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# College Physics-I

PHY 2053C-0001 Spring 2014: January 06 - April 29, 2014  
M, W, Fr 2:30 PM - 3:20 PM, MAP 0260

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Instructor: Dr. Aniket Bhattacharya

Office: PS 304

Office Hours: F 10:00 AM -11:00 AM

F 1:00 PM - 2:00 PM

Or by appointment

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## Course Description :

PHY 2053 is the first of a two-semester sequence in introductory physics offered primarily for students majoring in information technology, the biological sciences and pre-health professions. Emphasis is placed on understanding major principles, and mathematics is used to clarify concepts. Students must have a good working knowledge of algebra and trigonometry. The course is quite intense and will require you to invest considerable time in study and problem solving.

## Objectives:

The major objectives of this course are for students to learn the fundamental principles of mechanics, to develop solid and systematic problem solving skills, and to lay the foundations for further studies in science, pre-health professions, and engineering.

## Prerequisites:

Prerequisites are MAC 1105 and MAC 1114. This includes, but it is not limited to, algebraic expressions, higher order polynomials, exponential and logarithmic functions, circle arc length, circular functions, identities, inverse functions, function of angles, triangle solving.

## Laboratory & Recitation:

The laboratory component of PHY 2053 covers material related to class lectures. The laboratory is required for all students enrolled in the course. Approximately first hour of each laboratory work will be devoted to recitation. The combined laboratory and recitation scores will determine 18% of your final grade in PHY 2053C.

## Course Text & related materials:

- Text: **PHYSICS, Eighth Edition** (Volume One) (required)  
Authors: Cutnell & Johnson .  
Publisher: John Wiley & Sons, Inc.  
Please note that we will be using 8<sup>th</sup> edition although the 9<sup>th</sup> of the text is available.
- **Laboratory Manual:** PHY2053 Laboratory Manual will be available at the book store. All students should have this manual by the end of first week of classes.
- A **WebAssign** is required as a component of the course to solve homework problems. In order to access the WebAssign homework please visit [www.webassign.net](http://www.webassign.net) and log in to your account using your NID (usually two letters and 6 digits that you use in you knights

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email) as your username and the **class key: ucf 6492 7634** for this course. If you have registered for this course later than Jan 03 then it is likely that your name is not listed in the WebAssign. Please contact me. I'll add you in the class list.

- ***iClicker*:**

We will be using the *iClicker* feedback system in class every day. Both *iClicker-2* and the order versions will work for this class. You may get one secondhand, and you should be able to sell your used iClicker at the end of the semester if you do not need it for future courses. Register your clicker at [www.iclicker.com/registration](http://www.iclicker.com/registration). Be sure to enter your NID in the Student ID field on the web site, including the two leading letters. If you run into problems with an older version please see me.

- **PHY 2053 Lab & Recitations:**

You need to complete all the labs. If you miss a lab or know in advance that you'll not be able to make it due to some unavoidable situation (which will require authentication/documentation), then you must make every effort to attend another section of the lab to make it up. Typically the first hours of the lab will be devoted to problem solving session followed by a quiz. These sessions will be your opportunity to get additional help in problem solving.

## **Course Organization & expectation:**

The course is quite intense and it will require you to invest considerable amount of time in studying and problem solving. The course will consist of a set of class lectures with demonstrations, unannounced quizzes, and I-clicker questions. Ideally, class time will be used to clarify the concepts that you have read in the text and to work out examples to show and help avoid common pitfalls. To obtain maximum benefit from this course you should read the materials *before* and *after* they are covered in class. It is very difficult but not impossible to catch up if you fall behind. Experience has shown that problem solving done in class is helpful for everybody only if the majority of the students are familiar with the topic. **Class attendance** is very important since some of the quizzes, test questions will be drawn from the class lectures, demonstrations, and discussions. Thus, reading the material prior to class attendance is not only required but will be helpful to yourself, and also to the rest of the class.

