

PHYS2212 - Principles of Physics II (Calculus based)

Spring 2021

Dr. Marco Guzzi

Students must use the Class key: **kennesaw 4244 2052** to enroll in WebAssign (for their homework)

This syllabus and other info about PHYS2212 are available on D2L and at the link:

<http://facultyweb.kennesaw.edu/mguzzi/>

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email: mguzzi@kennesaw.edu (When e-mailing me, **put "PHYS2212" in the subject line** along with the subject of your message.)

DO NOT use D2L or WebAssign to email me: you will not get a reply.

You must use ONLY your KSU email address to email me, otherwise you will not get a reply.

Lectures (Online): Tuesday and Thursday 11:00am-12:15pm, D2L Collaborate Ultra

Recitations (Face-to-Face): Tuesday 2:00pm-2:50pm, Clendenin Bldg - Room 2009 (CNR 15995)

Recitations (Face-to-Face): Tuesday 12:30pm-1:20pm, Clendenin Bldg - Room 1008 (CNR 15996)

Recitations (Face-to-Face): Thursday 12:30pm-1:20pm, Clendenin Bldg - Room 1008 (CNR 15997)

PHYS2212 is a hybrid course. Students are required to use a webcam for tests and final exam.

Office hours:

Wed and Fri 3pm - 4pm. Alternatively, you can schedule an appointment via email.

Textbook: Physics for Scientists and Engineers with Modern Physics, Serway and Jewett, 10th ed.

Catalog course description

PHYS2212 - Principles of Physics II (calculus based)

4 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisite: a grade of "C" or better in MATH2202 and PHYS2211 or PHYS1211K.

This course is an introductory calculus-based course on electromagnetism, physical optics, and quantum physics. The student will be able to apply the concepts of electric field and electric potential to problems in electrostatics and with electric currents, describe the motion of charged particles in magnetic fields and induction, explain the origin of electromagnetic waves and properties of light, determine the behavior of light waves passing through single or multiple slits, and understand elementary principles of quantum physics.

Course content

PHYS 2212 is a calculus-based course on electromagnetism and related topics. Special relativity and its applications to electromagnetism will be discussed as well as introductory concepts of modern physics. Symbolic calculus, vector calculus, derivatives and integrals will be heavily used during the course. **Problem solving is emphasized. Homework is an integral part of the course.**

Students are expected to have good knowledge of integrals and series.

The course will cover electric forces and fields, electric flux and Gauss's law, electric potential, electric current, capacitors, direct current circuits, magnetic fields and flux, Biot-Savart and Ampere's laws, Faraday's law of induction, AC circuits, Maxwell's equations, electromagnetic waves, interference and diffraction, special relativity and its applications to electromagnetism. Concepts of modern physics will be covered, and Fundamental Forces of Nature will also be discussed.

Course material

The material is presented online by using PowerPoint combined with a virtual whiteboard. Videos will also be used when necessary.

Learning Outcomes

1. Solve problems of electrostatics, that include discrete and continuous charge distributions, using pictorial, graphical, physical, or mathematical representations (including calculus and vectors), and other representations as appropriate.
2. Solve problems of magnetostatic and induction using pictorial, graphical, physical, or mathematical representations (including calculus and vectors), and other representations as appropriate.
3. Analyze and solve DC and AC circuit problems using pictorial, graphical, physical, or mathematical representations (including calculus and phasors), and other representations as appropriate.
4. Describe the nature of electromagnetic waves and predict the behavior of light waves passing through single or multiple slits.
5. Identify and describe the basic ideas of special relativity and quantum theory and apply these principles to simple systems.

Instructions for the PHYS2212 online course

1. Lectures will be delivered online through the video conference tool "Collaborate Ultra" accessible through D2L. PowerPoint slides combined with a virtual whiteboard will be used.

How to connect to the online lecture through "Collaborate Ultra" in D2L

- All you need is a computer with good internet connection and with video and audio working.
- Go to D2L and select our course: Principles of Physics II (PHYS2212) XLS Spring 2021;
- On the Navigation Bar on top, select "Other", and from the dropdown menu select: "Collaborate Ultra". Click on it.
- In Collaborate Ultra, you will find the session PHYS2212 already in place. Click on it to enter.
- A menu on the right will pop up. Click on "join the session" to log in as a participant.
- Alternatively, you can use the link below:
<https://us.bbcollab.com/guest/bbe5787ecff44d5b94c726223a02aa3f>

You must enter your first and last name to join the session as a guest participant.

