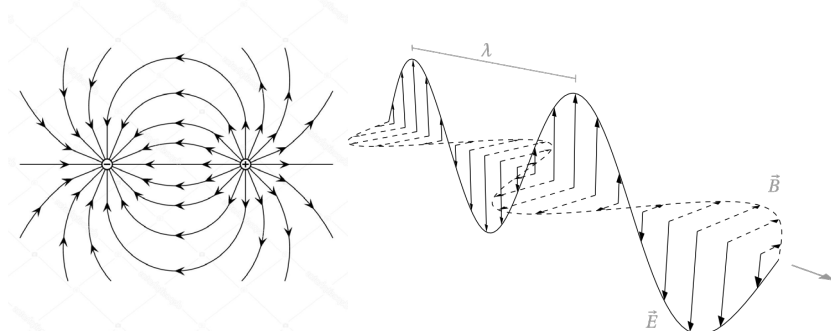


General Physics for the Physical Sciences II



Instructor Dr. Gintaras K. Duda
Hixson-Lied G-78
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402-280-5730

Class Meetings MWF 9:30-10:45 am
HLSB G-59
Office Hours TBA
open door for short issues
by appt. for long issues

Course E-Site: Official class notifications, including cancellations, will come through the course website on BlueLine: <https://blueline.instructure.com>
Exams: February 11th, March 18th, and April 22nd: 9:30-10:45 am in HLSB G-59
Final Exam: Thursday, May 5th, 3:00-6:00 p.m., room TBA

Course Description

The primary student learning goals of Physics 214 are the development of a strong understanding of the principles that form the foundation of electricity, magnetism, waves, and modern physics. In addition, the student is expected to develop their problem-solving skills and the effective application of these skills to physics. The course works to meet these goals using a variety of techniques that physics education researchers have found to be effective. These methods involve repeated exposure to the material at several levels, from conceptual to mathematically advanced. Homework is submitted electronically using an online program called FlipItPhysics that helps students in solving problems and provides immediate feedback. Students will work in small groups to develop problem-solving skills in a cooperative learning environment. Laboratory exercises in the separate lab course (PHY 206) are designed to reinforce the understanding of physical principles and address topics (e.g. circuits and optics) that are better learned through hands-on experience. Completion of PHY 214 and PHY 206 together satisfy the Magis core Doing Natural Science requirement.

Knowledge of trigonometry, geometry, and algebra is assumed. Completion of the first half of the physics sequence is required (PHY 201, 211, 213, or 221). Calculus I must be completed, and Calculus II should typically be completed or currently registered. The course will use calculus to illuminate physical concepts and to make predictions.

Fit to Mission

Our modern world has become increasingly complex and, in the coming decades, it is clear that we will need to prepare our graduates to face important challenges such as the global demand for clean energy, the problems associated climate change, and the demand for health care providers to care for an ever growing population. To face these and other social-scientific challenges, our students need to understand the process of scientific

inquiry, have the capacity to think critically about the evidence presented to them, and develop creative, innovative solutions. They also need to have the capacity to carefully consider the societal impact of global choices. This course provides training in scientific inquiry and provides an important perspective on the nature of reality that is embraced by the Jesuit and Catholic love for the whole truth. Armed with multiple perspectives, the course empowers students with the scientific reasoning needed to become effective leaders in the service to others.

Required Texts and Materials

1. The required textbook for the course is *University Physics Volume II* published by OpenStax by Ling, Sanny, and Moebs. This is a free, online textbook and is available for download at:

<https://openstax.org/details/books/university-physics-volume-2>

You can use the textbook as an e-book, through a web browser, or as a pdf file on a mobile device. A paper copy can also be purchased through the OpenStax website for \$45.

2. Students must also enroll in the online learning system **FlipItPhysics** (www.flipitphysics.com, previously known as "smartphysics") by Gladding, Selen, and Seltzer. FlipItPhysics is a fully integrated learning environment that includes animated PreLectures, CheckPoints, and an online homework system with interactive tutorials and a feedback system to help students better understand any mistakes they are making.

Additional materials, assignments, and special announcements pertaining to emergency situations (e.g., weather related closures) will be posted on BlueLine.

For all classes, quizzes and exams, students should bring a scientific (non-graphing & non-programmable) calculator.

Physics Department Curricular Objectives

This course meets the following physics department goals:

- Students will demonstrate an improved understanding of the fundamental concepts in each of the major areas of physics.
- Students will be able to use concepts and techniques from more than one area of physics together to solve problems.
- Students will demonstrate a conceptual problem-solving ability.
- Students will demonstrate a proficiency in the application of mathematics to physics.
- Students will demonstrate the ability to work as members of a team.

