

### SYLLABUS

**COURSE DESCRIPTION** This algebra-based physics course is intended for those majoring in the life sciences and others for whom basic knowledge of physics is helpful or desired.

**LEARNING GOALS** This course addresses the General education program (GEP)'s functional competency Scientific and Quantitative Reasoning. It has been approved to meet the GEP Sciences distribution requirement. In particular, it addresses the following two competencies:

- Understand and use mathematical and scientific methods of inquiry, reasoning, processes, and strategies to investigate and solve problems.
- Organize, interpret, draw inferences, and make predictions about natural or behavioral phenomena using mathematical and scientific models and theories.

By the end of this semester, students should be able to demonstrate the following abilities:

1. Qualitatively and quantitatively reason with definitions of distance, displacement, speed, velocity, and acceleration.
2. Create and interpret graphs of position vs. time, velocity vs. time, and acceleration vs. time.
3. Solve problems related to one-dimensional and two-dimensional motion.
4. Identify forces and draw free-body diagrams, calculate components and vector sums of forces.
5. Apply Newton's laws of motion to solve problems involving conservative and non-conservative forces and motion.
6. Apply equilibrium conditions to extended objects to determine unknown forces and torques.
7. Apply conservation of energy to solve problems involving energy transfers and transformations for a system.
8. Apply the first law of thermodynamics and the ideal gas law to solve problems relating to thermal processes for ideal gases.
9. Apply properties of fluid pressure and Archimedes' principle to solve problems relating to buoyancy.

**PREREQUISITE** High school mathematics, including trigonometry, or MATH 150.

**INSTRUCTOR** Dr. Lili Cui [lili@umbc.edu](mailto:lili@umbc.edu)  
**Office hour:** Mon 11-11:50 am, Tuesday 11-11:50 am, and Wed 2-3 pm  
in Physics 226A (Physics Tutoring Center), or by appointment

**Email policy:**

- Visiting my office hour is the best way of contact. The time is set aside for you and you will get individual attention. I'd love to use the time to know you in person.
- Physics related questions should be posted on the *Blackboard Discussion Board* instead of personal email so everyone in class can benefit from the discussion.
- Email is a great method for non-physics questions. Please include your full name, course number, and use your UMBC email address to ensure prompt response.

**REQUIRED TEXTBOOK & OTHER MATERIAL**

- College Physics: A Strategic Approach by Knight, Jones, and Field, 3rd ed.
- MasteringPhysics (electronic homework assignments)
- Clicker (Turning Technologies RFC-03, can be purchased from UMBC bookstore)
- Calculator
- A clear and focused mind, positive attitude, and patience

## SUCCESS STRATEGY

- Be sure you have the time required for the course. You are expected to attend all classes – lectures and discussions. In addition, experience shows that success requires at least 8 hours of intensive effort outside of class each week. If you typically spend much less than 8 hours of outside study, you are unlikely to be able to learn the material. If you typically spend much more than 12 hours of outside study, you should consult with the instructor about ways to study more efficiently.
- Physics is about understanding, not memorization. Instead of only paying attention to results, it is more important to understand how you get results.
- You have many resources including the textbook, study group, your friends, Teaching Assistants, me, YouTube and more. Use them wisely.
- It is essential to develop an ability to think and learn for yourself. You must be actively engaged to learn the material, you cannot passively watch me or your classmates and expect to understand the concepts and develop problem solving skills. Cognitive science has proven that the mind must interact to learn.

Success in the course is not “a piece of cake”, but can be achieved with effort and the right study strategies.

## GRADING POLICY

Type of Assignment	Percentage
Reading Quiz	5%
Lecture participation	5%
Weekly Quiz	5%
Homework	10%
Lab	10%
Exam (4 @ 11.25% each)	45%
Final Exam	20%
Total	100%

I do not grade on a curve. Why should I assume that x% of you will be failing this course? If you all do an excellent job, you all deserve an A. How well your neighbor is doing should not affect your grade. Help each other and learn from each other.

