PHYS 103: Fundamental Physics I
Syllabus - Fall 2021

Location: Trout 207
Instructor: Dr. Daniel Hickox-Young
Office Hours: MW 2:30-4:00PM
Or use Calendly to schedule
(https://calendly.com/hickoxyoung)

Time: MWF 09:40-10:40AM
E-mail: hickoxyoung@roanoke.edu
Phone: (540) 375-4975
Office: Trexler 266A
Also available via Zoom as needed

Masks: The College does not currently have a mask mandate in place, and I will not be requiring masks in our classroom. However, COVID-19 transmission rates remain high in our community, and anyone is welcome to wear a mask if they choose. You may see me wearing a mask, depending on local transmission rates and whether I've been traveling or under the weather recently.

Office Hours: You are always welcome to stop by my office. Talking about physics with students is one of my favorite things. You are guaranteed to find me in my office during office hours (unless otherwise announced). If you'd like to make sure I'm available outside of office hours, you can schedule an appointment with Calendly (https://calendly.com/hickoxyoung). I am happy to meet in my office (Trexler 266B) or via the Zoom link below, as you prefer. If you need to meet outside of traditional business hours (i.e. after 5pm) send me an email and we can find a time to meet via Zoom. 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 and readings will be assigned from the textbook. 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, please discuss the details with me either in person or via email at least 24 hours in advance.

Homework: Homework assignments will be regularly assigned, falling into two categories: (1) Textbook Problems, which are graded for completion but not for accuracy. Textbook problems will be assigned after each class, so that you can have regular practice applying concepts from class. Learning physics is a bit like learning another language, it's hard to improve without practicing the fundamentals.
(2) A Critical Thinking Problem (CTP) which is graded for accuracy. One multi-part CTP will be assigned per week. 50% of your homework grade is derived from completing the textbook problems, while the other 50% comes from your grade on the CTPs.

Homework assignments are due in physical format at the beginning of class. Late homework assignments will only receive credit if discussed and approved prior to the beginning of class (with exceptions under extenuating circumstances, i.e. illness, family emergency, etc.).

Exams: There will be four one-hour mid-term exams and a 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/az_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 grammaticallycorrect, 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: Electronic devices are valuable tools, therefore my general policy is to allow the use of electronic devices in the classroom. Laptops or tablets may be used for notetaking during regular class sessions if this seems useful to you or even during exams if you

need access to an electronic version of the textbook. Scientific calculators may be used during class when needed and during exams.

However, I expect your phones to be on silent mode and out of reach at all times, and I expect that any electronic devices will not be used to browse the internet or communicate with anyone inside or outside of class. A violation of this policy during an exam will be considered violation of Roanoke College's Academic Integrity policy, and I reserve the right to limit the use of electronic devices in the classroom if I feel this policy is being abused.

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 CTP 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. All materials for this course may be consulted during an exam. This includes uploaded lectures and online versions of the textbook. Any electronic devices used during the exam should NOT be used to browse the internet. 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 early in the semester so that I may make appropriate changes to my records.

PHYS 103: Fundamental Physics I, Fall 2022 Daily Schedule

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

Day	***Chapter***	***Sections***	***Topic***
31 Aug	1	1.1-1.8	Introductions + brief lecture
02 Sep	2	2.1-2.7	One-Dimensional Kinematics
05 Sep			
07 Sep	3	3.1-3.6	Vectors in Physics
09 Sep			
12 Sep	4	4.1-4.5	Two-Dimensional Kinematics
14 Sep			
16 Sep	5	5.1-5.7	Newton's Laws of Motion
19 Sep			
21 Sep	***Test 1: Chapters 2-4***		
23 Sep	6	6.1-6.3, 6.5	Applications of Newton's Laws
26 Sep			
28 Sep	7	7.1-7.2, 7.4	Work and Kinetic Energy
30 Sep			
03 Oct	8	8.1-8.4	Potential Energy and Conservation of Energy
05 Oct			
07 Oct	9	9.1-9.7	Linear Momentum and Collisions
10 Oct			
12 Oct	***Test 2: Chapters 5-8***		
14 Oct	10	10.1-10.6	Rotational Kinematics and Energy
FALL BREAK			
24 Oct			
26 Oct	11	11.1-11.3, 11.6-11.7	Rotational Dynamics and Equilibrium

28 Oct			
31 Oct	13	13.1-13.2, 13.4-13.6	Oscillations about Equilibrium
02 Nov			
04 Nov	***Test 3: Chapters 9-11***		
07 Nov	14	14.1-14.2, 14.4-14.8	Waves and Sounds
09 Nov			
11 Nov	15	15.1-15.8	Fluids
14 Nov			
16 Nov			
18 Nov	16	16.1-16.5	Temperature and Heat
21 Nov	***Test 4: Chapters 13-15***		
THANKSGIVING BREAK			
28 Nov			
30 Nov	17	17.1-17.3, 17.5-17.6	Ideal Gases and Kinetic Theory
02 Dec			
05 Dec	18	18.1-18.5, 18.8-18.9	The Laws of Thermodynamics
07 Dec			
09 Dec			
14 Dec	***08:30-11:30 AM***	***Final Exam: Chapters 2-11,13-15***	