PHY 102: Intro Physics for Life Science Fall 2022

Instructor: Dr. Truong Le (he,him,his)
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Credits for the course: 1
Lectures Time: MWF 8:30-9:30 am
Lectures Room: Trexler 263

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. To minimize distraction, please put your cell phone to silent mode before the lectures. The instructor has the right and the authority to expel anyone who disrupts the lecture or behaves inappropriately at any time. **This syllabus will continue to change with students' notice.**

Office Hours: MWF (10-12 pm), and by appointment. Office hours can be live face to face or zoom (**https://roanoke-edu.zoom.us/j/84574957578**)

Course Description: This algebra-based course provides an overview of topics in physics that are of particular importance to the life and medical sciences. The course covers mechanics (units, motion, energy), electricity and magnetism, heat, atomic and nuclear physics, fluids, waves, and instrumentations, all in the context of biological systems.

Prerequisites: None

Laboratory: You must be enrolled in the laboratory portion PHYS 102L of this course. Although PHYS 102L operates as a separate course, it counts as 25% of the course grade for PHYS 102. 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. These lab sections are conducted by a lab instructor different from the overall instructor for the class. This lab instructor is responsible for both conducting the lab sessions and providing the laboratory component of your grade in the class.

Course Material: Required and recommended

- **Online homework system (required):** Edfinity. You will need to buy a Edfinity access code. The cost for you is $25.00; to register go here: **https://edfinity.com/join/CFFP9V8A**.
- **Calculator (required):** A scientific calculator that can do trigonometric functions, exponentials, and logarithms is required. Graphing calculators or cellphones will not be allowed during tests.
- **Text (recommended):** College Physics (OpenStax) by Paul Urone and Roger Hinrichs.
- **Text (recommended):** Physics (any Edition) by James S. Walker (A request has been sent to the library to have this textbook on reserve.)

Learning Outcomes: 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

Learning Styles: Recognizing that students learn science in a variety of ways, the instructor will take advantage of many different techniques, including collaborative learning, to maximize the overall effectiveness of this course. Although collaborative efforts will be encouraged for solving in-class problems, assigned homework, and quizzes, they are not allowed for tests (**to be determine**).

Team Collaborations: Group of three or four students will be arranged to develop problem-solving skills/strategies.

Show your work: Your solutions should be neat, clear, organized and use derivations in symbolic form (as discussed in class), and they should follow the solving-physics-problems's guidelines. The points you earn are based on the process you take to get the correct results and not the results itself, so it will be good to practice this when doing your HW, even if it is not necessary for submitting online HW.

Participation: You will work on a tutorial (worksheet) every Friday. You will need to submit your tutorial online (inquire) before leaving the class.

Online Homework: Homework will be assigned after every lecture, and they are due before the next class. There will be 2-3 problems/homework. Be prepared to spend between 2-3 hours outside of class per homework. You are allowed to work with your team or with a group (not copying) on your HW, which means discuss the ideas and things you don't understand, until you do. **You will have nine attempts to submit your solutions to a numerical problem. However, you will have only two attempts for a multiple choice problem.** So you will be happiest if you understand what you are doing. The point of homework is to practice thinking, not copying a solution algorithm from another source. **You need to submit all assigned problems on-time before the due date to receive full credit, otherwise, you will ONLY receive credits for the problems that you have submitted.**

Quiz: You will take a quiz every Friday with your group over the hw/tutorial that you have submitted/done, and one quiz will be submitted per group. The aim is to see how well you understand the homework/tutorial.

Written Exams: There will be 3 group exams in this course with one problem per exam as individual.

Note: Quizzes and exams will be open book/notes/notecard. Any missed quiz or test will count as zero points unless it is an excused absence (illness, participation in a scheduled University event, etc.), which should be cleared with me before the quiz or test. The missed quiz or test may be made up in a way decided by the instructor.