90.0% or Above	A
80.0% - 89.9%	B
70.0% - 79.9%	C
60.0% - 69.9%	D
59.9% or Below	F

- There is NO extra credit at the end of the term. It is far easier to fix problems early in the semester than after the tests have been taken.
- Check your grades on Blackboard routinely. Please contact me or your TA for any grading questions within TWO day after grade is available.

## READING QUIZ

- You are required to read the textbook sections (see schedule) prior to every class; it makes for efficient learning. The class time will be spent on clarifying and applying the materials.
- To prepare you actively engage in class, weekly reading quizzes will be assigned online through Blackboard. Reading quizzes typically consist of 5-10 questions, and usually due before each Monday’s class at 9:30 am.

## LECTURE

- Lectures focus on deepening your understanding of the more difficult concepts and developing scientific reasoning and systematic problem solving skills, not on delivering the basic content.
- The lecture PowerPoint slides will be posted on Blackboard the night before every lecture. You are expected to print them out to take lecture notes on; it gives you the structure of every lecture and facilitates the note-taking process. But remember these slides are not the complete content of the class but only an outline, studying them out is not a substitute for attending lectures.
- Clickers will be used to track attendance and promote active learning by providing instant feedbacks for both the instructor and students. You need to bring your clicker (with good battery) to every class. If your clicker does not work or if you forget your clicker, you will not receive attendance credit.
- There will be a short quiz at the beginning/end of Friday's lecture.
- If you miss one lecture, you are responsible for making up the material.

## LAB

- You must attend the lab section that you are officially registered for.
- Many of the main concepts of the course will be introduced or reinforced in weekly laboratory sessions, through direct experience with the physical world. *In some cases, later lectures will build on the understanding you achieve in lab.*
- Your grade for each lab is based on completing an individual online prelab (20%), full participation in and completion of team lab activity (40%), and individual lab homework due at the beginning of the next session (40%). The prelab needs to be submitted before the beginning of your lab. Lab homework will only be accepted if you complete the related lab.
- There will be one in-lab exam, see the schedule for the exact date. The lab activities and homework will help you acquire the skills you'll need for the lab exam.

## HOMEWORK

- A major part of what I expect you to learn in this class will come as a result of doing homework. The homework assignments are designed primarily to build conceptual understanding, develop scientific reasoning skills, and provide practice and feedback with systematic problem solving. You need to fully *understand* how to solve the assigned homework problems to do well on the exams and to succeed in the course.
- Individual homework will be submitted via the MasteringPhysics online system.
- Homework questions are not easy and you will find yourself spend a lot of time on them. This is expected. Don't put off assignments until the night before they are due. Instead start your homework early enough so you have time to get help.
- You are encouraged to work together, however, you must fully understand how to solve problems on your own.
- Since the main purpose of homework is to prepare you for the exams, keep a careful written record of your work for future studying.
- There are websites where you can view (or perhaps purchase) solutions to homework problems. I cannot stop you from cheating, but I strongly recommend you don't. *Consider your goals...are you trying to just get the homework done or do you actually want to learn something?* I guarantee that the more you use solutions written by someone else, the less likely you will be able to produce your own solutions on quizzes and exams.

## EXAM

- You have to do well on all exams to be able to get a good grade for the course. The lecture, lab, and homework will help you acquire the understanding and problem solving skills you'll need.

- Four 50-minute exams will be given on Fridays at 8 AM. See the schedule for the exact dates, location will be announced later.
- Each exam will consist of a mix of multiple-choice questions and show-your-work problems.
- You are allowed to bring a 3 inch \*5 inch index card and use a calculator during exams. No cell phones or other communication devices.

## FINAL EXAM

The final exam will be comprehensive. There is no make-up exam for the final and no one will be allowed to take the final at a different time.

## MAKE UP POLICY

Life is full with surprises so it's understandable that you might miss a class or two. The course policy has been set up to accommodate a few unexpected situations.

