Spring 2019 Physics 132 Section 002 CRN 44243

Professor
Dr. Jared Workman

Class Location
HH 106

Class Hours

11:00-11:50 MTWTh

Final

Wednesday, May 15th 10:00-11:50

Text Book

Physics For Scientists and Engineers, Foundations and Connections, Volume 2, Deborah Katz, Cengage

Course Website

http://org.coloradomesa.edu/~jworkman/teaching/spring19/132/index132.php
The syllabus will be posted here.

Welcome to Physics 132

The theory of electromagnetism was one of the great accomplishments of 19th century physics and, built on the general framework of Newton's Laws of mechanics, unified and explained a large range of phenomena associated with charged objects, currents and magnets. By the end of the century the theory had evolved to a compact and aesthetically pleasing form, which is still widely used. Electromagnetism is arguably the most important way of probing and learning about the physical world. Almost all modern scientific laboratories and the experiments conducted in them would be impossible to imagine without extensive use of electronic equipment. Much of what is learned in these circumstances hinges on understanding the electromagnetic interaction between the equipment and the physical system that is being observed. Electromagnetism has made possible much of the technology that is characteristic of the industrialized world: electric appliances, electronics, electric motors, power generation, computers, wireless communication, etc,. . . . One of the predictions of the theory of electromagnetism is the existence of electromagnetic waves, which offer a complete description of the classical properties of light. Optics is the study of the properties of light. Some, such as reflection, refraction and image production using lenses are readily apparent. However, optics has consistently yielded surprising phenomena, which often provide fundamental insights into the nature of the physical world. Phys 132 aims to introduce you to the phenomena of electricity and magnetism and optics and the theories which describe them as well as some of their practical applications.

What We Will Cover

1. Electric charge, fields, potentials and currents.
2. Electric circuits (capacitance and resistance).
3. Magnetic fields, interaction with currents.
4. Maxwell's equations, electromagnetic waves.
5. Light
6. Wave optics.
7. Geometric optics.

Here is CMU's course catalog description:

From the catalog…
Calculus-based introduction to classical electromagnetism and optics. Detailed coverage of electrostatics, electric circuits, magnetism, electromagnetic waves, geometrical optics and wave optics. The mathematics of calculus and vectors is used throughout. For majors in the sciences and engineering. Requires a mastery of the foundations of classical mechanics as covered in PHYS 131. Prerequisites: PHYS 131/131L, and MATH 152 or MATH 136 (either may be taken concurrently). A grade of C or higher in PHYS 131/131L is required.

Prerequisites: PHYS 131, 131L.

Physics can be a very daunting subject when first encountered, the notions can appear strange and different students learn in different ways. If you do not understand something please come by and ask me for more help. You are also encouraged to work with you peers. You are not allowed to use solution manuals.

What to look for in this syllabus

- How to contact me
- Evaluation (grades)
- Late or missed work/exams
- Homework
- Exams
- Resources for student assistance
- Student Conduct
- Important Dates
- Student Learning Outcomes, Essential Learning Outcomes, Program Level Outcomes
- Work load expectations
- Guaranteed Transfer

How to Contact Your Instructor

Visit my office: WS 230C
Office Hours: Mon/Wed 10:00-11:00, Tue/Thu 1:00–2:00, & Fri 12:00-1:00

Email me at: jworkman@coloradomesa.edu

Evaluation

Homework 20%
Exams 60%
Final Exam 20%

Grading

Grades will be assigned as follows:

Excellent	A	> 90%
Good	B	80%-90%
Average	C	70%-80%
Deficient	D	60%-70%
Failing	F	< 60%

A curve **may be used** at the end of the semester. I can be contacted at any time to give you an update of your current grade.

Late or Missed Work/Exams

Late Work is not accepted. Missed exams will be automatically assigned a grade of zero. I can be contacted PRIOR to an assignment/exam date if flexibility is needed however any missed work will require documentation to be excused.

Homework

Homework will be assigned on the course website. Homework is expected on the day it is assigned for and at the beginning of class on that day, late homework will receive a zero grade. Late means anything after the beginning of class on the due date. If you come in late, I reserve the right not to accept your homework.

Students are encouraged to re-work incorrect homework problems. Homework will be collected randomly at the professor's discretion. I generally only scan to see if effort has been made. I routinely put homework problems and text book examples on the exams. If you are copying answers from solutions you will be unlikely to pass this course.