2. Homework will be assigned through the WebAssign on-line tool. Student must use the Class key: **kennesaw 4244 2052** to enroll in WebAssign and use WebAssign to hand in homework. Students must buy the license (and the textbook). Problem solutions will be posted every week on D2L in the "Announcement" section.
3. PHYS2212 tests and final exam will be posted on D2L in the "Assignments" section.
4. Students must be connected with their webcam turned on during all tests and final exam.
5. Students must upload a scanned version of their completed test/exam on D2L in the "Assignments" section. They must upload **one single file in PDF format**. Students are responsible for uploading the correct and readable PDF version of their test. Tests that are uploaded in the wrong format or are unreadable will be rejected and grade 0 will be assigned.

Online Resources to convert files in a PDF format:

<https://www.online-convert.com/>

Click on "Document Converter" and select PDF from the dropdown menu. It will ask you to upload your file. You can upload your document as JPEG, PNG, Doc, etc., It will be converted in PDF format. Once the conversion is done, you can download the file/s on your device (if you have many files, you can download all of them at once in a single compressed .zip file). I use this on a regular basis, and it works very well.

Useful free website to merge, split, compress PDF files: www.ilovepdf.com

Do's and Don'ts

1. You must study the assigned textbook chapters and other assigned readings **before** the lecture.
2. Regular lecture and breakout sessions attendance is essential for success in this class. If students miss a class, it is their responsibility to get the notes for missed lectures from another student.
3. Be on time for class.
4. **Cellular telephones, pagers, and similar devices must be turned off or placed in silent mode during lectures.** Use of cell phones should be restricted to emergencies.
5. **The usage of calculators able to take derivatives and integrals of functions (for example like TI-84 Plus) is strictly forbidden. This is considered cheating. You are allowed to use ONLY standard scientific calculators.**
6. **In class (virtual or F2F), avoid conversations and other disruptions that may distract other students during the lecture.** If you have questions or comments, direct it to the professor.
7. **Rude and disrespectful student behavior is not tolerated (administrative actions will be taken).**
8. Occasionally, it may be necessary for the instructor to make corrections, updates or changes to this syllabus. Corrections or changes to the syllabus will be announced on D2L and in class: **students are expected to check D2L for announcements at least once or twice a day.**

Grading policy

Three tests will be given during the semester.

Homework: 10%

Tests: 60% (3 tests, 20% each)

Final Exam: 30%

Grades: A >89.99%; B 79.99% - 89.99%; C 69.99%-79.99%; D 59.99%-69.99%; F <59.99%

Grading method used for Tests and Final Exam (Important)

Tests and exams are graded by assigning points for:

- Correctly identifying the physics of the problem;
- Setting up correctly all the equations and diagrams for the specific physics situation described in the problem, and commenting when necessary or relevant;
- Correctly identifying the all unknown variables to be determined;
- Correctly work out all the necessary symbolic and differential calculus-based operations;
- Correctly work out all the algebraic calculations to determine the solution.

For example:

- If you stick in only numbers to solve a problem, with no explanation, you will get 0 points.
- If you do not work out all the symbolic and vector calculations correctly (e.g., if you equate a vector to a scalar quantity) your equations will be considered incorrect/incomplete and you will not get credit.

D2L (Internet-based utility)

Course information, homework solutions and announcements will be available "D2L".

This on-line course information system is accessible from <http://d2l.kennesaw.edu/> .

To sign on, use your KSU Local Area Network (LAN) username and password.

Students are expected to check D2L for announcements at least once or twice a day.

Homework Assignments.

Homework assignments and homework grading will be done through the WebAssign on-line platform. Students should use the class key: **kennesaw 4244 2052** in order to enroll, access and submit their homework. Homework makes 10% of student's final grade.

Recitations/Breakout Sessions (Delivered in Face-to-Face modality)

Students are expected to attend recitations (aka breakout sessions) where they are expected to work on homework assignments. Homework solutions will be posted on D2L **after** the due date of the scheduled assignment. Attending recitations is critical to be successful in this course.

According to COVID-19 response, students must wear a mask in class and observe safe distancing. Failure to observe this safety measure will result in classroom access denied.

Important dates: withdrawal, last day of class, and final exam.

- First day of class: *Tuesday, January 12, 2021, 11:00AM.*
- Last day to withdraw without academic penalty: *March 15, 2021 at 11:45PM.*
- Last day of Class: *Thursday, April 29, 2021.*
- Final exam: *Tuesday, May 4, 2021, 10:30am - 12:30pm.*

(These dates are subject to change. Please check this again on the KSU Office of the Registrar website: <https://registrar.kennesaw.edu/dates-deadlines/final-exams-sp.php>)

IMPORTANT (for tests and final exam)

Students must always double check the quality of the PDF file they are sending. If the file is not readable, it will be difficult if not impossible to grade the exam. This will cause text/exam rejection. Students must double check the scanned files and the quality before uploading the exam.

