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

MATH 106, MATH 150, MATH 151, or MATH 155 with a grade of 'C' or better or score of 5 on the Math Placement Test.

INSTRUCTOR

Dr. Lili Cui lili@umbc.edu

Office hour:

- MonWed 2:10-3:00 PM and Fri 9:30-10:20 AM, in PHYS 226A
- 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.

Email policy:

- Physics related questions should be posted on the *Discord* 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

- A reliable computer, reliable Internet access, and a microphone
- College Physics: A Strategic Approach by Knight, Jones, and Field, 4th ed.
- PollEverywhere App
- 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 labs. 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, AI 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
Homework	15%
Quiz	5%
Lab	10%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	25%
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 days after grade is available.

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.
- Poll Everywhere App will be used to promote active learning by providing instant feedback for both the instructor and students. It is not required but highly recommended.
- 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*.
- Lab grade will be divided between your full participation and submitted work.
- Personal computers and smartphones are not allowed during the lab.
- Your lab TA will give specific guidelines.

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 quizzes and to succeed in the course.
- Individual homework will be submitted via Blackboard, typically due on Tuesdays, Thursdays, and Sundays at 11:59:00 PM, however the due dates may be adjusted on occasions.
- 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 hour 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 quizzes and exams, keep a careful written record of your work for future studying.
- There are websites where you can find answers 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 (or by AI), the less likely you will be able to produce your own solutions on exams.

QUIZ

- Weekly quizzes will be given on Fridays at 8:00-8:50 am, online in Blackboard. You must access the quiz between 8:00-8:20 am. Each quiz is 30 minutes long.
- The lectures, homework, and lab activities will help you acquire the understanding and problem-solving skills you'll need.
- Quizzes are cumulative.
- Quizzes are individual work, and academic integrity will be enforced. They are open book and open note, but you cannot talk to anyone nor access Internet to search for answers. No cell phones or other communication devices.

MIDTERM & FINAL EXAMS

- The midterm and final exams are cumulative and in person.
- You have to do well on all exams to be able to get a good grade for the course.
- A 3×5 inch index card with anything written on both sides is allowed.
- Calculator is allowed.
- See schedule for the exam dates.

MAKE UP POLICY

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

- Homework: Lowest two scores will be dropped. These count towards ALL absences (excused or unexcused) and problems with technology.
- Quiz: Lowest two quiz scores will be dropped. These count towards ALL absences (excused or unexcused) and problems with technology.
- Lab: If you must miss a lab for legitimate reasons*, contact your TA and me as soon as possible. With written verification of your absence, you might be allowed to attend the makeup lab scheduled on Week 15. Only one make up lab is allowed for the entire semester.
- Midterm and Final Exams: If you must miss an exam for legitimate reasons*, contact me before the scheduled exam. Failure to do so could result in a zero for that exam. With written verification of your absence, a makeup exam can be arranged.

**Legitimate reasons are defined as officially sanctioned UMBC activities, illness, family emergency, detention by authorities, or another insurmountable difficulty. I'll request written verification for the cause of your absence.*

FREE TUTORING

- 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.
- Academic Success Center also supplies free tutoring service by appointment. To make an appointment, please visit https://academicsuccess.umbc.edu/tutoring/

AI USAGE

Students are encouraged to use Artificial Intelligence (AI), such as ChatGPT, as a learning companion *rather than simply a shortcut to find answers*. When used responsibly, AI can greatly enhance learning by providing personalized explanations and guiding through problem-solving processes. However, relying on AI solely to complete assignments, without actively engaging in the material, leads to little or no understanding, which will inevitably be reflected in poor performance on individual, in-person exams. To gain the most value, students should use AI to ask questions, explore concepts, and develop the understanding necessary to solve physics problems independently.

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.

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 - FA2025" 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, lectures note, homework, lab, and etc.
- Checking the *Grades* that you have earned.

