PHYS 107 — Introductory Physics II — Spring 2016

Instructor: Dr. Rick DeJonghe, SES 2154, rdejon2@uic.edu

Lectures: CRN 16968 — M 5-5:50 pm, TR 5-6:15 pm, all in SES 230.
CRN 19527 — TR 3:30-4:45 pm in Lecture Center C3, F 4:00 pm in SES 230.

Office Hours: TR 11:00 am - 12:00 pm and by appointment.

Textbook: College Physics: A Strategic Approach (3rd Edition), Knight, Jones and Field.

Course Website: `http://blackboard.uic.edu`

Prerequisites: Grade of C or better in PHYS 105 and Grade of C or better in PHYS 106.

Disclaimer: The terms of this syllabus are subject to change by announcements in class, on the course website (Blackboard), or by email.

Course Description

4 hours. Non-calculus course. Electrostatics; electric current; magnetism; Faraday's law; Maxwell's relations; electromagnetic radiation; introduction to quantum mechanics; the Heisenberg uncertainty principle; Bohr model; nuclear physics; particle physics. Credit is not given for PHYS 107 if the student has credit for PHYS 142.

Introduction

Physics 107 is a non-calculus based physics course focused primarily on electricity and magnetism, physical and geometrical optics, and selected modern physics topics. It is the second course in a sequence of two introductory "foundation" physics courses. Please be sure you have also registered for both a 108-discussion (DIS) and 108-laboratory (LAB) section. Although physics 108 is a separate course, with a separate grade, both Physics 107 and 108 should be taken simultaneously.

Warning: For many students, Physics 107 is the most challenging class they take at UIC. This course is more difficult than Physics 105, mostly due to the fact that the material is less intuitive. Everyone has experiences with rolling balls and spinning wheels, while the topics of this course — electric and magnetic fields, quantum and nuclear physics — are outside the realm of direct human experience. The second reason Physics 107 is more difficult than Physics 105 is that it builds off the material in Physics 105, and so any lack of understanding from that course will come back to haunt you. You will need to be comfortable with vectors, 2d motion, forces, torques, energy, work, and waves in order to do well in this course. As with Physics 105, you will *not* receive a passing grade simply for showing up and "making an effort"; you must attain a basic proficiency with the material.

Grading

The final score will be determined according to the following weights.

Item	Percent
Participation (iClicker):	5%
Quizzes (lowest one dropped):	5%
Pre-lecture Assignments (Mastering Physics):	5%
Homework (Mastering Physics):	10%
First Midterm:	25%
Second Midterm:	25%
Final Exam:	25%

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, according to the following breakdown (this will *not* change):

A: 80%+ B: 65%+ C: 50%+ D: 35%+ F: < 35%

The grade of incomplete (I) is given only in special cases according to very strict criteria.

Mastering Physics

Both the Homework and the Pre-lecture assignments will be administered through the Mastering Physics website (`www.masteringphysics.com`). To register and log in for the first time, use the following class ID:

`UICPHY107SPRING2016DEJONGHE`

Note: If you have already purchased Mastering Physics access for a previous course, you do *not* need to purchase it again.

Course Components

Lectures

You are expected to attend all lectures, and you are responsible for all material covered and announcements made in lecture. Lecture slides will be posted on the Blackboard site, but we will not be using lecture capture in this course.

iClicker — Participation

Every day during class you will need to bring your iClicker. There will be a handful of questions asked each day — you will receive 3 points for each question answered, and one additional point for each correct answer. It is recommended that you do the assigned reading in the pre-lecture assignment before each class in order to be able to consistently answer the questions correctly.

You must register your iClicker correctly *before finals week* to receive participation points. To register your iClicker use the iClicker registration tool on Blackboard. If you have not registered your iClicker correctly by the final day of classes, you may still register before the final for *half* credit.

Quizzes

Three quizzes will be given in class during the semester. These will be similar to the long problems on the exams. To help prepare you for the long problems on the exams, the quizzes will be timed — you will have exactly 20 minutes for each quiz. As described for the exams below, you may bring a cheat-sheet, and no equations or constants will be provided for you. Like the exams, **no** make-up quizzes will be given; however, the lowest quiz grade will be dropped.

The Text and Pre-Lecture Assignments

The Pre-lecture assignments are on Mastering Physics (labeled **PL xx**), and will involve reading the text, possibly watching a short video, and answering a few questions (usually about 5-8). Each assignment should take about an hour to complete (including the reading).

