

# PHYS 031: Physics for Engineers I. Spring 2023



## Section C

Credits: 4

Class Times: (In Innovation Hall E330)

MWF, 10:50 - 11:40

T, 11:40 - 12:55

Evening Exams: (In Given E E131 [Carpenter Auditorium])

W, 18:40-19:30 (only on Feb. 8<sup>th</sup>, Mar. 8<sup>th</sup>, and Apr. 12<sup>th</sup>)



## Instructor:

Malcolm Sanders

E-mail: malcolm.sanders@uvm.edu

Office: E203B Innovation Hall

Office Hours: MW, 1:00 p.m. – 2:00 p.m.

or by appointment

Phone: (802) 656-0050

Mastering Physics Code for Section: sanders22662

**Course Description:** This course is designed to provide engineering students 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. There will be four classroom meetings per week on Monday, Tuesday, Wednesday, and Friday (times listed above) in Innovation Hall E330. This is a laboratory science class and lab activities are integrated into the daily 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.**

**Pedagogy:** 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 earn credit for participation in all in-class activities.** You are expected to engage in productive discussion of the physics topics with your group during our class sessions, but are not expected to complete all of the in-class activities or to get every answer “correct”. Many of the questions are designed to help us identify misconceptions, and certain groups will benefit far more from an in-depth discussion of the first question than a rushed completion of all questions. 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, though we will strive for maximum flexibility for absences associated with the COVID-19 pandemic. 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*, 5<sup>th</sup> Edition, by Randall D. Knight. Includes access to Mastering Physics and Learning Catalytics. ISBN: 0137319495.

This course requires access to the e-textbook *Physics for Scientists and Engineers: A Strategic Approach*, and access to the Pearson online services Mastering Physics and Learning Catalytics, which are all under one ISBN. The first time you log into Mastering Physics and enter your registration information, you should join our course: **sanders22662** and follow the directions for joining this section, you will need to provide your UVM netID and enter your name (first and last) **exactly as they appear in our course Blackboard roster**. The required material may be purchased directly in Mastering Physics once you have created an account and joined our course. Detailed instructions as to how to register and purchase access may be found on our course Blackboard site under Course Materials, “Mastering Physics Student Registration Instructions”.

### **Computer Required:**

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

### **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. Your grade for daily work will be based both on participation (~70%) and correctly answering the questions (~30%).

### **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 regularly!**

## Homework:

Homework will be due each Sunday by 11:59 PM (or 24 hours later in case of a Monday holiday), 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. Late homework may be completed in the days following the due date, with maximum credit reduced by 20% each day following the due date with the reduced credit only for the questions answered late. 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. The exams will have two equally-weighted components, a group component where each group submits one answer sheet, and an individual component. One sheet of hand-written notes and a calculator are allowed as resources. The mid-term exams will cover the most recent material preceding the exam with group component during our class session in E330 and the individual component will take place in Given E E131 (Carpenter Auditorium) during our evening exam time. 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. Feb. 8
- Midterm 2 will be on Wed. Mar. 8
- Midterm 3 will be on Wed. Apr. 12
- Final Exam will be on Friday, May 12th, 7:30 a.m. - 10:15 a.m., ML SCI 235.

## 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	30% (10% each)	A =	90 - 100%
Final Exam	15%	B =	80 - 89.9%
In-Class Activities	30%	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.

### **Student Learning Accommodations:**

In keeping with University policy, any student with a documented disability interested in utilizing ADA accommodations should contact Student Accessibility Services (SAS), the office of Disability Services on campus. SAS 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 SAS:

A170 Living/Learning Center

802-656-7753

access@uvm.edu

uvm.edu/access.

### **Religious Holidays:**

Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time. The complete policy is here.

### **Discrimination:**

The University of Vermont, including its Schools and Colleges, seeks to maintain a safe learning, living, and working environment. To that end, the University of Vermont strictly prohibits discrimination against, and harassment of, its students, employees, and affiliates on the basis of an individual's membership in a legally protected category as defined in the University's Equal Opportunity in Educational Programs and Activities and Equal Employment Opportunity/Affirmative Action Policies. Any act that falls within the definition of Sexual Misconduct constitutes discrimination or harassment and is a violation of this Policy. Furthermore, the University strictly prohibits retaliation. For more information and resources, please refer to the University's discrimination policy.

### **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:**

A detailed schedule of readings, quizzes, and assignments is available on the course Mastering Physics site.