

PHYS 102: Introductory Physics for Life Sciences
Syllabus - Fall 2018

Location: Trexler 372

Instructor: Dr. Hiba Assi

Office Hours: MWF 14:30-15:30, Tue/Thu 10:30-11:30

Open-door visits & appointments are welcome

Time: MWF 09:40 – 10:40

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Office: Trexler 264B

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Course textbook: James S. Walker, *Physics*, 5th ed., Pearson, 2016

ISBN-10: 0321976444/ ISBN-13: 9780321976444

A copy of the textbook is on course reserve at Fintel library. Even if you do not buy the book, you must still purchase a Mastering Physics access code (see below) and you will be responsible for the covered sections.

Optional textbook: F. R. Hallet, J. L. Hunt, R. H. Stinson, E. McFarland, G. Renninger and D. Sullivan, *Physics for the Biological Sciences*, 4th ed., Nelson, 2003.

ISBN-10: 0176224513/ ISBN-13: 978-0176224516

Other required materials: You will need to purchase access to *Mastering Physics* online homework management system (ISBN-10: 0321980395/ ISBN-13: 9780321980397) in order to complete assignments.

To register, go to www.pearson.com/mastering and use the instructor's course ID: assi89904 to enter/purchase your access code and log in to the system.

Additionally, you will need a working scientific calculator for assignments and exams.

Course Description: This algebra-based (no calculus) 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.

Learning Outcomes: At the end of the course, successful students will:

- Identify underlying physical phenomena within the biological and chemical realm
- Attach and manipulate units as a viable source of knowledge about the physical world
- Construct organized physical analyses that demonstrate logically connected steps of thought
- Synthesize numerical information, physical assumptions, and previous concepts to correctly solve physics problems
- Apply analytical thinking and physical modeling to other scientific arenas

Required Laboratory Course: 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.

Important NOTE: The lab session of PHYS 102 is closely tied to PHYS 103 –the first semester in a traditional two-semester sequence. Some material covered in lab will not be covered in our course, and the order of topics which are covered in this course might differ from the order in which they appear in lab. I will work closely with lab instructors to ensure the friction between lab topics and our schedule is as minimal as possible.

Lecture Periods: The lecture will cover topics outlined in the course schedule and will involve solving sample problems and answering questions from the previous lectures. Any question is welcomed in class at any point! You are strongly advised to read the corresponding sections before coming to class to benefit the most from the lecture that day.

Attendance: Attendance will be formally taken in the beginning of class and will count towards your final grade. The maximum number of absences, whether excused or not, is four for the whole semester. You are fully responsible for the material that was covered and for any announcements made in class, such as changes to the schedule and/or syllabus.

Homework: Problem sets will be regularly assigned and administered through Mastering physics. Problems may be attempted several times with no loss in points for the first few incorrect attempts. Correctness is ultimately required to secure full credit. Keep an organized folder for your detailed solutions so you can refer to them when studying and preparing for exams. Unless an extension is granted beforehand, all late items will be reduced by 10% for each school day beyond the due date/time. As a result, assignments receive 50% reduction after one week and 100% reduction after two weeks (no assignments will be accepted if more than two weeks late).

Discussion/Review Sessions: Review sessions for exams will be agreed upon and announced in advance in class.

Exams: There will be four one-hour mid-term exams and a fully comprehensive three-hour final exam, with their dates specified in the course schedule. Exam make-ups for excused reasons (family or medical emergencies, and university-recognized commitments) must be discussed and arranged with me at least two weeks in advance, unless it is an emergency. If your missed exam is unexcused, you will receive a zero on that exam. You will need to create your own exam formula sheet of a certain approved length that will be announced in advance in class, and exams are closed-book otherwise.

THE LOWEST MID-TERM EXAM GRADE WILL BE DROPPED.

MCSP Conversation Series: You are required to attend ONE talk in the MCSP Conversation Series (schedule available at <http://cs.roanoke.edu/MCSPSeries>) 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 between one and two pages in length. For

extra-credit, you may attend two more lectures during the semester, and each submitted paper will earn 0, 0.5, or 1 point to be added to your final grade. Note that a simple summary of the talk is not sufficient to receive credit.