Homework

- **Homework is the core of this class:** A major part of what you are expected to learn in this class will come as a result of doing homework. Problems will not usually be "plug-and-chug" manipulation exercises — most will be reasonably challenging. Expect each week's homework to take 4-6 hours to complete.

- **Online Assignments and Adaptive Follow-ups:** The online homework is on Mastering Physics, and consists of core homework assignments (the assignments labeled **HW xx**), as well as adaptive follow-up assignments (which will appear after the core assignment is completed). The adaptive follow-up assignments are individually tailored, and will be due two days after the original assignment.

- **Written Homework:** In addition to the online homework, there will be additional written (paper) homework problems. Solutions for written homework problems will be posted along with the problems in the "Written Homework" section of the Blackboard website. These will not be turned in, but are essential to learning the material in the course.

- **Homework Grading:** The core online homeworks will comprise 90% of your Homework grade, and the adaptive follow-ups will comprise 10% of your Homework grade. Written homeworks will not be graded. Late core online homeworks will typically be penalized at a rate of 30% per day, and late adaptive follow-up assignments will receive no credit.

Examinations

- There will be three written examinations during the course of the term. They will consist of about 20 multiple choice problems, and 3 long problems (similar in length to written homework problems and quizzes).
- Students should bring to the exams a working calculator, #2 pencils with good erasers, and one 8.5" × 11" cheat-sheet (double-sided) with anything you like on it. No equations or physical constants will be provided on the exam. Textbooks, cell phones, computers, or any forms of wireless communication are strictly prohibited in an exam. Giving or receiving aid in an examination is cause for dismissal from the University.
- It is your responsibility to be available for all examinations, to take the exams at the arranged time, and to insure your exam is turned in and collected by the instructor. There will be **no** make-up exams given after the exams are over — no exceptions. If you have a UIC class conflict, contact us well in advance (by the beginning of week 3) to schedule an alternate time.
- The sections of the book which will be covered on the exam are listed in the table below. Any sections which do not occur on the following course outline will *not* be covered on the exam.

Exam	Sections Covered	Date and Time
Midterm 1	**20.1-21.5, 21.7-23.6**	**Wed. Feb. 10 at 6pm**
Midterm 2	**23.7-24.7, 25.1-25.5, 25.7-26.2, 17.1-17.5**	**Wed. Mar. 16 at 6pm**
Final	**18.1-19.3, 19.6, 25.6, 28.1-28.7, 29.1-29.7, 30.1-30.5**	**Mon. May 2 at 6pm**

Phys 108 (Discussion and Lab)

Be sure you have also signed up for a Physics 108 discussion (DIS) and lab (LAB) section. Physics 108 is an entirely separate course which follows its own pace and is not connected with Physics 107 in *any* way (other than the fact that we cover some similar topics) — please direct any Physics 108 questions to your lab or discussion TA, or to professor Sivananthan (siva@uic.edu). Furthermore, if the connection between Physics 107 and Physics 108 (or lack thereof) is not to your liking, please let the Physics department in your course evaluations at the end of the semester — we are always looking to improve the student experience in our classes.

Course Outline

The following is a tentative course outline, which is subject to change. The topics and readings will probably not align exactly with the weeks they are listed in as the course progresses.

Week/Date	Reading	Topics	Homework	Quizzes/Exams
1	20.1 - 20.5	Electric charges and fields	PL 01, 02	—
1/11			HW 00	
2	20.6 — 20.7	Conductors, forces/torques on charges	PL 03, 04	—
1/18	21.1 - 21.5	Electric potential	HW 01	
3	21.6 — 21.8	Electrical potential and capacitors	PL 05, 06	Quiz 1 (1/28)
1/25	22.1 - 22.5	Current, Resistance, Ohm's Law	HW 02	covers 20.1-21.5
4	22.6	Direct current circuits	PL 07, 08, 09	—
2/1	23.1 - 23.6		HW 03	
5		*Review for Midterm 1*	HW 04	**Midterm 1**
2/8	23.7 — 23.8	RC Circuits, Neurons		2/10 - 6pm
6	24.1 - 24.6	Magnetic fields and forces	PL 10, 11, 12	—
2/15				
7	24.7	Magnetic dipoles	PL 13, 14	—
2/22	25.1 - 25.4	Magnetic induction	HW 05	
8	26.1-26.2	AC, transformers	PL 15, 16	Quiz 2 (3/3)
2/29	25.5	Electromagnetic Radiation	HW 06	covers 23.7-25.4
9	25.7	Electromagnetic spectrum	PL 17, 18	—
3/7	17.1 - 17.5	Interference and Diffraction	HW 07	
10		*Review for Midterm 2*	HW 08	**Midterm 2**
3/14	18.1-18.2	Reflection, Ray tracing		3/16 - 6pm
3/21	—	**Spring Break**	—	—