Magis Core Curricular Objectives

This course, taken together with PHY 206 or PHY 224 will satisfy the Doing Natural Science Core Objectives:

- Students will carry out a natural scientific inquiry (individually or collaboratively) and communicate its essential elements.
- Students will generate a scientific hypothesis and design an investigation to examine or test the hypothesis.

Course Structure and Grading

Attendance Policy

Students are required to attend all face-to-face classes which they assigned to if they are healthy. I will be utilizing active engagement exercises in class, so it is important that everyone attends and participates. Remember, cognitive science tells us that learning is a productive/constructive activity – learning requires mental effort and participation! Students who miss a class because of an emergency (non-health related) are expected to notify their instructor as soon as possible. **If you are sick, please do not come to class.** In the event of illness (fever/chills, shortness of breath, headache, sore throat, lack of taste/smell, etc.) please and notify me **and stay home.** Even if you can't come to class, you won't fall behind. Students who must miss class for a protracted period of time due to illness or self-quarantining due to COVID-19 exposure will be able to engage the course material online.

Mask Usage

Students in this course will adhere to all community standards at Creighton University. While a campus-wide mask mandate is in effect, face coverings (masks) must be worn at all times in our classroom. Face coverings with exhalation valves or vents and breathable neck gaiters or neck fleeces made of polyester spandex do not prevent the spread of COVID-19 and may not be used on campus to satisfy Creighton's face covering requirement. Failure to wear a mask will be considered a breach of the Policy on Disruptive Student Conduct in the Classroom or other Learning Environment (on BlueLine), will result in forfeiture of participation points as well as referral to the Office of Community Standards and Well-Being and/or removal from class.

PreLecture activities

Prior to each class students will complete a 15-20 minute online PreLecture activity. These present the student with an introduction to new material using a sequence of narrated animations, all under student control. Each PreLecture consists of six to eight dynamic pages of material designed in accordance with accepted multimedia learning principles, as well as two to three embedded questions which allow students to check their understanding of the new material. This must be completed before the posted deadlines. Students should pay careful attention to the PreLecture presentations **and take notes.** Some material will not be repeated during the lecture section. Interactive class activities during the lecture hour will assume familiarity with the PreLecture material. Students should come to class ready to participate. **Full credit will be earned until the deadline, and 80% credit up until class time. Zero credit will be given for preLectures completed after class time.**

CheckPoint Assignments

Upon completion of the PreLecture, students are asked a carefully designed set of multiple-choice and free-response questions. These CheckPoints provide instructors with feedback on the student understanding of relevant concepts prior to the lecture. The instructor can then use this information to create the structure of the lecture that is to come. Credit for the CheckPoint activities will be given for any serious attempt. Students do not have to get the correct answer to receive full credit for these problems. For our lecture time to be most productive, the PreLectures and CheckPoint assignments must be completed **before** the posted deadlines. **Full credit will be earned until the deadline, and 80% credit up until class time. Zero credit will be given for CheckPoint assignments completed after class time.**

Online Homework

The online homework assignments challenge students to apply what they have learned before and during lecture. The FlipItPhysics homework system tracks student progress throughout the semester, providing

formative feedback and allowing both the student and the instructor to track progress on each assignment and each section of the course. The system detects the most common mistakes on a given problem and provides guidance that builds student understanding. Homework problems will be assigned each week. Assignments are scheduled on FlipItPhysics and will generally be **due Thursday evenings** most weeks (a few HW assignments will be due on a Tuesday). Students may discuss homework problems, but they should be aware that assignments differ from student to student in terms of the numbers and figures used. It is assumed that students have a calculator capable of trigonometric functions, natural logs, and exponentials. The Homework assignments are necessary for developing problem-solving skills and are a reflection of the material you will likely encounter in Quizzes and Exams. **Full credit will be earned until the deadline, 90% credit up until the time of the quiz (the following day), and 75% credit for 3 more days after that.**

Written Homework

A small number of problems (usually 1-2) will be assigned per week that should be written out by hand. These problems will come either from the OpenStax textbook or will be specially devised by the instructor. Solving and writing out these problems will give you valuable practice in solving exam and quiz workout questions (same format). These problems will be graded and will collectively count for 5% of your total grade. The written homework will be submitted weekly through BlueLine.

Group work and Quizzes

Most Fridays will consist of a 45-minute group worksheet, followed by a 20-30 minute individual quiz. These will usually cover the material due the previous night. Students will be organized into small groups (2-3 students per group) to collaborate and discuss conceptual questions and focus problems that are similar to homework problems. The quiz that follows will cover material very similar to the homework. The lowest Group work and Quiz score will be dropped.