Discord server will be set up and used for 24/7 online interaction outside of the classroom.

DISABILITIES

Accommodations for students with disabilities are provided for all students with a qualified disability under the Americans with Disabilities Act (ADA & ADAAA) and Section 504 of the Rehabilitation Act who request and are eligible for accommodations. The Office of Student Disability Services (SDS) is the UMBC department designated to coordinate accommodations that creates equal access for students when barriers to participation exist in University courses, programs, or activities.

If you have a documented disability and need to request academic accommodations in your courses, please refer to the SDS website at sds.umbc.edu for registration information and office procedures.

SDS email: disAbility@umbc.edu SDS phone: 410-455-2459

If you will be using SDS approved accommodations in this class, please contact the instructor to discuss implementation of the accommodations.

SEXUAL ASSAULT, SEXUAL HARASSMENT, AND GENDER BIASED VIOLENCE AND DISCRIMINATION

UMBC Policy in addition to federal and state law (to include Title IX) prohibits discrimination and harassment on the basis of sex, sexual orientation, and gender identity in University programs and activities. Any student who is impacted by sexual harassment, sexual assault, domestic violence, dating violence, stalking, sexual exploitation, gender discrimination, pregnancy discrimination, gender-based harassment, or related retaliation should contact the University's Title IX Coordinator to make a report and/or access support and resources. The Title IX Coordinator can be reached at titleixcoordinator@umbc.edu or 410-455-1717.

You can access support and resources even if you do not want to take any further action. You will not be forced to file a formal complaint or police report. Please be aware that the University may take action on its own if essential to protect the safety of the community.

If you are interested in making a report, please use the Online Reporting/Referral Form. Please note that, if you report anonymously, the University's ability to respond will be limited.

Notice that Faculty and Teaching Assistants are Responsible Employees with Mandatory Reporting Obligations.

Lab Schedule with TA Information

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00			**Lab 3** (5169) 8:00-9:50 am *Tashin Ahammad*	**Lab 2** (5168) 8:00-9:50 am *Tomas Sujeta*	
8:30					
9:00					
9:30					
10:00					
10:30					
11:00					
11:30		**Lab 9** (5175) 11:30-1:20 *Krishna Sharma*			
12:00					
12:30					
1:00	**Lab 7** (5173) 1:00-2:50 pm *Tashin Ahammad*		**Lab 13** (5424) 1:00-2:50 pm *Tashin Ahammad*		
1:30					
2:00					
2:30		**Lab 6** (5172) 2:30-4:20 pm *Tomas Sujeta*		**Lab 17** (5472) 2:30-4:20 pm *Krishna Sharma*	
3:00	**Lab 5** (5171) 3:00-4:50 pm *Nicolas Rueda*		**Lab 11** (7375) 3:00-4:50 pm *Nicolas Rueda*		
3:30					
4:00					
4:30				**Lab 16** (5455) 4:30-6:20 pm *Nicolas Rueda*	
5:00	**Lab 4** (5170) 5:00-6:50 pm *Dakota Wolf*	**Lab 8** (5174) 5:00-6:50 pm *Krishna Sharma*	**Lab 14** (5425) 5:00-6:50 pm *Tomas Sujeta*		
5:30					
6:00					
6:30					

TA CONTACT INFO

Tashin Ahammad	m429@umbc.edu
Krishna Sharma	ksharma4@umbc.edu
Tomas Sujeta	tsujeta1@umbc.edu
Nicola Edgar Rueda	erueda1@umbc.edu
Dakota Wolf	dwolf7@umbc.edu