Homework is 20% of your grade. BE AWARE – I will disenroll students whose homework grade falls below a 60 percent for 2 consecutive weeks. If you don't intend to pass, don't intend to remain in the course. I may or may not give you a warning via email prior to disenrolling you.

The homework assigned is the minimum required to master this subject and I encourage you to work additional problems.

Be aware

- Failing to staple a homework assignment results in a 10% penalty for that assignment
- Failure to use units results in an additional 15% penalty
- problems must be worked out forgoing numbers (when possible) until the last step. Starting with numbers may result in in the problem not being graded
- This is true for tests as well, only problems worked symbolically until the last step will be graded.
- Make SURE you understand all the examples in each chapter.
- The assigned homework is the minimum required, do more if you are doing poorly in the class.
- Copying solutions is pointless, you will fail the tests if you do so.

Exams

There will be 3 exams (probably three) and a final.

I reserve the right to disenroll you from the course if you fail the first exam, if you fail 2 exams you will be assigned a grade of F for the course and I will not grade any of your future exams.

The non-final exams will be non-cumulative.

If you miss an exam you probably have failed the course.

The final exam will be cumulative and not droppable.

Exams may not be missed although if you contact me before hand I will try to accommodate you in re-scheduling them for family emergencies or experiences beyond your control. Exam dates will be announced in class. All missed exams not excused by the professor will receive a grade of zero and the rules for units and problem solving will be the same as for homework.

No smartphones, tablets, laptops, etc.

If you miss class the onus is on you to find out what the exam dates are.

I will not be supplying study guides.

You are expected to know all the topics covered in each section. You are EXPECTED TO READ THE BOOK. This statement seems self evident to me but apparently is not obvious. Make sure you can follow through and understand every example in every chapter we cover. Failure to do so will likely result in a poor grade.

Resources for Students

Your instructor: I am here to help you learn; please let me know if you are having trouble with anything! My contact information is at the top of the syllabus, or you can talk to me after class or during my office hours.

The Course Website: Contains all class information and several helpful (and some just fun) links.

Tutorial Learning Center: HH113 http://www.coloradomesa.edu/tutoring/index.html

Students With Disabilities: Students with disabilities have certain privileges extended to them including but not limited to extended exam time. It is your responsibility to contact the EAS (Educational Access Services) At Houston Hall, Room 108, 1-970.248.1856 http://www.coloradomesa.edu/eas/links.html and bring me the necessary forms for any special dispensations received.

Class Policies

All students expected to follow the Student Code of Conduct. Violations of the Student Code of Conduct may result in disciplinary action. The code of conduct is here here http://www.coloradomesa.edu/academics/policies/academic_integrity.html. Some specific items that are important in this class are:

1. Don't call me mister, it's Dr. Workman.
2. Create and sustain a respectful and quiet learning environment. Allow your fellow students to learn and the instructor to teach. Disrespectful, disruptive or abusive behavior toward an individual or group is unacceptable. If you are disruptive to your classmates or to me, I will dis-enroll you from the course.
3. Due to the rapid pace of this course, late work is generally not accepted. In the event of illness, family emergency or other special circumstances, you must contact me BEFORE the deadline to make arrangements for late work or early tests. At the instructor's discretion, you may then turn in the work within 1 week of the deadline.
4. I encourage participation, ask questions, email me, ask for reading material for your own edification after the course is over, provide me with feedback. I am not directly grading you on participation but it will play a factor in the end of the semester grade. This is an interesting topic and I want you to be involved in learning it.
5. Turn off your cell phone.
6. No smart phones, ipads, earphones, etc during class time, no texting or web browsing. You all get one freebie phone ring then I may ask you to leave. I reserve the right to temporarily or permanently remove a student for the continued disruptive use of electronic equipment.
7. Laptops are fine for note taking but please do not web surf during class. If I find you surfing the web you forfeit your laptop privileges. Students using laptops are required to sit at the front of the class.
8. I will turn any students I find cheating, copying each other's work, or plagiarizing material over to the department chair, no exceptions. If you are unsure if something is prohibited, ask me. You are encouraged to work together but please do not hand in identical assignments, they will not be accepted.