## **Homework & Quizzes :**

Homework will be submitted online at <http://www.WebAssign.net/login.html>. You are expected to check for new assignments without being notified. Doing a thorough job on the homework problems, *i-Clicker* questions and quizzes can earn you up to 22% of the total credit for the course and will be a good preparation for the exams. The quizzes will NOT be announced. Quizzes will be based on previously covered material up to and including the quiz day reading assignment. Usually, they will consist of 1 problem with several parts or several multiple choice problems to be answered in 10 minutes or less. It is anticipated that about 10-12 quizzes will be given during the semester. **The lowest 2 scores will be dropped.** As two quizzes will be dropped, there will be **no make-up quizzes !**

## **Examinations:**

You will have **three in-class tests** and a **comprehensive final**. All examinations will be

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closed book and closed notes. A formula sheet will be provided. All exams may be problem solving, multiple choice, or a combination of the two. For written problems, you need to provide the steps that lead to your answer. The lowest score among the three tests will be dropped to calculate the final grade. The weights of each item in determining the final grade is listed below. You also MUST know your student ID number and record it accurately in the proper location on the test form and on each written exam so that the computer can keep track of your scores as the term progresses. (You must SHOW your UCF photo ID card when you turn in your exam answer sheet.) A protractor, ruler and a nonprogrammable calculator with trigonometric capabilities may be used during exams. Cell phones must be turned off during the tests and the final.

### Grades:

The grades of exams, homework, quizzes, i-Clicker scores, and labs will be added together to determine your grade. NO GRADE INFORMATION WILL BE GIVEN OVER THE TELEPHONE or by email.

**Your grade in this course is based on the following weights:**

In-class exams (2 (each 18%) out of 3)	36 %
Comprehensive Final exam	24 %
Quizzes	10 %
I-clicker questions	2 %
Homework	10 %
Laboratory	18 %
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Total	100 %

**Final grades** will be given according to the following scale:

<b>A</b>	85 % and above
<b>B</b>	(75 - 84) %
<b>C</b>	(60 - 74) %
<b>D</b>	(50 - 59) %
<b>F</b>	< 50 %

For borderline cases +/- grades will be considered.

**Tentative Examination schedules and coverage (subject to change):**

<b>Test 1</b>	<b>February 03 lecture period (MAP 0260)</b>	<b>Chapters 1 - 3</b>
<b>Test 2</b>	<b>March 14 lecture period (MAP 0260)</b>	<b>Chapters 4 - 6</b>
<b>Test 3</b>	<b>April 14 lecture period (MAP 0260)</b>	<b>Chapters 7 - 9</b>
<b>Final</b>	<b>April 23, 1:00 PM - 3:50 PM (MAP 0260)</b>	<b>Chapters 1 - 10</b>

### Missed Work Policy:

It is Physics Department policy that making up missed work will only be permitted for University-sanctioned activities and bona fide medical or family reasons. Authentic justifying documentation must be provided in every case (in advance for University-sanctioned activities).

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At the discretion of the instructor, the make-up may take any reasonable and appropriate form including, but not limited to the following: allowing a 'dropped' exam, a replacement exam, replacing the missed work with the same score as a later exam. All assignment and exam grades are final 72 hours after they have been returned. Please contact me before this 72-hour period is over if you have a grading dispute.

### **Other Policies:**

During exams and quizzes only a formula sheet (provided) can be used. No books, lecture notes or anything else is allowed to be used. You should show your work in quizzes and tests, i.e., a step by step solution of the problem should be presented. No attempt of cheating will be tolerated. If a student tries to cheat at a quiz or a test, the student will earn an F for that quiz or test. All electronic devices such as cell phones, laptop computers, blackberries, i-phones etc. should be turned off during class hours, exams and quizzes. Any attempt to use such devices, or use books or lecture notes, or communications and exchange of notes between students during tests or quizzes will be considered an attempt of cheating.

