

Physics 141 Course Syllabus

General Physics I - Mechanics

Spring 2016

- Course Website:** <http://uic.blackboard.com/>
- Instructors:** Dr. Adrian Barkan, barkana@uic.edu, 2150 SES, (312) 996-0101
 Prof. Fatemeh Khalili-Araghi, akhalili@uic.edu, 2146 SES, (312) 355-3322
 Prof. Claudio Ugalde, cugalde@uic.edu, 2176 SES, (312) 413-2790
- Office Hours:** Office hours for Instructors and Lab TAs will be posted on Blackboard. During officially-posted office hours, you may visit *without an appointment*.
- Textbook:** *University Physics*, 14th Edition, Young & Freedman, Chapters 1-14
- Laboratory Text:** None required. All lab documents will be provided electronically.
- Disclaimer:** The terms of this syllabus are subject to change by announcements in class, on the course website (blackboard), or by email. *Last updated 2016-01-07*

Introduction:

Physics 141 is a calculus-based course focused primarily on classical mechanics. It is the first course in a sequence of three introductory “foundation” physics courses, where Physics 141 covers classical mechanics, Physics 142 covers electricity and magnetism, and Physics 244 covers modern physics.

Registration:

Please note that the course prerequisites will be strictly enforced, and if you have not met them you will be dropped from the course. The course prerequisites are given in the UIC Schedule of Classes, and for physics 141 they are: Grade of C or better in MATH 180. Due to the high demand for this course, this requirement will not be able to be waived by the instructors.

Please be sure you are signed-up for 200 minutes of lecture (LCD) classes, and one 110-minute laboratory (LAB) class for doing experiments. Four sections of this course are being offered. Each section will meet as a full class in the times listed here:

For Short	Section	Lecture / Discussion Times	Instructor
“9am”	CRN 26635	MWF 9:00-9:50 and W 2:00-2:50	A. Barkan
“11am”	CRN 17010	MWF 11:00-11:50 and F 2:00-2:50	A. Barkan
“2pm”	CRN 17011	TR 2:00-3:15 and F 2:00-2:50	C. Ugalde
“3pm”	CRN 17009	MWF 3:00-3:50 and F 4:00-4:50	F. Khalili-Araghi

Laboratory experiments are conducted during the LAB class, scheduled for 1 hour 50 minutes long. Experiments will start on the **third** week of classes, Jan. 25 – 29; see the Table of Contents

(TOC) for details. You do **not** need to attend the 110-minute laboratory class during the first two weeks of classes. Lab classrooms are in **SEL-EAST**, the Science and Engineering Laboratory East building or more precisely **SELE** (i.e. the east-side of the big building on the **north** side of Taylor St.). **Do not confuse SELE** (the correct building) with **SELW**, the opposite side of the same building (section T-7 on the linked map), or with **SES**, the Science and Engineering South building on the south-side of Taylor Street (section T-8 of the linked map).

The Text, Lectures, and Problem-Solving:

Reading the textbook is an essential part of the course. Students will benefit the most if they read ahead *before* coming to the lecture. Students are expected to take accurate notes during the lecture and to ask relevant questions. Each student is individually responsible for the material covered in the book as well as in each lecture.

However, do not simply read the textbook and decide that you understand it. Because, eventually, your goal is to be able to solve problems on your own *without* the textbook. In particular, solve as many problems from the end of each chapter as you can (and do so *without* help from the internet). This is the primary means by which you will discover if you understand the material. It is very important that you spend time working on understanding how to apply the “big ideas” of lecture to specific problems. A good place to start is the **Suggested Problems** list on Blackboard, which we picked to show a variety of topics and difficulty levels. Begin those as soon as possible, and if you get stuck, set the problem aside and return to it later. Working in small groups is often a useful environment to tackle difficult problems. If you continue to have difficulty, take advantage of the many tutors, laboratory TAs, and instructors’ office hours for additional assistance.

