

## SYLLABUS

### COURSE DESCRIPTION

Introductory Physics I - PHYS121 is the first semester of calculus-based introductory physics course. The focus is on mechanics.

### 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:

- Solve 1-dimension and 2-dimension kinematics motion problems
- Apply Newton's laws to solve problems related to motion and force
- Apply energy principle to solve mechanics problems
- Apply conservation of momentum to solve problems related to collision
- Apply Newton's 2<sup>nd</sup> law for rotation to solve rotational dynamics problems
- Solve problems related to static equilibrium
- Apply conservation of angular momentum to solve problems
- Apply Newton's laws and energy principle to solve problems related to simple harmonic motion

### PREREQUISITE

You must have passed MATH 151 or at least be enrolled in it this semester. Basic college algebra is used extensively in this course, and the use of calculus will be phased into the course on pace with the MATH151 class.

### CLASS MEETING

Lecture: MWF 9:00-9:50 AM, MEYR 030 *or* MWF 11:00-11:50 AM, LH1 101  
Discussion: at the section time for which you are registered

### INSTRUCTOR

Dr. Lili Cui [lili@umbc.edu](mailto:lili@umbc.edu)

- Office hour: Mon 1-2, Tue 11-12, Wed 2-3, or by appointment, room Physics 321
- 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

- Physics for Scientists and Engineers, by Tipler and Mosca, 6<sup>th</sup> ed., Volume 1
- FlipItPhysics (electronic pre-lecture and homework assignments)
- Clicker (Turning Technologies RFC-03, can be purchased from UMBC bookstore)
- Calculator
- A clear and focused mind, good attitude...

## 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
Prefecture and checkpoint	5%
Lecture participation (clicker)	5%
Quiz	5%
Homework	10%
Discussion	10%
Exam (3 @ 15% 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.

## PRE-LECTURE

- You are required to read the related textbook sections and complete pre-lecture assignments via FlipItPhysics prior to every lecture; it makes for much more efficient learning. The class time will be spent on clarifying and applying the material.
- As a general rule, FlipItPhysics Prefectures and Checkpoints will be due on Mondays and Wednesdays at 8:30 AM, though the due dates may be adjusted on occasions.

## LECTURE

- 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.
- 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.
- If you miss one lecture, you are responsible for making up the material.

## DISCUSSION

- The discussion classes are a required part of the course, and you must attend the discussion class in which you are registered.
- Each discussion grade will be divided equally between your attendance and submitted work.
- Full attendance is required for every discussion. Discussion is based on group work, it's designed to provide you with a collaborative learning environment so you can help and learn from each other. To ensure the integrity of group work and the fairness to each group member, full attendance is mandatory and there will be a penalty for arriving late or leaving early. 20% will be removed from the discussion score for every five minutes that a student is tardy in coming to the discussion. In addition, those arriving late to class will not be allowed to benefit from the work of students who arrive on time. If you are ten minutes late, you will be automatically removed from your original group. You might need to work on your own or join another group.
- Your discussion instructor 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. You need to fully understand how to solve the assigned homework problems to do well on the exams and to succeed in this course.
- Individual homework will be submitted via the FlipItPhysics online system. As a general rule, assignments will be due on Thursdays at midnight 11:59 pm, though the due dates may be adjusted on occasions. You are normally allowed six submissions per question part.
- 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. Written homework might be collected and graded.
- 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 prelecture, lecture, discussion activities, and homework will help you acquire the understanding and problem solving skills you'll need.
- Three 50 minute exams will be given on Friday morning 8:00-8:50 AM. See the schedule for the exact dates.
- 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, with some extra weight to content that follows the last mid-term exam.
- 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.

- Lecture: You will be given three "free" days for not clicking in lecture. These count towards ALL absences and clicker malfunctions.
- Online FlipItPhysics prelecture, checkpoints and homework: You can request an automatic extension any time up to 3 days after the assignment is due with a 50% penalty of all unearned points.
- Discussion: There is no make-up discussion. Lowest discussion score will be dropped. If you must miss a discussion for legitimate reasons\*, contact your TA as soon as possible to make alternative arrangement.
- Exam or Quiz: If you must miss an exam or quiz for legitimate reasons, contact me as soon as possible.

\*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.

## TUTORIAL CENTER

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.

## 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 “PHYS121-FA16” 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, homework, lectures notes, and etc.
- Checking the *Grades* that you have earned.
- Interacting with the instructor and others online using *Discussion Board*.

**TA/LA Teaching Schedule for Discussions**

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00				8:00-9:50 <b>Section 03 (1060) UC</b> <i>Nirmal Nandi*</i> <i>Rachel Morin</i>	
8:30					
9:00					
9:30				<b>Section 08 (6807) PY</b> <i>Qianqian Song*</i> <i>Matthew Mascone</i>	
10:00					
10:30					
11:00					
11:30				11:30-1:20 <b>Section 04 (1061) UC</b> <i>Qianqian Song*</i> <i>Thomas Hyatt</i>	
12:00					
12:30					
1:00			1:00-2:50 <b>Section 07 (1064) UC</b> <i>Jon Gustafson*</i> <i>Rachel Morin</i>	<b>**Section 12 (6810) PY</b> <i>Nirmal Nandi*</i> <i>Phoebe Sandhuas</i>	
1:30		<b>**Section 11 (6809) PY</b>			
2:00		<i>Zach Baum*</i>			
2:30		<i>Matthew Mascone</i>		2:30-4:20 <b>Section 05 (1062) UC</b> <i>Josey Stevens*</i> <i>Benjamin Zidek</i>	
3:00					
3:30					
4:00				<b>**Section 13 (6811) PY</b> <i>Zach Baum*</i> <i>Kurt Hamblin</i>	
4:30			4:30-6:20 <b>Section 02 (1059) UC</b> <i>Maxwell Atkins*</i> <i>Benjamin Zidek</i>		
5:00					
5:30					
6:00			<b>**Section 14 (6812) PY</b> <i>Qianqian Song*</i> <i>Thomas Hyatt</i>	5:00-6:50 <b>Section 09 (6806) PY</b> <i>Logan Pauli*</i> <i>Phoebe Sandhuas</i>	
6:30					
7:00					
7:30			<b>Section 06 (1063) UC</b>		
8:00			<i>Mary Keenan*</i>		
8:30			<i>Kurt Hamblin</i>		

