PHY 331 - Principles of Modern Electromagnetism  
Fall 2018

General information

Course Format: in-person  
Days: Tuesday & Thursday  
Times: 12:00 p.m. – 1:15 p.m.  
Location: PRLTA 135 (Poly)

This course is offered by the College of Integrative Sciences and Arts. For more information about the college, visit our website: https://cisa.asu.edu/. If you have questions or concerns, please send your inquiry to cisa@asu.edu

Instructor information

Name: Dr. Igor A. Shovkovy  
Office Location: Wanner Hall 340F  
Office Hours: 10:30 a.m. – 11:30 a.m. on Mondays & Wednesdays, and by appointment.  
To make an appointment, please contact the instructor via email at least 1 day in advance.  
Email: Igor.Shovkovy@asu.edu  
Phone Number: 480-727-1953

Textbook(s)

Required Textbook:  
*Introduction to Electrodynamics* (4th edition) by David J. Griffiths  
ISBN: 9780321856562

Additional Textbook (optional):  
*Field and Wave Electromagnetics* (2nd edition) by David K. Cheng  
ISBN: 978-0201128192

Course information

Prerequisites: APM 270 (Mathematics of Change I), MAT 274 (Elementary Differential Equations) or MAT 275 (Modern Differential Equations). Students should have knowledge of vector algebra, differential calculus and integral calculus.

While PHY 131 (University Physics II: Electricity and Magnetism) is not an official prerequisite, it is highly recommended that students take it before enrolling into this course.

Course Description: A study of the unified description of electromagnetic phenomena provided by Maxwell’s equations in differential and integral form. The planned list of topics includes Maxwell’s equations, electrostatic fields, Laplace’s and Poisson’s equations, dielectrics, magnetic fields and materials, electromagnetic induction and Faraday’s law, displacement current and Ampere’s law, electromagnetic waves, and, if time permits, the photon theory of light.
**Course Objectives:** Students are expected to (i) gain a theoretical understanding of key concepts of electromagnetism, (ii) learn methods and techniques commonly used in studying electrostatic and magnetostatic systems, (iii) develop practical problem-solving skills, (iv) strengthen logical thinking and reasoning.

**Learning Outcomes:** Through weekly readings, written homework assignments, and exams, students will have demonstrated that they are able to
- solve conceptual and numerical problems in electromagnetism;
- apply vector algebra, differential calculus and integral calculus in electromagnetism;
- use curvilinear coordinates in physics context;
- understand and explain electromagnetic phenomena using the fundamental laws of physics;
- effectively communicate physics ideas;
- use proper terminology in the context of electromagnetism.

**Course Policies**

**Attendance** is expected. Students are responsible for all material presented in class, all homework, and for all changes to the schedule or plans announced in class.

**Homework** is truly one of the most important components in this course. This is because doing homework is the only way to truly learn the material and build a good intuition for physics. Solving physics problems effectively is a skill that students must develop. The only known way to achieve this is by practicing. The lectures will only cover the key concepts. The text will elaborate on these concepts and provide further explanation of their meaning and on how one uses them to solve problems. There is no way to do well in this course if you do not give the homework assignments the effort they require. (Allow about **4 hours per week** for reading and homework assignments.) Your homework assignment should be neatly and clearly written. The front page should list your name, the date and the homework assignment number. Each problem should be clearly labeled. The problem solutions should contain detailed explanations. Late homework will **not** be accepted.

**Examinations.** There will be **three midterm exams** on the dates shown below in the tentative schedule (the actual dates will be announced in class). The **final exam** at the end of the semester is a **comprehensive** exam. The use of the textbook and class notes will not be permitted during the exams.

**Electronic devices.** The use of cell phones, iPads, laptops, and other similar devices is not permitted during lectures and exams.

**Disability Accommodations.** Students who feel they may need a disability accommodation(s) in class must provide documentation from the Disability Resource Center to the class instructor verifying the need for an accommodation and the type of accommodation that is appropriate. Students who desire accommodations for a disability should contact DRC as early as possible (i.e., before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student’s responsibility to make the first contact with the DRC.
Accommodation for university-sanctioned activities. In compliance with ACD 304-02, students who participate in university-sanctioned activities that require classes to be missed, should be given opportunities to make up examinations and other graded in-class work. However, absence from class or examinations due to university-sanctioned activities does not relieve students from responsibility for any part of the coursework required during the period of the absence.