Week/Date	Reading	Topics	Homework	Quizzes/Exams
11	18.3-18.7	Refraction, Lenses and Mirrors	PL 19, 20, 21	—
3/28	19.1-19.3,19.6	Human Eye, Dispersion		
12	28.1-28.6	X-ray diffraction, Photoelectric effect	PL 22, 23	—
4/4		Matter waves, Energy Quanization	HW 09	
13	28.7	Uncertainty Principle	PL 24, 25	—
4/11	29.1-29.4	Spectroscopy, Bohr Model	HW 10	
14	29.5-29.7	Quantum-mechanical Atoms	PL 26, 27	Quiz 3 (4/21)
4/18	30.1-30.2	Nuclear structure and stability	HW 11	18.1-19.6,28.1-29.4
15	30.3-30.5	Radioactive Decay, Half-life	PL 28	—
4/25		*Review for Final*	HW 12	
16	—	**Final Exam**	—	Final (5/2)

Useful Information

Academic Calendar

`http://catalog.uic.edu/ucat/academic-calendar/`

Additional Help

Physics 107 tutoring will be available in the Science and Learning Center SES 201B (next to Bunsens Cafe). Tutoring hours will be listed at the center, and should also be available online (`http://phys.uic.edu/physics/undergraduate-studies/tutoring-schedule`) by the end of the second week of class. This is a free service provided by the Physics Department.

Late Registration and Withdrawal

Friday, January 22: Last day to complete late registration; last day to add a course(s) or make section changes; last day to drop individual courses via Student Self-Service without receiving W (Withdrawn) grade on academic record. Last day to submit Withdraw from Term request via Student Self-Service and receive 100% cancellation of tuition and fees.

Friday, March 18: Last day for undergraduate students to use optional late drop in college office and receive grade of W on academic record.

Grade Point Average Recalculation

Students may repeat a course to increase their knowledge of the subject matter. In LAS, courses with an A, B, or C grade may not be repeated. Courses with D or F grades may be repeated once without written permission. Undergraduate students are allowed grade point average recalculation in a maximum of four repeated courses. Under the course repeat policy, all courses taken and their grades appear on the transcript in the semester in which they were taken. Under the grade point average recalculation policy, the grade earned the first time the course was taken will be dropped from the calculation of the cumulative GPA and the grade(s) earned when the course was repeated will be used in the calculation. Grade point average recalculation for a repeated course is *not* automatic – for the grade point average recalculation policy to apply, a student must declare to his or her college the intent to repeat a course for a change of grade. Students must submit this request to their college before the end of the official add/drop period. The course must be repeated within three semesters of the receipt of the original grade, and it must be taken at UIC. Go to `http://www.las.uic.edu/students/current-undergraduate/academics/academic-policies-procedures/repeating-a-course-with-gpa-recalculation` for more details.

University Policies

Academic Honesty

As an academic community, the University of Illinois at Chicago is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community – students, staff, faculty, administrators – share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students shall be handled pursuant to the **Student Disciplinary Policy**. See the following website for details — `http://dos.uic.edu/conductforstudents.shtml`.

Religious Holidays and Observance

Students who wish to observe their religious holidays shall notify the faculty member by the tenth day of the semester of the date when they will be absent unless the religious holiday is observed on or before the tenth day of the semester. In such cases, the student shall notify the faculty member at least five days in advance of the date when he/she will be absent. The faculty member shall make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an exam or assignment equivalent to the one completed by those students in attendance. If the student feels aggrieved, he/she may request remedy through the campus grievance procedure. `http://www.uic.edu/depts/oae/docs/ReligiousHolidaysFY20132015.pdf`

Grievance Procedures

UIC is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity involving students and employees. Freedom from discrimination is a foundation

for all decision making at UIC. Students are encouraged to study the University's "Nondiscrimination Statement". Students are also urged to read the document "Public Formal Grievance Procedures". Information on these policies and procedures is available on the University web pages of the Office of Access and Equity: `www.uic.edu/depts/oae`

For Students with Disabilities

Students with disabilities who require accommodations for access and participation in this course must be registered with the Office of Disability Services (ODS). Please contact ODS at 312/413-2103 (voice) or 312/413-0123 (TTY).