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

- Lab 25%
- Attendance 5%
- MCSP Talk 5%
- Homework 15%
- Three Mid-term Exams 10% each
- Final Exam 20%

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

90 – 100	A- to A
80 – 89.9	B- to B+
70 – 79.9	C- to C+
60 – 69.9	D- to D+
< 60	F

Rounding UP (never down) final course grades may take into consideration the instructor's evaluation of the student's effort, improvement, integrity, and conduct.

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

Use of Electronic Devices: You are allowed to use personal laptops and tablets, but only for the purpose of taking notes. Scientific calculators can also be used during class if needed and during exams. Your phones must be on silent mode and out of reach during class and must be turned off during exams. Violations of this policy during exams can constitute a violation of the academic integrity policy.

Disability Support: Accessible Education Services (AES) is 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 Laura Leonard, 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 Laura Leonard at your earliest convenience to schedule an appointment.

Academic Integrity: The Academic Integrity (AI) policy at Roanoke College will be thoroughly followed in this course, and I expect you to abide by all the outlined rules to avoid any questionable conduct. General concepts related to Mastering Physics problems may be clarified through conversations with other students, but you should solve the problems on your own. Exams are closed-book, and no discussion among students is allowed after the exam in case a student has not taken the exam. I will explicitly inform you if/when you can start discussing

exams with others. You will need to create your own exam formula sheet of a certain approved length that will be announced in advance in class. If I become aware of a possible violation of these guidelines, I am obligated report it to the Academic Integrity committee. Student Resources on 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: Each member of this class is valued, and is expected to 1) treat everyone else with respect and 2) contribute to a welcoming and inclusive environment.

PHYS 102: Introductory Physics for Life Sciences, Fall 2018- Daily Schedule

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

<i>Day</i>	<i>Chapter</i>	<i>Sections</i>	<i>Topic</i>
29 Aug	1	1.1-1.8	Introductions + brief lecture
31 Aug	2	2.1-2.7	One-dimensional kinematics
3 Sep			
5 Sep	3	3.1-3.6	Vectors
7 Sep	4	4.1-4.5	Two-dimensional kinematics
10 Sep			
12 Sep	5	5.1-5.7	Newton's laws of motion
14 Sep	6	6.1, 6.5	Applications of Newton's laws
17 Sep	7	7.1-7.2, 7.4	Work, kinetic energy, power
19 Sep	8	8.2, 8.3	Potential energy, conservation of energy
21 Sep	Test 1: Chapters 1-6		
24 Sep	9	9.1-9.2, 9.4, 9.7	Linear momentum, center of mass
26 Sep	10	10.1-10.2, 10.5	Rotational kinematics and energy
28 Sep	11	11.1-11.2, 11.6-11.7	Rotational dynamics
1 Oct			
3 Oct	13	13.1-13.2	Simple harmonic oscillation
5 Oct	15	15.1-15.9	Fluids
8 Oct			
10 Oct	16	16.1-16.6	Temperature and heat
12 Oct	Test 2: Chapters 7-11,13		
15 Oct	Fall Break- No classes!		
17 Oct			
19 Oct			
22 Oct	17	17.5-17.6	Phase changes
24 Oct	18	18.1-18.3, 18.5,18.8	Laws of thermodynamics
26 Oct			
29 Oct	19	19.1-19.4	Electricity
31 Oct	22	22.1-22.3	Magnetism
2 Nov	25	25.3	Light, electromagnetic spectrum
5 Nov	26	26.1, 26.5-26.7	Geometric optics
7 Nov			
9 Nov	Test 3:Chapters 15-19,22		
12 Nov	27	27.1-27.4	Human eye, microscopes

14 Nov			
16 Nov	31	31.1-31.4, 31.7	Atoms, atomic radiation
19 Nov			
21 Nov	<i>Thanksgiving Break- Enjoy!!!</i>		
23 Nov			
26 Nov	32	32.1-32.6	Nucleus, nuclear radiation
28 Nov			
30 Nov	Instruments	notes	
3 Dec		notes	
5 Dec	Test 4: Chapters 25-27, 31-32		
7 Dec	<i>Review for final exam</i>		
12 Dec	08:30-11:30	<i>Final Exam- Best of Luck!!!</i>	