9. Please arrive to class on time and wait until class is over to leave. I will remove students who regularly arrive late from the course.
10. It is your responsibility to learn of any missed work.
11. Don't talk during class, raise your hand whenever you want to but don't talk. I reserve the right to remove you from the class for the day or completely dis-enroll you from the course for talking during lecture.
12. I do not answer emails where the information can be found on the course website or in this syllabus.

Important dates:
http://www.coloradomesa.edu/registrar/dates.html

Disclaimer: The instructor reserves the right to modify this syllabus and schedule.

Student Learning Outcomes

The learning outcomes for this course are as follows. A student who has taken this course will demonstrate the ability to:

1. Translate between verbal and mathematical descriptions of physical situations. Apply mathematical reasoning, using algebra, trigonometry and calculus, to analyze these situations.
2. Articulate the arguments, verbal and mathematical, used to analyze physical situations.
3. Represent physical processes graphically and describe given graphical representations in physical terms.
4. Use calculus to describe and analyze physical situations.
5. Use the mathematics of vectors, vector algebra, products of vectors and vector components to analyze physical situations.
6. Distinguish between and relate electric charge, forces, fields, potentials and currents.
7. Distinguish between and relate magnetic forces and fields.
8. Determine and use electric fields, electric potentials, electric forces, electrostatic energy, magnetic fields and magnetic forces in various physical situations.
9. Describe and use basic concepts associated with waves and superpositions of waves.
10. Use the geometrical picture of light to describe the properties of and propagation of light in various physical situations.
11. Use the wave picture of light to describe the properties of and propagation of light in various physical situations, including interference and diffraction phenomena.

Essential Learning Outcomes

This course is part of CMU's essential learning curriculum and satisfies the following essential learning outcomes:

1. Demonstrate investigative and analytical thinking skills to solve problems.

2. Select and use appropriate information in an academic project.

Program Learning Outcomes

This course contributes to the fulfillment of the following program learning outcomes for the BS in Physics degree. A student will have demonstrated the ability to:

1. Show fluency with the major fields of physics (classical mechanics, electromagnetism, statistical physics and quantum theory).

2. Use mathematical representations to analyze physical scenarios.

Work Load Expectations:

An undergraduate student should expect to spend on this course a **minimum** of two hours outside the classroom for every hour in the classroom. The outside hours may vary depending on the number of credit hours or type of course. More details are available from the faculty member or department office and in CMU's Curriculum Policies and Procedures Manual. In reality I'd expect you will spend 10-15 hours a week on this particular class if you expect a decent grade.

Disclaimer:

The instructor reserves the right to modify the schedule and syllabus. It is tentative based on class progress.

Guaranteed Transfer

The Colorado Commission on Higher Education has approved [Phys 132] for inclusion in the Guaranteed Transfer (GT) Pathways program in the GTSC1 category. For transferring students, successful completion with a minimum C- grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/Academics/Transfers/gtPathways/curriculum.html.

Content Criteria:

This course should provide students with the opportunity to / Students should be able to:

a) Develop foundational knowledge in specific field(s) of science.
b) Develop an understanding of the nature and process of science.
c) Demonstrate the ability to use scientific methodologies.
d) Examine quantitative approaches to study natural phenomena.

The laboratory (either a combined lecture and laboratory, or a separate laboratory tied to a science lecture course) content of a GT Pathways science course (GT-SC1): Students should be able to:

a) Perform hands-on activities with demonstration and simulation components playing a secondary role.
b) Engage in inquiry-based activities.
c) Demonstrate the ability to use the scientific method.
d) Obtain and interpret data, and communicate the results of inquiry.
e) Demonstrate proper technique and safe practices.

Student Learning Outcomes:

Inquiry and Analysis Competency

Inquiry is a systematic process of exploring issues/objects/works through the collection and analysis of evidence that results in informed conclusions.

Student Learning Outcomes (SLOs): Students should be able to:

1. Select or Develop a Design Process

    a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.

2. Analyze or Interpret Evidence

a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
b. Utilize multiple representations to interpret the data.

3. Draw Conclusions

    a. State a conclusion based on findings.

Quantitative Literacy Competency

Competency in quantitative literacy represents a student's ability to use quantifiable information and mathematical analysis to make connections and draw conclusions. Students with strong quantitative literacy skills understand and can create sophisticated arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc.).

Student Learning Outcomes (SLOs): Students should be able to:

1. Interpret Information

    a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).

2. Represent information

    a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).