The university's withdrawal policy is explained at:

<http://registrar.kennesaw.edu/student-records/registration-policy.php>

The Academic Standing Appeal policy is explained at:

https://appeals.kennesaw.edu/withdrawal_appeal.php

Students are solely responsible for managing their enrollment status in a class. Nonattendance does not constitute a withdrawal.

Tentative Schedule

Week 1

Electric Fields

Chapter 22: Sec. 22.1-22.6

Week 2

Continuous charge distributions and Gauss's Law

Chapter 23: Sec. 23.1-23.4

Week 3

Electric Potential

Chapter 24: Sec. 24.1-24.6

Week 4

Capacitance and Dielectrics

Chapter 25: Sec. 25.1-25.7

February 9 (Tuesday) TEST 1

Week 5

Current and Resistance

Chapter 26: Sec. 26.1-26.6

Direct-Current Circuits

Chapter 27: Sec. 27.1-27.4

Week 6

Magnetic Fields

Chapter 28: Sec. 28.1-28.6

Week 7
Sources of Magnetic Field
Chapter 29: Sec. 29.1-29.6

Week 8
Faraday's Law
Chapter 30: Sec. 30.1-30.6

Week 9
Inductance
Chapter 31: Sec. 31.1-31.6

March 4 (Thursday): TEST 2

March 15, 2021 at 11:45PM - Last day to withdraw without academic penalty.

Week 10
Alternating Current Circuits
Chapter 32: Sec. 32.1-32.7

Week 11
Electromagnetic waves
Chapter 33: Sec. 33.1-33.7

Week 12
Wave Optics
Chapter 36: Sec. 36.1-36.6

Diffraction Patterns and Polarization
Chapter 37: Sec. 37.1-37.6

Week 13
Relativity
Chapter 38: Sec. 38.1-38.8

March 08 – March 14 - No classes; Spring break

Week 14
Introduction to Quantum Physics
Chapter 39: Sec. 39.1-39.8

Week 15
Quantum Mechanics
Chapter 40: Sec. 40.1-40.7

Fundamental Interactions of Nature
Chapter 44: Sec. 44.1-44.11

April 22 (Thursday): TEST 3

April 26, 2021: Last Day to Withdraw for the Term With a WF

April 29, 2021: Last day of class (Highly recommended to attend)

Final Exam: Tuesday, *May 4, 2021, 10:30am - 12:30pm*. (Please check this again on the Office of the Registrar website: <https://registrar.kennesaw.edu/dates-deadlines/final-exams-sp.php>)

Exams/Tests Policy

Three tests will be given in this semester. Test dates are reported on this syllabus.

Tests and exams will be posted on D2L. Students must upload their completed test/exam on D2L in the "Assignments" section. They must upload **one single file in PDF format**. Students are responsible for uploading the correct and readable PDF version of their test. **Tests that are uploaded in the wrong format or are unreadable will be rejected and grade 0 will be assigned.**

The use of any mobile device that transmits a signal is not permitted during any of the exams. Students are strongly advised not to waste their time surfing on the internet, checking Chegg or Google to find problem solutions: these will not be found there. I will invent fresh new problems for each test/exam based on the homework and lecture material. Students must comply with the KSU Academic Integrity code of conduct.

Make-up Exam policy

Make-up exams will not be given. If you know ahead of time you have a conflict, let me know.

If you miss an exam because of an illness (yours, or of a family member) or some other unforeseeable event, contact me as soon as you can. You can e-mail me, or call the Physics Dep. Office at 470-570-4205. You must provide documentation showing the reason for missing the exam.

Final make-up exam is ONLY for documented and excused emergencies or for scheduling conflicts with other final exams.

Academic Integrity

Every KSU student is responsible for upholding the provisions of the [Student Code of Conduct](http://scai.kennesaw.edu/codes.php) (<http://scai.kennesaw.edu/codes.php>), as published in the Undergraduate and Graduate Catalogs. The Student Code of Conduct addresses the University's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to University materials, misrepresentation/falsification of University records or academic work, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the University, which include either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement.

Attendance & Participation

Students are expected to attend all lectures and recitations, take all tests and exams, and complete all homework assignments.

Students with Disabilities

Any student with a documented disability or medical condition needing academic accommodations of class-related activities or schedules must contact the instructor immediately. Written verification from the KSU Student Disability Services (<http://sds.kennesaw.edu/>) is required. No requirements exist that accommodations be made prior to completion of this approved University documentation. All discussions will remain confidential.

Other Policies

See the [Student Handbook](http://catalog.kennesaw.edu/) (<http://catalog.kennesaw.edu/>) for other policies.

Inclement Weather

For the official status of the university check the KSU website <http://www.kennesaw.edu>