Grading:

Final scores are based on the following items, with the percentage weighting as given:

Attendance/Participation	7%	(iClicker)
Written Homework	10%	(due each week on Wednesday evening)
Lab Work	13%	(pre-lab homework and in-class lab report)
Midterm Exam 1	20%	(see below for date)
Midterm Exam 2	25%	(see below for date)
Final Exam	25%	(see below for date)

A single letter grade of A, B, C, D or F is assigned at the end of the semester according to the final score each student has earned. Exam grades can be curved, but most other scores will be judged on a straight scale (after some necessary adjustments) $A \geq 90\%$ $B \geq 80\%$ $C \geq 70\%$ $D \geq 60\%$ $F \geq 0\%$. The grade of incomplete (I) is given *only* in special cases according to very strict criteria. Please note: January 22nd is the Add/Drop Deadline and March 18th is the last day to withdraw from a course and receive a grade of W on academic record.

After each midterm exam, we will post your scores and an estimated grade on Blackboard Grade Center. We will also report Midterm Grades to the Registrar based on your performance after the first midterm exam. Information about midterm grades can be found at: <http://advising.uic.edu/midterms/>

Attendance and In-Class Participation:

We will be utilizing the iClicker class-participation remote system. Every student must have their own individual remote for submitting their answers to questions in lecture (“voting”). Your same remote can be used for all “iClicker” classes at UIC, even if different courses are taken in the

same semester. However, you cannot use multiple remotes for a single course; the sync program will find scores for only one remote per student. You can purchase this remote at the UIC bookstore, or online; any version of the hardware (iClicker, iClicker2, or iClicker+) will be acceptable for PHYS 141. WiFi versions of iClicker (REEF) are problematic in some classrooms and will not be used.

Please register your iClicker device from the PHYS 141 Blackboard site, under Tools, then iClicker Student Registration, at your convenience. (We might also need to do an in-class registration procedure, at a later date. Voting will proceed smoothly; but due to a new “registration fee” at iClicker.com, we can save you a few bucks by using alternative approaches.) We/you won’t know for certain that your *registration* is correct until later; but your remote will indicate that your *voting* is working correctly each time you vote, and hence you will get all your points.

Weekly Homework:

Weekly Written Homework assignments will also be given during the semester. Each assignment typically covers topics from the previous week. Often (though not always) the assignment will be closely related to one of the Suggested Problems or other textbook problems, to illustrate the kind of variations you might encounter on the exams. Paperwork will be handled through the online Crowdmark Online Grading Platform. The assignments will be available from a link emailed to your *NetID@uic.edu* email account. Download, print, and complete the homework on paper. Submit the assignment online according to the Crowdmark instructions. Some penalty will be automatically applied to late submissions. BUT, once the graders begin grading, no further submissions will be accepted by the Crowdmark system; this could happen immediately after the deadline, so plan to submit it on time!

Laboratory:

Physics is at its heart an experimental science, and the laboratory component is an integral part of this course. The LAB section held in SELE is your actual 1 hour 50 minute lab experiment.

Your lab score will be based on a short, weekly “pre-lab” homework assignment, and on your small-group lab-experiment report. The homework will be made available online via Blackboard, and is primarily intended to ensure you read through the lab manual *before* coming to class. (Some experiments will keep you busy for the entire class period, and you must come prepared or risk not completing some of the work.) All other laboratory documents will also be available online, via Blackboard.

All experiments ***must be completed*** to pass this course. If you miss a lab, you can only make it up during the allowed weeks and provided your TA is available and you have a legitimate excuse. Time has been set aside in the schedule for this purpose. Make-up labs must be scheduled in advance, and ideally should be scheduled before you are actually absent from class. Only one lab can be made-up per make-up class.

Exams:

There will be three written “closed book” examinations during the course of the semester – two midterm exams, and a final exam. Common exams are given to all Physics 141 sections and a common grading system is applied. This is the most important requirement of this course, accounting for 70% of your total score. It is your responsibility to be available for all examinations; alternative exam times will only be arranged in the case of conflict with other UIC classes that you are properly registered for. There will be **no** make-up exams given after the exams are over – **no exceptions**.

Each of the three exams covers approximately 5 weeks’ worth of materials, and therefore is not intended to be cumulative. However, later topics are often built upon earlier ones; therefore, earlier concepts might appear on later exams, and a review of all topics before each exam is recommended. Like the Written Homework, problems can be taken directly from the text (especially

the Suggested Problem List); or be from lecture; or be modified versions of those problems; or be completely new problems that use the same concepts.

