induction
- Ch. 30: Inductance
- Ch. 31: Alternating Current
- Ch. 32: Electromagnetic Waves

Textbook and online learning system:

Having (and reading) the textbook is crucial for succeeding in this class!
The textbook that we use is University Physics, by Young and Freedman, 14th Edition. The publisher is Pearson Addison Wesley. We will cover chapters 21-32.
If you buy the textbook new, it should come with an access code for the online homework, which is REQUIRED.
If you want to save a few bucks and buy it used, or previous editions, you will have to purchase the online homework separately. The online homework can be accessed at http://www.
How to succeed in this course

Physics is fundamental to every problem you will encounter as an engineer or scientist. The principles you learn here will continue to apply throughout your coursework and career as an engineer or scientist. Therefore, it is essential to develop good problem solving skills now. In fact, you cannot pass the course without it. All majors require a C- or better to count toward your degree program.

Schedule at least 6 hours of study per chapter!

- You will need a minimum of 3 hours of preparation time per chapter (2 hours reading, 1 hour pre-class work).
- You will also need a minimum of 3 hours per chapter (post-class) working through various exercises to prepare for the exams (including solving problems without the use of anything but the equation from the book/notes).

There are many worked examples in the book, the answers to odd-numbered problems are in the back of the book. The MasteringPhysics exercises contain many tutorials and also gives hints for when you get stuck.

If you miss a class, you should schedule an additional 2-3 hours to cover on your own what you missed. Coming to office hours will help, but is not a substitute for coming to class.

Studying and problem-solving in groups is highly recommended, but you should also schedule time to solve problems on your own, because that is what your grade depends on.

Most importantly: Do not fall behind! Every week builds on what we did in the weeks before.

Classroom Protocol

Flipped class protocol: This is a flipped learning class! It is a modern and highly recommended pedagogical model that is being widely adopted by many instructors across all teaching subjects. In basic terms, the typical lecture and homework elements are reversed, meaning you prepare yourself before coming to class, while the class time is (mainly) dedicated to problem solving. In our case, the class protocol is as following:

- Your homework is to read selected book chapters, and do the online pre-class preparation before we start with a particular class topic. The homework consists of reading and conceptual questions, and video tutorials aimed at understanding the topic. This pre-lecture homework is graded and it is mandatory.
• During the class time, I will briefly go over some important topics, address some questions from your pre-lecture homework, and go over some problem-solving strategies. The rest of the class time is dedicated to in-class exercises.

• Another set of exercises (Preparation for exams) will be posted on Mastering Physics for you to practice on your own or in class. These are not graded and do not have a due date. These are basically examples of problems you will encounter in your exams.

Attendance: I understand that life's events can occasionally make it difficult to attend every class meeting, so if you miss class once or twice during the semester, you will be OK as long as you put in an extra 2-3 hours of study time to cover the material you miss. If you find that you have a situation that causes you to miss more than one or two classes, please contact me ASAP to figure out how to succeed in this course. If you already know that you will miss more than a total of two class meetings this semester, I would not recommend taking this course. Please arrive on time to class. If an illness or emergency causes you to miss a class, please notify me ASAP.

Lab: Every student must pass the lab during the same semester as the lecture course. It is required that you take and pass both the lab and the lecture in the same semester if you fail either the lecture or the lab you will have to repeat the entire course (both lecture and lab) regardless of your grade in the lecture.

You will be assigned a numerical lab grade (0-100) that will count toward 5% of your overall final grade in the course. A lab grade of 70% or greater is required to pass the course, regardless of how the numbers work out for your overall grade. In other words, if you get 50% in the lab and 90% in lecture, you will receive an F for the course, unfortunately. The key to doing well in lab is to have good attendance, actively participate in the experiments, and write a good lab report.

Electronic devices: You may use calculators on all assignments (in-class, homework, and exams), unless otherwise specified. Please remember to keep your cell phones quiet (and stowed away!) during class. Please do not use your laptop computers, tablets or other electronic devices during class, unless the classroom activity calls for it.

Keep in touch: The best way to get in touch with me outside of class or office hours is via email. Please keep in mind that I am not a 24-hour physics hotline, so questions that come in at 7:00 pm or later might not be replied to until the following morning! I am happy to address any questions in detail during class or office hours.

Help Sessions: Stop by my office during office hours to discuss the lectures, homework, exams, etc. I am also happy to make an appointment with you if you can’t make it to my office hours.

Make sure to have your questions ready when you come by. When other students are waiting, individual visits are kept to 10 minutes. Please keep in mind that whatever is shared with me may also be discussed with the department chair and/or other relevant university staff concerned with your education.
Course Requirements and Assignments:

SJSU classes are designed such that in order to be successful, it is expected that 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, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

There will be three midterm exams and a final cumulative exam. There might be occasional announced or unannounced in-class quizzes.

Online homework: The majority of the assignments done outside of class will be conducted online, through the website http://www.masteringphysics.com. Once you log in and set up your account, it will ask which course you want to join. The course ID is will be give to you in class. DO NOT TYPE IN ‘PHYSICS51’ this will lock you into another course at some other university, and it is extremely hard to fix this problem! The homework interface is pretty easy to work with, once you get the hang of it. It is about as hard as shopping online. Please be patient, and come see me if you have any problems. It is a lot easier to show me in person what the problem is, rather than over the phone or email. The online homework will require you to enter numerical answers and/or equations, much like writing computer code (e.g. Excel, MatLab). There are also interactive questions that require you to sort items, for example.