Accommodation for religious practices. In compliance with ACD 304-04, students who need to be absent from class due to the observance of a religious holiday or participate in required religious functions must notify the faculty member in writing as far in advance of the holiday/obligation as possible. Students will need to identify the specific holiday or obligatory function to the faculty member. Students will not be penalized for missing class due to religious obligations/holiday observance. The student should contact the class instructor to make arrangements for making up exams/assignments within a reasonable time.

Academic Integrity. Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see http://provost.asu.edu/academicintegrity.

If you fail to meet the standards of academic integrity in any of the criteria listed on the university policy website, sanctions will be imposed by the instructor, school, and/or dean. Academic dishonesty includes borrowing ideas without proper citation, copying others’ work (including information posted on the internet), and failing to turn in your own work for group projects. Please be aware that if you follow an argument closely, even if it is not directly quoted, you must provide a citation to the publication, including the author, date and page number. If you directly quote a source, you must use quotation marks and provide the same sort of citation for each quoted sentence or phrase. You may work with other students on assignments, however, all writing that you turn in must be done independently. If you have any doubt about whether the form of cooperation you contemplate is acceptable, ask the TA or the instructor in advance of turning in an assignment. Please be aware that the work of all students submitted electronically can be scanned using SafeAssignment, which compares them against everything posted on the internet, online article/paper databases, newspapers and magazines, and papers submitted by other students (including yourself if submitted for a previous class).

Turning in an assignment (all or in part) that you completed for a previous class is considered self-plagiarism and falls under these guidelines. Any infractions of self-plagiarism are subject to the same penalties as copying someone else’s work without proper citations. Students who have taken this class previously and would like to use the work from previous assignments should contact the instructor for permission to do so.

Prohibition of Commercial Note Taking Services. In accordance with ACD 304-06 Commercial Note Taking Services, written permission must be secured from the official instructor of the class in order to sell the instructor's oral communication in the form of notes. Notes must have the note taker’s name as well as the instructor's name, the course number, and the date.
Course content, including lectures and assignments are copyrighted materials. In accordance with ACD 304-06 Commercial Note Taking Services, students may not share outside the class, upload, sell, or distribute course content or notes taken during the conduct of the course.

**Percentage Distribution:**

<table>
<thead>
<tr>
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<th>Percentage</th>
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<tbody>
<tr>
<td>Homework assignments</td>
<td>35%</td>
</tr>
<tr>
<td>Mid-term Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Mid-term Exam 2</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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**Course Grading System:** Grades will be determined by the percentage you accumulate:

- A: 90% – 100% Excellent
- B: 78% – 89.9% Good
- C: 66% – 77.9% Average
- D: 54% – 65.9% Passing
- E: < 54% Failure
- XE: Failure due to Academic Dishonesty

**Grade Appeals.** ASU has formal and informal channels to appeal a grade. If you wish to appeal any grading decisions, please see [http://catalog.asu.edu/](http://catalog.asu.edu/)

**Incompletes.** A mark of "I" (incomplete) is given by the instructor when you have completed most of the course and are otherwise doing acceptable work but are unable to complete the course because of illness or other conditions beyond your control. You are required to arrange with the instructor for the completion of the course requirements. The arrangement must be recorded on the Request for Grade of Incomplete form ([http://students.asu.edu/forms/incomplete-grade-request](http://students.asu.edu/forms/incomplete-grade-request)).

**Tentative schedule**

The exact schedule for lectures and exams will depend on how long it takes to cover the material. The following is a tentative schedule:

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>Aug. 16, 2018</td>
<td>First class</td>
</tr>
<tr>
<td>Oct. 4, 2018</td>
<td>1st midterm test</td>
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<tr>
<td>Oct. 8-9, 2018</td>
<td>Fall Break – No classes</td>
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<tr>
<td>Nov. 15, 2018</td>
<td>2nd midterm test</td>
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<tr>
<td>Nov. 22-23, 2018</td>
<td>Thanksgiving holidays – No classes</td>
</tr>
<tr>
<td>Dec. 29, 2018</td>
<td>Last class</td>
</tr>
<tr>
<td>Dec. 4, 2018</td>
<td>Final Exam (12:10 p.m. - 2:00 p.m.) <a href="https://students.asu.edu/final-exam-schedule">https://students.asu.edu/final-exam-schedule</a></td>
</tr>
</tbody>
</table>