### **Other relevant informations:**

- **Supplemental Instruction:** Supplemental instruction (SI) is an academic success and retention program for historically difficult courses. SI uses regularly scheduled study sessions led by peers called SI leaders. SI leaders have taken the course before and received an A. They undergo continuous training in proactive strategies to conduct effective SI sessions. SI leaders attend all classes, take notes, and do all the assignments. They conduct 4 SI sessions each week. During these sessions, SI leaders help students apply study strategies to the course content. SI leaders help students work cooperatively using the textbook, lecture notes, and other materials to build accurate information, solve problems, work on sample tests and practice to prepare for exams. SI leaders do not relecture but create a comfortable atmosphere for teamwork and group study and models effective study habits. In SI sessions, students learn how to integrate course content and study skills while working together. SI sessions are voluntary, anonymous, and free to all students enrolled in courses that offer SI. Students who attend SI have a wide range of academic backgrounds and ability. Research shows that students who attend SI sessions on a regular basis can earn on an average one half to a full letter grade higher than their peers who do not attend SI.
- **Conduct:** Please turn off your cell phones before entering class, and please don't have any sidebar conversations during class. There will be ample opportunity for you to talk during class at certain times. We will take a 2-3 minute break each day, and are also encouraged to talk during clicker questions. However, it is imperative that the class is quiet at all other times so that your fellow students are not distracted. I encourage you to raise your hand and ask relevant questions in class.
- **Disability Access Statement:** As stated on the website [www.sds.ucf.edu/Faculty\\_guide](http://www.sds.ucf.edu/Faculty_guide), "The University of Central Florida is committed to providing reasonable accommodations for all persons with disabilities. This syllabus is available in alternate formats upon request. Students with disabilities who need accommodations in this course must contact the professor at the beginning of the semester to discuss needed accommodations. No accommodations will be provided until the student has met with the professor to re-

quest accommodations. Students who need accommodations must be registered with Student Disability Services, Student Resource Center Room 132, phone (407) 823-2371, TTY/TDD only phone (407) 823-2116, before requesting accommodations from the professor.”

- **Email:** It is very likely that I will need to send email to you regarding class logistics or material. These e-mails will go to the e-mail address on record at UCF. In addition, announcements will be posted on Webassign. If you write an email to me, please identify yourself in it, and **please include PHY2053 in the subject line** and send e-mail to *aniket@physics.ucf.edu*.
- **Calculators and Laptops:** Calculators may be used for exams and for clicker questions. You may take notes on a laptop. However, you may not use your laptop for facebook, web surfing, or other activities not directly related to class.
- **Important Dates:**
  - Classes begin: Jan 06, 2014
  - Late Registration: Jan 06 - Jan 10, 11:59 PM, 2014
  - Drop/swap deadline on myUCF: Jan 09, 2014
  - Add deadline on myUCF: Jan 10, 2014
  - Spring Break: March 03 - March 08 (No lectures/labs)
  - Withdrawal deadline: March 18, 2014
  - Grade forgiveness deadline:** March 18, 2014
  - Last Day to Reinstate Drop for Nonpayment Classes Deadline: March 18, 2014
  - Classes end: April 21, 2014
  - Final exam: Wednesday, April 23, 2014 1:00 PM 3:50 PM (MAP 0260)**
- **Holidays:**
  - Martin Luther King Jr. Day: Monday, January 20, 2014

### PHY 2053C-0002: Spring 2014 Dr. Bhattacharya Tentative Schedule

Weeks	Dates	Sections	Lecture Topics	Recitation
<b>Week 1</b>	Jan 06	1.1 - 1.5	Units, SI units, dimensions, dimensional analysis	<b>Review</b>
	Jan 08	1.5 - 1.8	Scalars and vectors, vector algebra, unit vectors	trigonometry
	Jan 10	2.1 - 2.3	Speed, velocity, displacement, acceleration	algebra
<b>Week 2</b>	Jan 13	2.3 - 2.4	Kinematics with constant acceleration	<b>Ch 1:</b> 15
	Jan 15	2.4 - 2.6	Free fall, other examples of kinematics	21, 24,
	Jan 17	2.7 - 2.8	Graphical analysis of velocity and acceleration	40, 49
<b>Week 3</b>	Jan 20	<b>Martin Luther King Jr. Day: No Classes</b>		
	Jan 22	3.1 - 3.2	Kinematics in two dimensions	<b>Ch 2:</b> 9, 18
	Jan 24	3.2 - 3.3	Kinematics in two dimensions, projectile motions	35, 44, 62
<b>Week 4</b>	Jan 27	3.3	Projectile motions (continued)	<b>Ch 3:</b> 2, 8,
	Jan 29	3.4	Relative velocity	16, 21, 27
	Jan 31		Review and problem solving for Test-I	28, 29
<b>Week 5</b>	<b>Feb 03</b>		<b>Test-I: Chapters 1, 2, &amp; 3; duration 50 minutes</b>	<b>Ch 3:</b> 42,78
	Feb 05	4.1 - 4.4	Newtons 1st and 2nd Law of motion	<b>Ch 4:</b> 3, 5,12
	Feb 07	4.5 - 4.7	Newton's 3rd law, law of gravitation and weight	

