PHYS 103: Fundamental Physics I
Syllabus - Fall 2021

Location: Miller Hall 012
Instructor: Dr. Daniel Hickox-Young
Office Hours: MWF 11:00-12:00; T 10:00-11:30
Also available via Zoom as needed

Time: MWF 09:40 – 10:40
E-mail: hickoxyoung@roanoke.edu
Office: Trexler 266B
Phone: (540) 375-4975

Masks: The College has issued a mask mandate for the start of the semester that requires masks to be worn in indoor common spaces such as our classroom. You must wear a mask in this class. If you arrive without a mask, you will not be allowed to stay and may lose credit for attendance or in-class work. The Bookstore sells masks if you need to make a quick purchase. If the mandate is extended, you will be required to continue to wear a mask.

Office Hours: Office hours will be held in-person in Trexler 266B. If you are unavailable during office hours, feel free to stop by any time my door is open. I'm also happy to meet by appointment via zoom using the link provided below (also linked on Inquire) if you prefer.
https://roanoke-edu.zoom.us/my/hickoxyoung
Meeting ID: 848 844 3643
No Passcode is required.

Course textbook: James S. Walker, *Physics*, 5th ed., Pearson, 2016
ISBN-10: 0321976444
ISBN-13: 9780321976444
Regular homework problems will be mainly assigned from the textbook. There is no required reading for this class, but the textbook is a valuable resource and it is highly recommended that you read the sections associated with each lesson before class.

Prerequisites: None

Other required materials: You will need a writing utensil and paper as well as a working scientific calculator for class sessions, assignments, and exams. You will also need a bound notebook with graph paper pages for the lab section of this class (see the lab syllabus for more details).

Course Description: This algebra-based course is the first part of the two-semester introductory physics sequence. During the fall semester, it introduces fundamental physical principles covering topics in classical mechanics, waves, solids and fluids, and thermodynamics.

Learning Outcomes: Upon successful completion of the course, students will be able to:
- Identify relevant physical principles which underlie the dynamics of real-world situations
- Manipulate units in order to relate physical models to observations of the physical world
- Construct organized physical analyses that demonstrate logically connected steps of thought
- Synthesize numerical information, physical assumptions, and scientific reasoning to describe physical systems

- Assess the validity and utility of a physical model in new contexts

Required Laboratory Course: You must be enrolled in the laboratory portion *PHYS 103L* of this course. Although PHYS 103L operates as a separate course, it counts as 25% of the course grade for PHYS 103. Please refer to the lab course syllabus for important information about the lab specifics and final grade. Note that if any lab experiment is not completed by the end of the semester, your course grade will be reduced by one whole letter grade. Lab does not meet during the first week of classes.

Lecture Periods: The lecture will cover topics outlined in the course schedule and will involve a mixture of traditional lecture, demonstrations, sample problems (worked both individually and in groups), and other activities designed to underscore the connection between course concepts and the physical world. Any question is welcomed in class at any point!

Attendance Policy: If you have a temperature of 100.4 or higher or other COVID symptoms, don't come to class. Call Health Services IMMEDIATELY. Do not come to class or go to any public area on campus. In order for your absence to be excused, you must give Health Services permission to notify me that you have consulted them about COVID symptoms. If Health Services informs you that you should isolate and not attend class for multiple days, inform me so that we can make a plan to keep you current in the course. All absences caused by consultation with Health Services about coronavirus symptoms or isolation ordered by Health Services will be excused but you will need to do the work and graded assignments even if we extend a deadline for you.

Formal attendance will not be taken in this class. However, I will be assessing your participation in the course based on your engagement with a variety of activities which will take place during class. You are fully responsible for the material that was covered and for any announcements made during class meetings. As with problem sets (details below), in order to receive participation credit for a class you have to be absent for, you must discuss the details with me either in person or via email at least 24 hours in advance.

Homework: Problem sets will be regularly assigned, divided into two parts: (1) Problems from the textbook, which are graded for completion but not for accuracy and (2) A "Challenge Problem" which is graded for accuracy. Problem sets will be announced one week before they are due and will generally be collected in class on Fridays, unless otherwise announced. Homework solutions will be posted on Inquire by the afternoon on the day they are due and graded work will be available to be picked up in-class or in my office.

Because solutions will be posted the same day, no late submissions will be allowed unless an extension is discussed and an alternative challenge problem is determined beforehand.

Exams: There will be four one-hour mid-term exams and a non-comprehensive final exam, with their dates specified in the course schedule. Exam make-up for excused reasons (family or medical emergencies, and university-recognized commitments) must be discussed and arranged with me at least one week in advance, unless it is an emergency. If your missed exam is unexcused, you will receive a zero on that exam. To limit your time commitment to this class,

exams will be held in class. If you receive academic accommodations or you cannot make it to class that day, you can complete the test at a different time, but please communicate this with me ahead of time. Exams are open-book and open-notes, see more below in the Academic Integrity section.
The lowest mid-term exam grade will be dropped.

Grading: Class grades will be calculated according to the following distribution

- Lab 25%
- Participation 5%
- Homework 30%
- Three Mid-term Exams 10% each (i.e. the 3 highest-scoring mid-term exams)
- Final Exam 10%

Furthermore, letter grades will be assigned at the end of the semester according to the following scale

A-	90-92	A	93-100		
B-	80-82	B	83- 86	B+	87-89
C-	70-72	C	73- 76	C+	77-79
D-	60-62	D	63- 66	D+	67-69
F	<60				

You should expect to spend at least 12 hours inside and outside of class each week on this course.