Students must bring to the exams a working calculator, and pens or pencils. Textbooks, cell phones, computers, or *any* forms of wireless communication are strictly prohibited in an exam. Any calculator is acceptable, but cell phones should not be used as a calculator since we cannot monitor texting, etc. Giving or receiving aid in an examination is cause for dismissal from the University. Any other violation of academic honesty can have the same effect.

The exams are scheduled as follows:

First Midterm - Tuesday, February 16, 2016, 6-8pm, location TBA

Second Midterm - Tuesday, March 29, 2016, 6-8pm, location TBA

Final Exam - Wednesday, May 4, 2015, 6-8pm, location TBA

It is your responsibility to be available for all examinations, to take the exams at the arranged time, and to ensure your exam is turned-in and collected by the Instructor.

Course Web Site:

Online course materials and official communications will be handled through the UIC blackboard system <http://uic.blackboard.com>. Your Instructor might choose to also post additional, lecture-specific materials at another Blackboard site or other online location.

Students with disabilities who require accommodations for access and participation in this course must be registered with the Disability Resource Center (DRC). Please contact DRC at 312/413-2183 (voice) or 312/413-4822 (video).

Physics 141 Table of Contents – Spring 2016

Last updated: 2016-01-06

Text: *University Physics*, 14th Edition, Young & Freedman, Chapters 1-14

Laboratory: All necessary documents will be posted online

Weekly Written Homework Assignments: distributed by email, submit by email, due Wednesday evenings

First Midterm - Tuesday, February 16, 2016, 6-8pm, location TBA on Blackboard, covering material from Chapters 1-5.2

Second Midterm - Tuesday, March 29, 2016, 6-8pm, location TBA on Blackboard, covering material from Chapters 5-9

Final - Wednesday, May 4, 2016, 6-8pm, location TBA on Blackboard, mainly focused on Chapters 10, 11, 13, and 14.

Week	Text	Topics	Written Homework	Lab
#1 of 15	Jan. 10-16	<p>Chapter 1 1.1 to 1.10</p> <p>Chapter 2 2.1 to 2.2</p> <p>Vectors Magnitude and Direction, Components, Addition, Products</p> <p>Motion in One Dimension Displacement, Time Average Velocity</p> <p>Overview of differentiation</p> <p>Instantaneous Velocity</p>	<p>Distributed by email: WHW-00, WHW-01 and WHW-02</p> <p>Due Jan. 15 by email submission: WHW-00</p>	No Lab Scheduled
#2 of 15	Jan. 17-23	<p>Chapter 2 2.3 to 2.5</p> <p>Chapter 3 3.1 to 3.2</p> <p>Acceleration Motion with Constant Acceleration Freely Falling Bodies Velocity and Position by Integration</p> <p>Motion in Two or Three Dimensions Position and Velocity Vectors Acceleration Vector Parallel and Perpendicular Components</p>	<p>Distributed by email: WHW-03</p> <p>Due Jan. 20 by email submission: WHW-01</p>	No Lab Scheduled
#3 of 15	Jan. 24-30	<p>Chapter 3 3.3 to 3.5</p> <p>Motion in Two or Three Dimensions (cont) Projectile Motion Circular Motion</p>	<p>Distributed by email: WHW-04</p>	<p>Computer Exp <u>1</u> <i>Introduction</i></p>