- Reading Quiz: Start early on reading quizzes, no late quizzes are possible.
- Lecture: You will be given 3 "free" days for not clicking in lecture. These count towards ALL absences and clicker malfunctions.
- Lab: If you must miss a lab, contact your TA and me as soon as possible. You must submit the homework from the previous lab to me directly or through the Physics Department before 4pm Friday of the week of your missed lab. With your TA's permission, you may attend your missed lab section during the makeup week and submit the related homework to your TA by May 14.
- Online homework: It's better late than never: Possible credit for each item drops steadily to 50% after 48 hours and stays there until the last day of class.
- Exam: If you must miss an exam due to officially-sanctioned UMBC activities, illness, family emergency, detention by authorities, or another insurmountable difficulty, contact me as soon as possible. At my discretion, I'll request written verification of the cause of your absence.

## TUTORIAL CENTER

- Physics Tutoring Center is located in PHYS 226A and it offers free walk-in tutoring. Operation hours and staffing information will be posted in our Blackboard site.
- The Learning Resource Center supplies free tutors for this and many other 100- and 200-level courses. Please contact at (410) 455-2444 or visit <http://www.umbc.edu/lrc/> for more information.

## ACADEMIC INTEGRITY

*"By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal."* To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook. All incidents of alleged Academic Misconduct will be reported.

## DISABILITIES

- If you have any condition such as a physical learning disability, which will make it difficult for you to carry out the work as I have outlined it or which will require academic accommodations, please notify me in the first two weeks of the course.
- If you are taking the exam with the Student Support Services, inform me by email with the detailed information at least 48 hours before every exam.

**COURSE  
WEBSITE**

I will put most of my teaching materials in our course site through Blackboard. After log in myUMBC, click on the “Blackboard” tab and then click on “PHYS111-SP2018” in the “My Courses” area. You are responsible for all content delivered via Blackboard. You are *required* to logon to the course website *at least once between lectures*.

You will use the website for:

- Checking the *Announcements*.
- Accessing *Course Materials*: syllabus, reading quiz, lectures note, lab, and etc.
- Checking the *Grades* that you have earned.
- Interacting with the instructor and others online using *Discussion Board*.

**TA  
CONTACT  
INFO**

Nipuni Adhikari     [nipuni1@umbc.edu](mailto:nipuni1@umbc.edu)  
 Achala Denagamage     [dwick1@umbc.edu](mailto:dwick1@umbc.edu)  
 Vijin Kizhake Veetil     [kvi1@umbc.edu](mailto:kvi1@umbc.edu)  
 Daniel Wines     [wines1@umbc.edu](mailto:wines1@umbc.edu)

TAs will host office hours in the Physics Tutoring Center (PHYS226A). Schedule will be available in Blackboard.

**TA schedule for the labs**

	Monday	Tuesday	Wednesday	Thursday	Friday
8:30		<b>Lab 05</b> (3342) 8:30-10:20 am Nipuni Adhikari			
9:00					
9:30					
10:00					
10:30					
11:00	<b>Lab 11</b> (8158) 11:00-12:50 Achala Denagamage	<b>Lab 06</b> (3343) 11:30-1:20 Nipuni Adhikari			
11:30					
12:00					
12:30					
1:00	<b>Lab 02</b> (3339) 1:00-2:50 pm Vijin Kizhake Veetil	<b>Lab 07</b> (3344) 2:00-3:50 pm Achala Denagamage			
1:30					
2:00					
2:30					
3:00	<b>Lab 10</b> (6635) 3:00-4:50 pm Vijin Kizhake Veetil				
3:30					
4:00					
4:30					
5:00					
5:30	<b>Lab 03</b> (3340) 5:30-7:20 pm Nipuni Adhikari	<b>Lab 08</b> (4251) 5:30-7:20 pm Achala Denagamage			
6:00					
6:30					
7:00					
7:30	<b>Lab 04</b> (3341) 7:30-9:20 pm Daniel Wines	<b>Lab 09</b> (4252) 7:30-9:20 pm Vijin Kizhake Veetil			
8:00					
8:30					
9:00					