**Course Outline:** [http://shovkovy.faculty.asu.edu/syllabus/2018/Fall/phy331_schedule.pdf](http://shovkovy.faculty.asu.edu/syllabus/2018/Fall/phy331_schedule.pdf)
Drop and Add Dates/Withdrawals. Please refer to the academic calendar on the deadlines to drop/withdraw from this course. Consult with your advisor and notify your instructor if you are going to drop/withdraw this course. If you are considering a withdrawal, review the following ASU policies: Withdrawal from Classes, Medical/Compassionate Withdrawal. Please note that the ASU Academic Calendar only refers to withdrawal for the academic portion of your study abroad program. Please refer to the Study Abroad Withdrawal Policies for important dates regarding withdrawing from your Faculty Directed program.

Email Communications. All email communication for this class will be done through your ASU email account. You should be in the habit of checking your ASU email regularly as you will not only receive important information about your class(es), but other important university updates and information. You are solely responsible for reading and responding if necessary to any information communicated via email. For help with your email go to: http://help.asu.edu/sims/selfhelp/SelfHelpHome.seam?dept_pk=822 and file a help desk ticket by clicking on “My Help Center.”

Establishing a Safe Environment. Learning takes place best when a safe environment is established in the classroom. In accordance with SSM 104-02 of the Student Services Manual, students enrolled in this course have a responsibility to support an environment that nurtures individual and group differences and encourages engaged, honest discussions. The success of the course rests on your ability to create a safe environment where everyone feels comfortable to share and explore ideas. We must also be willing to take risks and ask critical questions. Doing so will effectively contribute to our own and others’ intellectual and personal growth and development. We welcome disagreements in the spirit of critical academic exchange, but please remember to be respectful of others’ viewpoints, whether you agree with them or not.

Student Conduct Statement. Students are required to adhere to the behavior standards listed below:

- ACD 125: Computer, Internet, and Electronic Communications http://www.asu.edu/aad/manuals/acd/acd125.htm, and
- The ASU Student Academic Integrity Policy http://www.asu.edu/studentaffairs/studentlife/srr/index.htm

Students are entitled to receive instruction free from interference by other members of the class. If a student is disruptive, an instructor may ask the student to stop the disruptive behavior and warn the student that such disruptive behavior can result in withdrawal from the course. An instructor may withdraw a student from a course when the student’s behavior disrupts the educational process under USI 201-10 (http://www.asu.edu/aad/manuals/usui/usui201-10.html). Course discussion messages should remain focused on the assigned discussion topics. Students must maintain a cordial atmosphere and use tact in expressing differences of opinion. Inappropriate discussion board messages may be deleted if an instructor feels it is necessary. Students will be notified privately that their posting was inappropriate. Student access to the course Send Email feature may be limited or removed if an instructor feels that students are sending inappropriate electronic messages to other students in the course.
Title IX. Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at http://sexualviolenceprevention.asu.edu/faqs.

Statement on Inclusion. ASU is a comprehensive public research university, measured not by whom we exclude, but rather by whom we include and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves. Arizona State University is deeply committed to positioning itself as one of the great new universities by seeking to build excellence, enhance access and have an impact on our community, state, nation and the world. To do that requires our faculty and staff to reflect the intellectual, ethnic and cultural diversity of our nation and world so that our students learn from the broadest perspectives, and we engage in the advancement of knowledge with the most inclusive understanding possible of the issues we are addressing through our scholarly activities. We recognize that race and gender historically have been markers of diversity in institutions of higher education. However, at ASU, we believe that diversity includes additional categories such as socioeconomic background, religion, sexual orientation, gender identity, age, disability, veteran status, nationality and intellectual perspective.

Syllabus Disclaimer. The course syllabus is an educational contract between the instructor and students. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes via email, or in the Announcements section on Blackboard.

Campus Resources

As an ASU student, you have access to many resources on campus. This includes tutoring, academic success coaching, counseling services, financial aid, disability resources, career and internship help and many opportunities to get involved in student clubs and organizations.

- Tutoring: http://studentsuccess.asu.edu/frontpage
- Counseling Services: http://students.asu.edu/counseling
- Financial Aid: http://students.asu.edu/financialaid
- Disability Resource Center: http://www.asu.edu/studentaffairs/ed/drc/
- Major/Career Exploration: http://uc.asu.edu/majorexploration/assessment
- Career Services: http://students.asu.edu/career
- Student Organizations: http://www.asu.edu/studentaffairs/mu/clubs/