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<b>Weeks</b>	<b>Dates</b>	<b>Sections</b>	<b>Lecture Topics</b>	<b>Recitation</b>
<b>Week 6</b>	Feb 10	4.8 - 4.9	Normal force, apparent weight, friction	<b>Ch 4:</b> 45, 58
	Feb 12	4.10 - 4.12	Tension force, Applications of Newton's law	71, 76
	Feb 14	4.11 - 5.3	Applications of Newton's law	
<b>Week 7</b>	Feb 17	5.1 - 5.2	Uniform circular motion, centripetal acceleration	<b>Ch 5:</b> 10, 15
	Feb 19	5.3 - 5.5	Applications: banked curves, satellites	21, 29, 60
	Feb 21	5.6 - 5.7	Weightlessness; vertical circular orbits	
<b>Week 8</b>	Feb 24	6.1 - 6.3	Kinetic energy and work, work done by force,	<b>Ch 6:</b> 9, 11,
	Feb 26	6.2 - 6.4	work-energy theorem, potential energy (PE)	20, 26, 45
	Feb 28	6.5 - 6.7	Conservation of mechanical energy, Power	57
<b>Week 9</b>		<b>Spring Break: No Classes Mar 03, 05, 07</b>		
<b>Week 10</b>	Mar 10	7.1 - 7.2	Impulse, momentum, conservation of linear momentum	52, 61, 64
	Mar 12	7.1 - 7.2	Elastic and inelastic collisions in one dimension	<b>Ch. 7:</b> 7
	<b>Mar 14</b>		<b>Test-II: Chapters 4, 5, &amp; 6; duration 50 minutes</b>	
<b>Week 11</b>	Mar 17	7.2 - 7.3	Elastic and inelastic collisions in one dimension	14, 32, 40
	Mar 19	7.3- 7.4	Collisions in two dimensions, center of mass	45
	Mar 21	8.1 - 8.3	rotational kinematics, angular velocity & acceleration	
<b>Week 12</b>	Mar 24	8.3 - 8.5	centripetal and tangential acceleration	<b>Ch. 8:</b> 12
	Mar 26	8.6 - 8.7	Rolling motion, Angular momentum	25, 37, 54,
	Mar 28	9.1 - 9.2	Torque: rigid body in equilibrium	58
<b>Week 13</b>	Mar 31	9.2 - 9.3	Rigid body, center of gravity	<b>Ch 9:</b>
	April 02	9.3 - 9.4	Newton's 2nd law for rotational motion	12, 25, 37, 44
	April 04	9.5	Rotational work and energy	49, 57, 60
<b>Week 14</b>	April 07	10.1	Ideal spring and Hooke's law	<b>Ch 9:</b> 52, 72
	April 09	10.1 - 10.2	simple harmonic motion (SHM),	<b>Ch 10:</b> 22,
	April 11	10.3 - 10.4	Energy in SHM, pendulum	24, 27
<b>Week 15</b>	<b>April 14</b>		<b>Test-III: Chapters 7, 8, &amp; 9; duration 50 minutes</b>	
	April 16	10.5 - 10.6	damped and Forced SHM, resonance	
	April 18	10.7 - 10.8	Deformation of solids, stress, strain	
<b>Week 16</b>	April 21		Review for the comprehensive (Chapters 1- 10) final exam	
	<b>April 23</b>		<b>Comprehensive Final Exam (Chapters 1 - 10)</b> <b>1:00 pm - 3:50 pm</b>	

Please note that this course outline is subject to change. The latest version will be available at Webcourses and/or WebAssign. I urge that you plan ahead and make a note of all the test dates and the final.