## PHYS 111 – Spring 2018 Schedule

	Date	Lecture Topic	Textbook	Lab
Week 1	Jan 29 (M)	Introduction and human motion	1.1-1.6	Lab 1 Introduction to motion
	Jan 31 (W)	Position and velocity	2.1-2.3	
	Feb 02 (F)	<b>Quiz 1, Acceleration</b>	2.4-2.5	
Week 2	Feb 05 (M)	1D motion	2.6	Lab 2 Changing motion
	Feb 07 (W)	Free fall	2.7	
	Feb 09 (F)	<b>Quiz 2, Vectors</b>	3.1-3.3	
Week 3	Feb 12 (M)	Projectile motion	3.6-3.7	Lab 3 Creating mathematical models of motion
	Feb 14 (W)	Kinematics of circular motion	3.8	
	Feb 16 (F)	<b>Exam 1; 8 AM, location TBA</b>		
Week 4	Feb 19 (M)	Force and motion	4.1-4.4	Lab 4 Force and motion
	Feb 21 (W)	Newton's laws	4.5-4.7	
	Feb 23 (F)	<b>Quiz 3, Applying Newton's laws</b>	5.1-5.4	
Week 5	Feb 26 (M)	Friction	5.5-5.6	Lab 5 Force, mass, and acceleration
	Feb 28 (W)	Interacting objects	5.7-5.8	
	Mar 02 (F)	<b>Quiz 4, Interacting objects</b>		
Week 6	Mar 05 (M)	Dynamics of circular motion	6.1-6.3	Lab 6 Gravitational forces
	Mar 07 (W)	Circular Orbit and Gravity	6.4-6.4	
	Mar 09 (F)	<b>Quiz 5, Springs and Hook's law</b>	8.3	
Week 7	Mar 12 (M)	Elasticity	8.4	Lab 7: Elasticity
	Mar 14 (W)	Applications		
	Mar 16 (F)	<b>Exam 2; 8 AM, location TBA</b>		
Week 8	Mar 19-23	Spring Break		
Week 9	Mar 26 (M)	Torque	7.3-7.4	Lab 8: Torque and equilibrium
	Mar 28 (W)	Static equilibrium	8.1	
	Mar 30 (F)	<b>Quiz 6, Energy model</b>	10.1	
Week 10	Apr 02 (M)	Work and kinetic energy	10.2-10.3	Lab 9 Conservation of energy
	Apr 04 (W)	Potential energy and conservation of energy	10.4-10.6	
	Apr 06 (F)	<b>Quiz 7, Power</b>	10.8	
Week 11	Apr 09 (M)	Metabolic energy	11.1-11.2	Lab Exam on mathematical modeling
	Apr 11 (W)	Oscillation	14.1-14.2	
	Apr 13 (F)	<b>Quiz 8, Simple harmonic motion</b>	14.3	
Week 12	Apr 16 (M)	Energy in Simple Harmonic motion	14.4	Lab 10 Oscillations tutorial
	Apr 18 (W)	Applications		
	Apr 20 (F)	<b>Exam 3; 8 AM, location TBA</b>		
Week 13	Apr 23 (M)	The first law of thermodynamics	11.3-11.4	Lab 11 Thermal processes tutorial
	Apr 25 (W)	Idea gas processes	12.1-12.3	
	Apr 27 (F)	<b>Quiz 9, Specific heat</b>	12.5	
Week 14	Apr 30 (M)	Calorimetry	12.6	Lab 12 Thermal physics
	May 02 (W)	Specific heat of ideal gasses	12.7	
	May 04 (F)	<b>Quiz 10, Density and pressure</b>	13.1-13.3	
Week 15	May 07 (M)	Buoyance	13.4	Make-up Lab
	May 09 (W)	Application		
	May 11 (F)	<b>Exam 4; 8 AM, location TBA</b>		
Week 16	May 14 (M)	Summary		No lab
Final	May 21 (M)	<b>Final Exam (comprehensive); 10:30 AM-12:30 PM, location TBA</b>		