MCSP Conversation Series/Extra Credit: You are required to attend ONE talk in the MCSP Conversation Series which (schedule available at https://www.roanoke.edu/inside/a-z_index/math_cs_and_physics/conversation_series/fall_2021) and submit a well-written reflection on the talk within one week of the presentation. The submission must present a brief summary of the key ideas of the talk and include a description of the parts of the presentation that were interesting, confusing, and relevant to this course. Your work must be grammatically-correct, typed, double-spaced, and approximately one page in length. Note that a simple summary of the talk is not sufficient to receive credit.
Your reflection on the MCSP talk will contribute to your participation grade. For extra-credit, you may attend additional MCSP talks during the semester, and the submitted reflection(s) will contribute to your overall grade.

Use of Electronic Devices: Laptops or tablets may be used for note-taking during regular class sessions, if this seems useful to you. Scientific calculators can also be used during class when needed and during exams. The use of laptops or any other electronic device (other than a calculator) during an exam is strictly prohibited. While in class, your phones must be on silent mode and out of reach to limit distractions and must be turned off during exams. Any use of such devices during an exam will be considered a breach of academic integrity.

Subject Tutoring: located on the lower level of Fintel Library (Room 5), is open 4-9 PM, Sunday-Thursday. Subject Tutors are highly trained, current students who offer free, one-on-one (and small group) tutorials in over 80 courses taught at Roanoke College, including: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Check out all available subjects and schedule 30- or 60-minute appointments at

www.roanoke.edu/tutoring. If you have a question, feel free to stop by, or contact us at subject_tutoring@roanoke.edu or 540-375-2590. See you soon!

Accessible Education Services (AES): located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Becky Harman, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Becky Harman at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Academic Integrity: Your learning and integrity are at the core of your RC education. For this reason, you must follow the rules outline in the College's AI policies. See https://www.roanoke.edu/inside/a-z_index/academic_affairs/academic_integrity. Collaboration is an important skill that you will be asked to develop in class and in lab, and I would encourage you to extend this practice beyond the classroom as you work on problem sets. However, for the challenge problem in particular, the final write-up should reflect your own understanding of the problem and I ask that you include the names of anyone you collaborated with when you turn in your problem set.

Exams are open-book and open-notes, i.e. only this course textbook and your class notes are permitted. Electronic devices (other than calculators) are NOT permitted during exams. If you choose to take notes electronically, I would ask that you print out your notes ahead of time. Exams in this class are an individual assessment tool, and so communication between students regarding exam content is prohibited until all students have completed the exam.

If I become aware of a possible violation of these guidelines, I am contractually obligated to report it to the Academic Integrity committee. The AI policy can be found online at: https://www.roanoke.edu/inside/a-z_index/academic_affairs/academic_integrity/resources_for_students

Class Environment: I consider this classroom to be a place where we will treat one another with respect, creating an environment that welcomes individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

PHYS 103: Fundamental Physics I, Fall 2020- Daily Schedule

The following schedule outlines the tentative timeline for the covered topics and exam dates:

Day	***Chapter***	***Sections***	***Topic***
01 Sep	1	1.1-1.8	Introductions + brief lecture
03 Sep	2	2.1-2.7	One-Dimensional Kinematics
06 Sep			
08 Sep	3	3.1-3.6	Vectors in Physics
10 Sep			
13 Sep	4	4.1-4.5	Two-Dimensional Kinematics
15 Sep			
17 Sep	5	5.1-5.7	Newton's Laws of Motion
20 Sep			
22 Sep	***Test 1: Chapters 2-4***		
24 Sep	6	6.1-6.3, 6.5	Applications of Newton's Laws
27 Sep			
29 Sep	7	7.1-7.2, 7.4	Work and Kinetic Energy
01 Oct			
04 Oct	8	8.1-8.4	Potential Energy and Conservation of Energy
06 Oct			
08 Oct	9	9.1-9.7	Linear Momentum and Collisions
11 Oct			
13 Oct	***Test 2: Chapters 5-8***		
15 Oct	10	10.1-10.6	Rotational Kinematics and Energy
FALL BREAK			
25 Oct			
27 Oct	11	11.1-11.3, 11.6-11.7	Rotational Dynamics and Equilibrium
29 Oct			
01 Nov	13	13.1-13.2, 13.4-13.6	Oscillations about Equilibrium
03 Nov			
05 Nov	***Test 3: Chapters 9-11***		
08 Nov	14	14.1-14.2, 14.4-14.8	Waves and Sounds
10 Nov			
12 Nov	15	15.1-15.8	Fluids
15 Nov			
17 Nov			
19 Nov	16	16.1-16.5	Temperature and Heat
22 Nov	***Test 4: Chapters 13-15***		
THANKSGIVING BREAK			
29 Nov			
01 Dec	17	17.1-17.3, 17.5-17.6	Ideal Gases and Kinetic Theory
03 Dec			
06 Dec	18	18.1-18.5, 18.8-18.9	The Laws of Thermodynamics
08 Dec			
10 Dec			
15 Dec	***08:30-11:30***	***Final Exam: Chapters 16-18***	