			Relative Velocity	Due Jan. 27 by email submission: WHW-02	<i>and Displacement</i>
#4 of 15	Jan. 31 -Feb. 6	Chapter 4 4.1 to 4.6	<u>Newton's Laws of Motion</u> Force and Interactions Newton's First and Second Law Mass and Weight Newton's Third Law Free-Body Diagrams	Distributed by email: WHW-05 Due Feb. 3 by email submission: WHW-03	Computer Exp 2 <i>Velocity and Acceleration</i>
#5 of 15	Feb. 7-13	Chapter 5 5.1 to 5.4	<u>Applying Newton's Laws</u> Particle in Equilibrium (Statics) Dynamics of Particles Frictional Forces Dynamics of Circular Motion <i>Review for <u>First Midterm Exam</u></i>	Distributed by email: WHW-06 Due Feb. 10 by email submission: WHW-04	Computer Exp 3 <i>Force</i>
#6 of 15	Feb. 14- 20	Chapter 2 2.6 Chapter 6 6.1 to 6.4	Overview of Integration <u>Energy and Kinetic Energy</u> Work and Kinetic Energy Work with Varying Forces Power	Distributed by email: WHW-07 Due Feb. 17 by email submission: WHW-05	<i>No Regular Labs Lab Make-ups Available this week</i>
#7 of 15	Feb. 21- 27	Chapter 7 7.1 to 7.5	<u>Potential Energy and Energy Conservation</u> Gravitational and Elastic Potential Energy Conservative and Nonconservative Forces Force and Potential Energy Energy Diagrams	Distributed by email: WHW-08 Due Feb. 24 by email submission: WHW-06	Air-Table Exp 4 <i>Projectile Motion</i>
#8 of 15	Feb. 28 -Mar. 5	Chapter 8 8.1 to 8.5	<u>Momentum, Impulse and Collisions</u> Momentum and Impulse Conservation of Momentum Elastic and Inelastic Collisions Center of Mass	Distributed by email: WHW-09 Due Mar. 2 by email submission: WHW-07	Computer Exp 5 <i>Work and Energy</i>
#9 of 15	Mar. 6-12	Chapter 9 9.1 to 9.6	<u>Rotation of Rigid Bodies</u> Angular Velocity and Acceleration	Distributed by email: WHW-10	Computer Exp 6 <i>Collisions</i>

			Rotation with Constant Angular Acceleration Linear and Angular Kinematics Energy in Rotational Motion Parallel-Axis Theorem Moment of Inertia	Due Mar. 9 by email submission: WHW-08	
#10 of 15	Mar. 13-19	Chapter 10 10.1 to 10.4	<u>Dynamics of Rotational Motion</u> Torque Rigid-Body Angular Acceleration Rigid-Body Rotation about a Moving Axis Work and Power	Distributed by email: WHW-11 Due Mar. 16 by email submission: WHW-09	Computer Exp 7 <i>Rotations</i>
-	Mar. 20-26				
#11 of 15	Mar. 27-Apr. 2	Chapter 10 10.5-10.7	<u>Review for Second Midterm Exam</u> <u>Dynamics of Rotational Motion</u> Angular Momentum Conservation of Angular Momentum Gyroscopes and Precession	Distributed by email: WHW-12 Due Mar. 30 by email submission: WHW-10	<i>No Regular Labs</i> <i>Lab Make-ups Available this week</i>
#12 of 15	Apr. 3-9	Chapter 11 11.1 to 11.5	<u>Static Equilibrium and Elasticity</u> Conditions for Equilibrium Center of Gravity Rigid-Body Problems Stress, Strain and Elastic Moduli Elasticity and Plasticity	Distributed by email: WHW-13 Due Apr. 6 by email submission: WHW-11	<i>No Regular Labs</i> <i>Lab Make-ups Available this week</i>
#13 of 15	Apr. 10-16	Chapter 13 13.1 to 13.8	<u>Gravitation</u> Newton's Law of Gravitation Weight Gravitational Potential Energy The Motion of Satellites Kepler's Laws Spherical Mass Distributions Apparent Weight and Earth's Rotation Black Holes	Distributed by email: WHW-14 Due Apr. 13 by email submission: WHW-12	Air-Table Exp 8 <i>Conservation of Angular Momentum</i>
#14 of 15	Apr. 17-23	Chapter 14 14.1 to 14.8	<u>Periodic Motion</u> Describing Oscillations Simple Harmonic Motion	Due Apr. 20 by email	<i>No Regular Labs</i>

			Energy in SHM Applications of SHM The Simple Pendulum The Physical Pendulum Damped Oscillations Forced Oscillations and Resonance	submission: WHW-13	<i>Lab Make-ups Available this week</i>
#15 of 15	Apr. 24-30		Complete unfinished material Review for <u>Final Exam</u>	Due Apr. 27 by email submission: WHW-14	<u>Computer</u> <u>Exp 9</u> <i>Oscillations</i>