Exams

Three exams will be given throughout the semester. A missed quiz or exam will be scored as a zero. **THERE WILL BE NO MAKE-UP QUIZZES OR MAKE-UP EXAMS.** (In the case of an extreme emergency, students should notify their instructor as early as possible and petition for an exception to be granted.) Books and notes may be used for the group-work activities, but not for quizzes or exams. Only scientific calculators without programming and/or graphing capabilities will be allowed during quizzes or exams. The three exams will take place on **February 11th, March 18th, and April 22nd** during class. The final exam will take place on **Monday, May 9th from 3-6 pm.**

Reflections and Self-Directed Learning

A critical aspect of Jesuit education is reflection. Here that self-reflection will take the form of an honest appraisal of your current educational state (i.e. your strengths and weaknesses) as well as your goals for this course and expectations of yourself. In particular, we will focus many of our reflections on your development of life-long learning skills. I want us together to pay attention to how your skills at independent learning are developing. You will evaluate your own development through a self-rating scale and self-reflective essays, and I'll provide my take on your development through feedback and evaluations throughout the semester. More concretely, you will be responsible for completing several different styles of reflections: i) a beginning of the semester reflection in which you will set your own personal goals for the course, ii) post-exam reflections, and iii) a final end-of-semester reflection where

you will look back at your initial goals and how you've grown and matured as a scientist over the course of the semester.

Pre/Post-Assessment Exams

Physics is historically a difficult course for students and considerable effort has gone into refining the pedagogy. In the interests of improving the course, it is important to gauge the success of instruction methods. Consequently, two assessment tests will be administered during the first and last weeks of class. Up to 5% extra credit towards any exam can be earned based on the final assessment score.

Grading

In assigning grades, I will make an evaluation of student performance guided by the grading standards given in the Undergraduate Issue of the Creighton University Bulletin. Grades will be maintained on BlueLine (and FlipItPhysics) where students can confirm the scores throughout the semester. Be sure to review the attendance policy as unexcused absences may lower your grade.

Grades will be weighted in the following manner:

Online FlipIt Assignments (HW, Pre-lectures, and Checkpoints)	10%
Written Homework Assignments	5%
Group Problem-Solving Exercises (approx. 10)	5%
Quizzes (approx. 10)	10%
Exams (3, each worth 15%)	45%
Final Exam	15%
Reflections/Self-Directed Learning	5%
In-class participation	5%

The grading scale for the course will be:

A	93% or greater	A-	90.0-92.9 %	B+	87.0-89.9%
B	83.0-86.9 %	B-	80.0-82.9 %	C+	77.0-79.9%
C	73.0-76.9%	C-	70.0-72.9%	D	60.0-69.9%
F	less than 60.0%				

Note: Spectacular performance on the final exam and/or on the conceptual pre-post tests may re-weight grades in a student's favor.

Attendance and Participation

Students are required to attend all classes. Student Services will be notified of students who miss a significant number of classes or are routinely late. Much of the in-class work is group based and so it is important that everyone attends and participates. Please email me your favorite physics equation if you have read this entire syllabus. Students who miss a class because of an emergency are expected whenever possible to notify me in advance. Missed activities will be scored as a zero. Participation in small group work requires students to be present for the entire session. Students arriving 10 minutes late or leaving 10 minutes early will be considered absent and may not receive points for that week's group work or quiz.

Participation grade rubric:

- A: 100% active participation and rare absence
- B: 85% average participation and/or absence
- C: 70% rare participation and/or multiple absences
- F: $\leq 50\%$ frequent absence from class

Miscellaneous Policies and Expectations

Americans with Disabilities Act Statement:

Disability Services at Creighton University is committed to providing services and resources to meet the need of qualified students with disabilities by establishing equal access to academic programs and University facilities. Students with a documented disability who wish to request academic accommodations in a particular class are encouraged to contact Disability Services as soon as possible to discuss the request process and eligibility requirements, as accommodations are not retroactive. If you believe that you may qualify or have questions regarding accommodations, please visit the [Disability Services Website](#) for more information or contact Disability Services at DisabilityServices@creighton.edu or 402-280-2195.

Once accommodations are granted from Disability Services, students are responsible for informing their professors of approved academic accommodations. Accommodation letters are generated and shared via ClockWork, an accommodation software system.

Class Cancellations:

In the unlikely event that this class must be cancelled, students will be notified through the announcements page of the course on BlueLine, and through email distribution using each student's creighton.edu email address.