Grading Policy

Exams: There will be a total of three exams. The final exam will be cumulative.

Grading Policy

The overall grade for this course will be evaluated based on the following table:

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Homework:</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes:</td>
<td>5%</td>
</tr>
<tr>
<td>Highest-score exam:</td>
<td>38%</td>
</tr>
<tr>
<td>Mid-score exam:</td>
<td>27%</td>
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<tr>
<td>Lowest-score exam:</td>
<td>20%</td>
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</table>
The letter-grade assignments will follow the curve illustrated below:

<table>
<thead>
<tr>
<th>Grade Percentage</th>
<th>Letter Grade</th>
</tr>
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<tbody>
<tr>
<td>$&gt; \mu + \frac{5}{3} \sigma$</td>
<td>A+</td>
</tr>
<tr>
<td>$(\mu + \frac{4}{3} \sigma)$ to $(\mu + \frac{5}{3} \sigma)$</td>
<td>A</td>
</tr>
<tr>
<td>$(\mu + \sigma)$ to $(\mu + \frac{4}{3} \sigma)$</td>
<td>A-</td>
</tr>
<tr>
<td>$(\mu + \frac{2}{3} \sigma)$ to $(\mu + \sigma)$</td>
<td>B+</td>
</tr>
<tr>
<td>$(\mu + \frac{1}{3} \sigma)$ to $(\mu + \frac{2}{3} \sigma)$</td>
<td>B</td>
</tr>
<tr>
<td>$\mu$ to $(\mu + \frac{1}{3} \sigma)$</td>
<td>B-</td>
</tr>
<tr>
<td>$(\mu - \frac{1}{3} \sigma)$ to $\mu$</td>
<td>C+</td>
</tr>
<tr>
<td>$(\mu - \frac{2}{3} \sigma)$ to $(\mu - \frac{1}{3} \sigma)$</td>
<td>C</td>
</tr>
<tr>
<td>$(\mu - \sigma)$ to $(\mu - \frac{2}{3} \sigma)$</td>
<td>C-</td>
</tr>
<tr>
<td>$(\mu - \frac{1}{3} \sigma)$ to $(\mu - \sigma)$</td>
<td>D+</td>
</tr>
<tr>
<td>$(\mu - \frac{2}{3} \sigma)$ to $(\mu - \frac{4}{3} \sigma)$</td>
<td>D</td>
</tr>
<tr>
<td>$(\mu - 2\sigma)$ to $(\mu - \frac{5}{3} \sigma)$</td>
<td>D-</td>
</tr>
<tr>
<td>$&lt; \mu - 2\sigma$</td>
<td>F</td>
</tr>
</tbody>
</table>
Additional grade requirements:

- You must have a minimum of 50% total points on your homework to get a passing grade in the course. If your total homework points are less than 50%, your final grade for the whole course will be an F.

- You will get 5% of your final grade for your homework once you accomplish more than 80% of total homework points by the end of the semester. If you get less than 80% (but more than 50%), your 5%-grade will be accordingly adjusted.

- You must get a passing grade in your laboratory part of the course. If your lab grade is unsatisfactory, you will receive an F in the lecture.

- If you miss an exam due to legitimate reasons, defined by SJSU rules (military order, death of immediate family member, divorce, natural disaster, personal health or serious family illness, pregnancy related issues), a makeup exam might be provided to you. If you miss an exam due to reasons that are not listed as legitimate, you will receive zero points; no makeup exams will be given.

Faculty Web Page

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on my faculty web page at https://sites.google.com/a/sjsu.edu/rankoheindl/home/teaching/phys_51. You are responsible for regularly checking this website and your instructor emails to learn of any updates.

University Policies

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semesters Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructors permission to record the course.
• “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructors permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”

It is suggested that the greensheet include the instructors process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.

In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.

• “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires 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 Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another persons ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSUs Academic Integrity Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make 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 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center at http://www.sjsu.edu/aec/ to establish a record of their disability.
Accommodation to Students’ Religious Holidays

San Jose State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See University Policy S14-7 at http://www.sjsu.edu/senate/docs/S14-7.pdf.

Student Technology Resources

Recommendations for computer access for this course are discussed above under “Other Requirements”. Other computers for student use (which may support some of the software needed for this course) are available in the Academic Success Center at http://www.sjsu.edu/at/asc/ located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union. Additional computer labs may be available in certain departments/colleges. Computers are also available in the Martin Luther King Library.

SJSU Peer Connections

For information about Peer Connections, see the Peer Connections website at http://peerconnections.sjsu.edu.

SJSU Writing Center

The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the Writing Center website at http://www.sjsu.edu/writingcenter. For additional resources and updated information, follow the Writing Center on Twitter and become a fan of the SJSU Writing Center on Facebook.

SJSU Counseling Services

For information about the Counseling Center, see the Counseling Services website at http://www.sjsu.edu/counseling.