**PHYS 121 – Fall 2016 Schedule**

	<b>Date</b>	<b>Lecture Topic</b>	<b>Textbook</b>	<b>Discussion</b>
Week 1	Aug 31 (W)	Measurement, Vector, Displacement	Ch1: 1-7	Discussion 1 Vector
	Sep 02 (F)	Velocity, Acceleration	Ch2: 1-2	
Week 2	Sep 05 (M)	Holiday - Labor Day		Discussion 2 1-D Kinematics
	Sep 07 (W)	1-D Kinematics	Ch2: 3	
	Sep 09 (F)	<b>Quiz 1</b> , Free Fall	Ch2: 3	
Week 3	Sep 12 (M)	Projectile Motion	Ch3: 1-2	Discussion 3 2-D Kinematics
	Sep 14 (W)	Relative Motion, Circular Motion	Ch3: 3	
	Sep 16 (F)	<b>Quiz 2</b> , Force, Newton's 1 <sup>st</sup> and 2 <sup>nd</sup> Laws	Ch4: 1-5	
Week 4	Sep 19 (M)	Newton's 3 <sup>rd</sup> Law	Ch4: 6-8	Discussion 4 Newton's Laws
	Sep 21 (W)	Friction	Ch5: 1	
	Sep 23 (F)	<b>Quiz 3</b> , Newton's Laws Problem Solving		
Week 5	Sep 26 (M)	Motion along a Curved Path	Ch5: 3	Discussion 5 Newton's Laws
	Sep 28 (W)	Applications		
	Sep 30 (F)	<b>Exam 1 (Chapters 1-5), 8:00 - 8:50 AM, location TBA</b>		
Week 6	Oct 03 (M)	Work	Ch6: 1-3	Discussion 6 Work-KE Theorem
	Oct 05 (W)	Work-Kinetic Energy Theorem	Ch6: 4	
	Oct 07 (F)	<b>Quiz 4</b> , Potential Energy	Ch7: 1-2	
Week 7	Oct 10 (M)	Conservation of Energy	Ch7: 3	Discussion 7 Conservation of Energy
	Oct 12 (W)	Newton's Law of Gravity	Ch11: 1-2	
	Oct 14 (F)	<b>Quiz 5</b> , Gravitational Potential Energy	Ch11: 3	
Week 8	Oct 17 (M)	Center of Mass	Ch5: 5	Discussion 8 Momentum and Impulse
	Oct 19 (W)	Momentum and Impulse	Ch8: 1	
	Oct 21 (F)	<b>Quiz 6</b> , Conservation of Momentum	Ch8: 2	
Week 9	Oct 24 (M)	Collisions	Ch8: 3	Discussion 9 Collisions
	Oct 26 (W)	Applications		
	Oct 28 (F)	<b>Exam 2 (Chapters 6-8 &amp; 11), 8:00 - 8:50 AM, location TBA</b>		
Week 10	Oct 31 (M)	Rotational Kinematics	Ch9: 1	Discussion 10 Rotation
	Nov 02 (W)	Rotational Kinetic Energy, Moment of Inertia	Ch9: 2-3	
	Nov 04 (F)	<b>Quiz 7</b> , Torque	Ch9: 4	
Week 11	Nov 07 (M)	Rotational Dynamics	Ch9: 5-6	Discussion 11 Rotational Dynamics
	Nov 09 (W)	Rotational Dynamics Problem Solving		
	Nov 11 (F)	<b>Quiz 8</b> , Static Equilibrium	Ch12: 1-3	
Week 12	Nov 14 (M)	Static Equilibrium Problem Solving		Discussion 12 Static Equilibrium
	Nov 16 (W)	Angular Momentum	Ch10: 1-2	
	Nov 18 (F)	<b>Quiz 9</b> , Conservation of Angular Momentum	Ch10: 3	
Week 13	Nov 21 (M)	Angular Momentum Problem Solving	Ch10: 3	No discussion
	Nov 23 (W)	Applications		
	Nov 25 (F)	Holiday - Thanksgiving		
Week 14	Nov 28 (M)	Simple Harmonic Motion	Ch14: 1-2	Discussion 13 Angular Momentum
	Nov 30 (W)	Applications		
	Dec 02 (F)	<b>Exam 3 (Chapters 9-10 &amp; 12), 8:00 - 8:50 AM, location TBA</b>		
Week 15	Dec 05 (M)	Pendulum	Ch14: 3	Discussion 14 SHM & Fluid
	Dec 07 (W)	Density and Pressure	Ch13: 1-2	
	Dec 09 (F)	Buoyance	Ch13: 3	
Week 16	Dec 12 (M)	Semester Review (last class)		No discussion
	Dec 16 (F)	<b>Final Exam (Chapters 1-14), 3:30 – 5:30 PM, location TBA</b>		