Policy on Academic Honesty:

All work is expected to be your own, unless it is explicitly designated as group work. On homework, discussion with peers is permitted, however, discussion should only occur after you have made a significant effort on your own. I strongly discourage sharing of written solution, but instead invite you to ask questions of your instructor, or someone who has found the solution.

Copies of the most current college procedures on academic honesty can be found at:

https://my.creighton.edu/ccas/sites/ccas.creighton.edu/files/ccas_academic_honesty_policy_.pdf

Any student who engages in academic dishonesty as described in the University Bulletins will receive a zero (0) for the test/assignment, etc., and may risk receiving an "F" in the course, depending on the severity of the infraction.

Disruption of Normal Classroom Activities

Creighton University may modify, suspend, or postpone any and all activities and services immediately and without notice because of force majeure causes beyond Creighton's control and occurring without its fault or negligence including, but not limited to, acts of god, fire, war, governmental action, terrorism, epidemic, pandemic, weather, national emergencies, or other threats to the safety of students or staff. Creighton may, at its option, alter the academic schedule or provide alternate instruction modalities to meet course objectives and competencies and program outcomes, including, but not limited to, distance or remote learning, until such time as Creighton determines normal operations may resume safely.

In the event of disruption of normal classroom activities due to a worsening COVID-19 out- break, another widespread disease outbreak, or other emergency, the format for this course may be modified to enable completion of the course. In that event, you will be provided an addendum to this syllabus that will supersede this version.

Course evaluations

Large course evaluations will be conducted during the last 2 weeks of the semester, prior to final exams, using the online IDEA campuslabs evaluation system. Your instructor has determined specific learning objectives relevant for this course that will enable the instructor to better understand how well the objectives are being achieved by the students. When you receive the email to complete the online surveys for each of your large courses, click on the link, complete the survey, and submit it. Your individual responses cannot be seen by anyone in the University, however, the College office receives data on completion rates for each course. Your instructor may provide an opportunity to complete the survey during class time. Your participation provides valuable feedback for the instructor, the department, and the College of Arts and Sciences.

Student Mental Health

All members of Creighton University recognize that you, as students, may experience stressors that can impact both your academic experience and personal well-being. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, relationships, identities, finances, etc.

If you are experiencing concerns, **seeking help is a courageous thing to do** for yourself and those who care about you. If the source of your stressors is academic, please contact me so that we can find solutions together. For other concerns, Creighton University offers many resources including Student Counseling Services, the EDGE, the Office of Disability Services, Student Health Education and Compliance, the Office of Student Retention, the Financial Aid Office, the Creighton Cupboard, the Student Leadership and Involvement Center, the VIP Center, the Creighton Intercultural Center, and so many more. All can be found on Creighton University's website or you can just ask.

It's my intention to challenge you in this course, but also to support you. In the event I suspect you may need additional support, I will express my concerns and the reasons for them and share resources that might be helpful. I don't need to know the details of what's going on (though you can share it with me if you want to), but simply to let you know I am concerned and that help, if needed, is available.



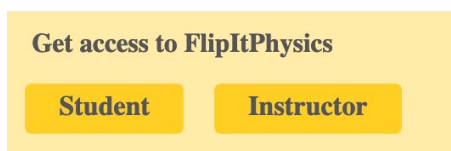
Gary Gladding, Mats Selen, and Tim Stelzer
Macmillan Higher Education

flipItPhysics includes:

1. Online PreLectures (animated lessons, completed before lecture)
2. Online CheckPoints (quizzes to check knowledge, completed before lecture)
3. Lectures (interactive, with clicker activities)
4. Online homework exercises
5. Printed textbook (reference, problems)

To access flipItPhysics: Go to www.flipitphysics.com

Create a flipItPhysics account:



1. Go to flipitphysics.com
2. Locate and select "Get access to FlipItPhysics > Students"
3. Begin the process of registering for the site. Enter your email address (your institutional email address) and Read and agree to the site terms and conditions.
4. Click "Register"
5. Set up your profile, and then choose the "Enrollments" tab.
6. Enroll in this course by entering in the Course Access Key.

Enroll in a Course

A screenshot of a web form titled "Enroll in a Course". The form has a light grey background. At the top, it says "Enter the access key of an existing course to enroll:". To the right of this text is a text input field containing "XXXXXXXX". Below the input field is a "Get Course" button.

The Course Access Key for this course is: 22SpCUPHY214

Note this is case-sensitive!

You will be given **30 days** in which to access flipItPhysics before having to purchase access or redeem an access code. This will provide you with a nice grace period should you drop the course.

Register by purchasing access or redeeming an access code.