Score on the Quiz and Exam are determined by the following rubric:

Score	Description
5	The solution is correct and the writing is clear. The instructor can easily see that the student fully understands how to solve the problem.
4	The solution is mostly correct, but there may be some flaws. The writing is reasonably clear. There is evidence that the student understands the key concepts involved in solving the problem, but may not fully grasp all of the details.
3	The solution is partly correct, but there are significant errors. The writing may be hard to follow in places. There is evidence that the student does not fully understand the key concepts required to solve the problem, or that the student is unable to use those concepts in an appropriate way.
2 or less	The solution is either completely incorrect or incomprehensible. This may indicate that there are serious flaws in all aspects of the solution, or that the writing was so poor that it was impossible to follow.

Extra credit - Before every lecture there will be at least one problem that you need to solve before attending the class. These are your extra credit assignments based on your reading of the material for the lecture of that day. You need to upload this assignment before class to receive the extra credit and they need to be complete. However, the answers do not need to be correct. We will go over these problems during the lecture. **These extra credits will apply toward your next exam.**

Grading: Your grade in this class will be determined by a combination of laboratory work, final exam, exams, quizzes, and homework. The laboratory component of your grade will be awarded by your lab instructor, please see them for details. The separate weightings will be:

Homework 15%

Participation 5%

Quiz 5% (group)

Two Exams 30% (15% each-weighted equally)

Final Exam 20% **Laboratory**

25%

Final Grade Final course grades will be assigned using the following scale:

A	93% or more	C+	77-79.9%
A-	90-92.9%	C	73-76.9%
B+	87-89.9%	C-	70-72.9%
B	83-86.9%	D	60-69.9%
B-	80-82.9%	F	below 60%

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 _2022*) 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 final exam.**

Subject Tutoring: located on the lower level of Fintel Library (Room 5), is open 4-9 PM, SundayThursday. 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.

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 Colleges AI policies. See https://www.roanoke.edu/inside/az 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.

Preliminary Schedule: Please follow the class instruction. We will roughly cover chapters 1-32. Some sections will be dealt with in more detail than others with some sections will be skipped completely.

Dates	Topics Covered	Chapter	Lab
Aug. 31	Measurement	1.1-1.8	
Sep. 2	1-D Motion	2.1-2.7	
Sep. 5,7	Vectors	3.1-3.4	
Sep. 9,12	2-D Motion	4.1-4.5	
Sep. 14	Newton's Laws	5.1-5.7	
Sep. 16,19	Applications of Newton's Laws	6.1-6.2,6.5	
Sep. 21	Work, kinetic energy, power	7.1-7.2,7.4	
Sep. 26 (week)	**Group Exam-1 (Review Sep. 23)**	1-7	
Sep. 28	Potential energy, conservation of energy	8.2-8.3	
Sep. 30, Oct. 3	Linear Momentum, collisions	9.1-9.2, 9.4-9.7	
Oct. 5	Rotational kinematics and energy	10.1-10.2,10.5	
Oct. 7,10	Rotational dynamics, equilibrium	11.1-11.2,11.6-11.7	
Oct. 12,24	Simple harmonic oscillation	13.1-13.2	
Oct. 28 (week)	**Group Exam-2 (Review Oct. 26)**	8,9,10,11,13	
Oct. 31	Waves and sounds	14.1-14.2	
Nov. 2,4	Fluids (selected topics)	15.1-15.4,15.7	

Nov. 7,9	Thermodynamics (selected topics)	16.1-16.3,16.4-16.5 17.5-17.6 18.1-18.3, 18.5,18.8	
Nov. 11,14	Electrostatics	19.1-19.4	
Nov. 16,18	Magnetism	22.1-22.3	
Nov. 21	Electromagnetic spectrum, geometric optics	25.3, 26.1,26.5-26.7	
Nov. 22-27	**Thanksgiving holiday (no classes)**		
Nov. 28	Human eye and microscopes	27.1-27.4	
Dec. 2,5	Atom and atomic radiation	31	
Dec. 7,9	Nucleus and nuclear radiation	32	
Dec. 9	**Last day of class**		
Dec. 14	**Group Exam-3 (time-TBD)**	14,15,16,17,18,19, 22,25,26,27,31,32	

I have read and understood this syllabus. Sign, date, and submit this syllabus for 10 points toward your participation grade.

Student's signature: **Date:**