PHYS 031A: Physics for Engineers I. Fall 2021

Section A
Credits: 4
Meeting Times:
MWF, 2:20 - 3:10 pm
R, 11:40 am - 12:55 pm

Instructor:
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Office Hours: Thursday, 9:00-11:00 am or by appointment
(Option: come in person, or meet on MS Teams)
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Course Description: This course is designed to provide students of engineering at UVM with a strong foundation in the fundamentals of physics. In this first semester, we will cover topics including the kinematics of motion, forces, work, energy, momentum, rotational motion, harmonic motion, and waves. While many students may have seen these topics in previous physics courses, successful completion of PHYS 031 should provide the level of understanding and communication required to teach the topics to others. Laboratory types of exercises will be incorporated into the day to day activities. **Safety is a priority. During any class activity, negligent or deliberate misuses of the equipment will not be tolerated and may result in an F for the assignment or the entire course.** Also, please obey the current COVID-19 policies in the classroom.

Active Learning Classroom: This course will rely on a flipped-classroom model where **students are required to read the assigned text before class, and complete scheduled reading quizzes as we move into each new chapter.** You will be required to complete online reading quizzes on Mastering Physics, which are due before we begin covering content from each chapter in class. Nearly all of your class time will be spent in small-group activities, including demonstrations, problem solving, tutorials, labs, and exploring conceptual details. **You will be graded for all in-class activities.** In-class activities will typically be graded based on a 80% participation and 20% correct answer weighting, or 100% participation for questions where all answers would be considered correct. Attendance is therefore very important, but illnesses and unexpected events often lead to absences. Three days of missed class activity will therefore be excused, but additional absences cannot be made up. Because the course is centered on small-group activities, you are expected to prepare for each day's activities in advance and to attend and actively participate on a daily basis. **Be aware that this class will require significant time commitment outside the scheduled meeting times.**

Prerequisite: MATH 021 or MATH 23.

Learning Objectives: Upon completion of this course, the student will be able to: 1) Apply physical principles and reasoning to draw conclusions based on given information. 2) To experimentally gather information (data) to draw conclusions when necessary information is not given. 3) To use written and oral expression to support the conclusions using a combination of verbal, mathematical, and graphical communication as needed. 4) Identify gaps in knowledge and understand how to secure the needed information or concepts. These goals will be accomplished within the context of the physics concepts covered in this course.

Required Course Materials: e-Text version of *Physics for Scientists and Engineers: A Strategic Approach, Vol. 1*, 4th Edition, by Randall D. Knight. Includes access to Mastering Physics and Learning Catalytics. ISBN: 9780134110561

This course requires access to a the e-textbook *Physics for Scientists and Engineers: A Strategic Approach, Vol. 1*, and access to the Pearson online services Mastering Physics and Learning Catalytics, which are all under one ISBN. The first time you log into MasteringPhysics and enter your registration information, you should join our course: **(Class ID: sanders58923)** and follow the directions for joining this section, you will need to provide your UVM netID. The required material may be purchased either through the UVM bookstore or directly in Mastering Physics once you have created an account and joined our course.

Laptop or Tablet required:

This course requires a laptop or tablet with wifi and bluetooth capability, and preferably a USB port. You will be required to log into MasteringPhysics and Learning Catalytics during class times. You will also need to access the wifi, bluetooth, and/or USB enabled laboratory equipment.

Online Communication Resources:

All students must have reliable access to the University of Vermont Blackboard course website. (bb.uvm.edu) This access requires internet connection, which is free of charge for all UVM students while on campus. You will need your UVM net ID and password to log into the Blackboard system. All supplementary course materials, course updates and announcements will be made via the Blackboard system. **It is the student's responsibility to check UVM email and Blackboard course website for updates at least once a day!**

Attendance & Class Expectations:

Students are expected to attend the class meetings at the scheduled times, and to actively participate in the daily activities. Discussion of the information and concepts is a key element of the course. You are expected to ask questions, express reasoning, and request clarification within your group discussions and through interactions with the course instructors.

Homework:

Homework will be due each Sunday by 11:59 PM, to be completed on Mastering Physics. The logical development of the theory and the problem solving depend heavily on what has come before. For this reason, it is imperative that you keep current; don't fall behind. A follow-up assignment will be granted to allow opportunities to make up missed points, due a few days after the original assignment and only available if the original score was below 90% of the total. Homework assignments will be completed on Mastering Physics, but it is strongly advised that each student keep organized detailed solutions. Preparing these solutions will help in studying for the exam and for working in groups on the homework.

Exams:

There will be three mid-term exams and one final exam. All of these will be paper exams. For each exam, students will work individually to answer the exam questions, i.e. you are not allowed to consult members or your group or anyone else. You will be allowed to prepare an 8.5" x 11" sheet of paper (both sides, if you need) with formulas and other reference material, but this reference sheet, and a calculator are the only materials you will be able to use during exams. The mid-term exams will cover the most recent material preceding the exam, and the final will be cumulative with an emphasis on the content covered during the last three weeks of the semester. Using external resources (including online cheating services) is surprisingly easy to catch on physics exams, is considered a violation of the Code of Academic Integrity, and will result in failing the course.

- Midterm 1 will be on Wed. Sept. 22
- Midterm 2 will be on Wed. Oct. 13
- Midterm 3 will be on Wed. Nov. 10
- Final Exam will be on Mon. Dec. 13, 16:30 - 19:15.

Course Grades:

Each student will receive a total grade based on the grades of the exams, homework, in-class labs and activities, and reading preparation. The individual components will be scaled and converted to letter grades according to:

Midterm Exams	15% (5% each)	A	=	90 - 100%
Final Exam	10%	B	=	80 - 89.9%
In-Class Activities	50%	C	=	70 - 79.9%
Homework	20%	D	=	60 - 69.9%
Reading quizzes	5%	F	=	59.9% or below

Within each letter grade, the + and - will indicate above and below the corresponding 7% and 3%. For example, grades above 77% but below 80% will receive a C+. All grades will be posted on Blackboard to ensure privacy. It is each student's responsibility to verify the accuracy of the postings regularly. **Report any discrepancies promptly.**

Academic Dishonesty Disclosure:
Academic dishonesty **will not be tolerated.** Perceived failures to abide by the standards of academic integrity will be prosecuted as set forth in the University of Vermont Code of Academic Integrity. The code states the four standards of academic integrity: that students may not plagiarize, fabricate, collude, or cheat. Note that there is a great but subtle difference between collusion and collaboration. Collaboration is one of the greatest tools for learning and creativity in science, and is highly encouraged. This will help you to expand your perspective and your arsenal of problem solving techniques.

Disability Services:
In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus. ACCESS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan. Due to the format of the exams, if extra time is needed you are strongly encouraged to discuss your options with the course instructor as soon as possible. Contact ACCESS: A170 Living/Learning Center; 802-656-7753; access@uvm.edu; or www.uvm.edu/access.

Course Evaluation:
All students are expected to complete an evaluation of the course at its conclusion. The evaluations will be anonymous and confidential, and the information gained, including constructive criticisms, will be used to improve the course.

Course Schedule:
Reading Assignment, Quiz and Homework deadlines for the entire semester are posted on the MasteringPhysics site for this course.