PHYS 111 – Fall 2025 Schedule

	Date	Lecture Topic	Textbook	Lab
Week 1	Aug 27 (W)	Introduction and Position	1.1-1.6	No Lab
	Aug 29 (F)	Velocity	2.1-2.3	
Week 2	Sep 1 (M)	NO CLASS – Labor Day		No Lab
	Sep 3 (W)	Acceleration	2.4	
	Sep 5 (F)	**Quiz 1 (8AM),** More on Acceleration	2.5-2.6	
Week 3	Sep 8 (M)	1D Kinematics	2.7	Lab 1 Introduction to Motion
	Sep 10 (W)	Free fall	3.1-3.4	
	Sep 12 (F)	**Quiz 2 (8AM),** Vectors	3.5	
Week 4	Sept 15 (M)	Projectile Motion	3.6	Lab 2 Changing Motion
	Sept 17 (W)	More on Projectile Motion	3.7	
	Sept 19 (F)	**Quiz 3 (8AM),** Circular Motion	4.1-4.7	
Week 5	Sep 22 (M)	Newton's 1st and 2nd Laws	5.1-5.2	Lab 3 Creating Mathematical Models of Motion
	Sep 24 (W)	Newton's 3rd Law	5.3-5.4	
	Sep 26 (F)	**Exam 1 (8:00-8:50 AM, in person, location TBA)**		
Week 6	Sep 19 (M)	Applying Newton's Laws in 2D	5.5	Lab 4 Force and Motion
	Oct 1 (W)	Friction	5.7-5.8	
	Oct 3 (F)	**Quiz 4 (8AM),** Interacting Objects		
Week 7	Oct 6 (M)	Ramp		Lab 5 Force, Mass, and Acceleration
	Oct 8 (W)	Dynamics of Circular Motion	6.1-6.5	
	Oct 10 (F)	**Quiz 5 (8AM),** Torque	7.3-7.4	
Week 8	Oct 13 (M)	Static Equilibrium	8.1	Lab 6 Gravitational Forces
	Oct 15 (W)	More on Static Equilibrium		
	Oct 17 (F)	**Quiz 6 (8AM),** Spring Force	8.3	
Week 9	Oct 20 (M)	Young's Modulus	8.4	Lab 7 Torque and Equilibrium
	Oct 22 (W)	Applications		
	Oct 24 (F)	**Exam 2 (8:00-8:50 AM, in person, location TBA)**		
Week 10	Oct 27 (M)	Energy and Work	10.1-10.2	Lab 8 Elasticity
	Oct 29 (W)	Kinetic Energy and Potential Energy	10.3	
	Oct 31 (F)	**Quiz 7 (8AM),** Conservation of Energy	10.4-10.7	
Week 11	Nov 3 (M)	Power	10.10	Lab 9 Conservation of Energy
	Nov 5 (W)	Metabolic Energy	11.1-11.2	
	Nov 7 (F)	**Quiz 8 (8AM),** Mass and Spring Oscillation	14.1-14.3	
Week 12	Nov 10 (M)	Simple Harmonic motion	14.4	Lab 10 Oscillation
	Nov 12 (W)	Pendulum Motion	14.5	
	Nov 14 (F)	**Quiz 9 (8AM),** Ideal Gas Law	12.1-12.3	
Week 13	Nov 17 (M)	Work in Ideal Gas Process	11.3-11.4	Lab 11 First Law of Thermodynamics
	Nov 19 (W)	Heat and First Law of Thermodynamics	12.5-12.7	
	Nov 21 (F)	**Exam 3 (8:00-8:50 AM, in person, location TBA)**		
Week 14	Nov 24 (M)	Density and Pressure	13.1-13.2	No Lab
	Nov 26 (W)	NO CLASS – Thanksgiving		
	Nov 28 (F)	NO CLASS – Thanksgiving		
Week 15	Dec 1 (M)	Buoyant Force	13.3	Makeup Lab
	Dec 3 (W)	More on Buoyant Force		
	Dec 5 (F)	**Quiz 10 (8AM),** Review		
Week 16	Dec 8 (M)	Summary		No lab
Final	Dec 12 (F)	**Final Exam (10:30 AM - 12:30 PM, in person, location TBA)**		