

# PHYSICS 107 – Fall 2009

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Web site: <http://physicsweb.phy.uic.edu/107/>

Textbook: **Physics – Volume 2, 4<sup>th</sup> Edition, James S. Walker, Pearson/Prentice Hall.**  
**ISBN-10: 0-321-54163-4** Available in UIC textbook store.

Homework: Online at <http://www.masteringphysics.com/> requires Student Access Kit (code)  
Course ID: **UICPHY107FALL2009**

Optional: Physics 107 CD by Prof. Clive Halliwell. The CD contains sample problems and solutions. Available in UIC textbook store.

## 1. Course Calendar and Assignments

The course calendar and assignments are available online at the course web site listed above. A preliminary course outline is also included at the end of this document. The course outline is subject to change as the semester progresses. Check the web site for the most up-to-date information.

It is strongly advised that you read the appropriate material before it is discussed in class. That way you will be able to focus on the things you do not understand and ask relevant questions in the lecture. You will be tested on material covered in class as well as assigned in the text.

It is essential to realize from the outset that the material in this course cannot be mastered simply by rote learning of facts or equations. You must concentrate on understanding the underlying principles and their application. The key to doing well in Physics is to firmly establish these fundamentals and practice their application. Mathematics is the language by which the ideas of physics are expressed. If you are not comfortable with the basics of high-school algebra and trigonometry, you should review them at the earliest possible time and/or ask for help.

Remember that learning is an interactive process. We are happy to answer your questions in lecture, in your physics 108 discussion section, and during office hours. Our office hours are posted on the course web site. Make full use of the tutoring hours available to you in the Science Learning Center, where graduate student tutors for this course will have their hours posted. We also encourage working and discussing physics with your fellow students – this can be very effective in aiding your own comprehension and pointing out what areas you do not fully understand.

Please be sure you have also registered for both a 108-laboratory and 108-discussion section. Although Physics 108 is a separate course, with a separate grade, both physics 107 and 108 should be taken simultaneously.

## 2. Examinations

There will be three written examinations during the course of the semester. It is your responsibility to be available for all examinations. This is the most important requirement of this course. There will be no make-up exams given after the exams are over – **no exceptions**.

The first two mid-term examinations are scheduled for Wednesday, September 23<sup>rd</sup> and Wednesday, October 28<sup>th</sup>, respectively, from 6–8pm. All sections are given the same exam and graded uniformly. The final examination will be given during finals week at a time to be scheduled later. A portion of the exams may contain multiple-choice (MCAT-style) questions.

*It is your responsibility to be available for all examinations. The use of cell phones, pagers or any electronic forms of communications during examinations is strictly prohibited.*

### 3. Homework

The assigned homework is an integral and essential part of the course. It is the principal method by which *you* will gauge *your* comprehension of the material. It is therefore very important that you spend time working on understanding the problems. In case of difficulty, please contact the instructors, tutors, or recitation TA's for help. Working together in a group is also encouraged and is often a useful way of tackling difficult problems (as long as you are not just copying).

Weekly homework assignments will be performed online at the Mastering Physics web page (<http://www.masteringphysics.com>). They will be "due" by the day and time listed (usually on the Tuesday of the week following the assignment). The online system will always "save your work" so you can easily work on the problems continuously throughout the week. Do NOT leave it all for the last minute. You will receive a grade even if you submit your homework after the due date, but your grade decreases every hour in such way that if the homework is completed two or more days late it will be worth only 20%. If you have ever set up a Mastering Physics account before it is possible that you can also use it for 107. If you do not have a Mastering Physics account then you will need a student access kit for Mastering Physics to create one. They are bundled basically "for free" with a new textbook purchased at the UIC bookstore or you can also purchase it separately, either online or at the bookstore. In either case, when you log in the first time, choose the new Mastering Physics Course ID: **UICPHY107FALL20009**.

### 4. Grades

Each student's final score for Physics 107 will be determined as follows, with the final letter grade based on a curve common to all sections:

First Examination	25%
Second Examination	30%
Final Examination	30%
Homework	15%

### 5. Late Registration and Withdrawal

**Sep. 4<sup>th</sup>, Friday** Last day to complete late registration and to add/drop a course.

**Oct. 30<sup>th</sup>, Friday** Last day to withdraw from a course with college permission.

**Source:** [http://www.uic.edu/depts/oar/registration/drop\\_policy\\_undergrad.html](http://www.uic.edu/depts/oar/registration/drop_policy_undergrad.html)

### 6. Laboratory and Discussion

The laboratory and discussion sections are an integral part of the course – and are listed, and graded, as a separate 1-credit hour course listed as Physics 108. Please see the Physics 108 website at <http://physicsweb.phy.uic.edu/108/> or your 108 instructor(s) for more details.

### 7. Additional Help

Physics 107 tutoring is available in the Science and Learning Center – SES 201B (next to Bunsen's Café). Tutoring hours will be listed at the center, and should also be available online by the end of the second week of class (see the course website for the link or physics department website: <http://physicsweb.phy.uic.edu/TA/Tutoring.html> or call Ms. Melanie Kane at 312-996-3401). This is a

free service provided by the Physics Department. It will be also posted on the announcement board at the department of Physics, room 2236 SES.

**8. Information 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 312-413-2183 (voice) or 312-413-0123 (TTY). Please also inform your instructors of the need for accommodations.

## Physics 107 Course Outline – Fall 2009

<b>WEEK and DATE</b>	<b>CHAPTER, TOPICS and TEXTBOOK SECTIONS</b>	<b>HOMEWORK PROBLEMS</b>	<b>EXAM SCHEDULE</b>
1 Aug. 24	<b>19. Electric Charges, Forces and Fields</b> Charge, insulators, conductors, Coulomb's law, electric field, induced charges, Electric flux, Gauss' law (19.1–19.7)	<b>Assignment #1</b> <b>Due Sep. 1</b>	
2 Aug. 31	<b>20. Electric Potential &amp; Electric Energy</b> Electric potential and potential energy, energy conservation, potential of point charges, equipotential surfaces, Capacitors, dielectrics, electrical energy storage (20.1–20.6)	<b>Assignment #2</b> <b>Due Sep. 8</b>	
3 Sep. 7 (Holiday: 7)	<b>21. Electric Current and DC circuits</b> Electric current, resistance, Ohm's law, electric power in circuits, resistors in series & parallel, Kirchoff rules, circuits containing capacitors, RC circuits (21.1–21.7)	<b>Assignment #3</b> <b>Due Sep. 15</b>	
4 Sep. 14	<b>22. Magnetism</b> Magnetic field, magnetic force on moving charge, motion of charge in magnetic field, magnetic force on a current-carrying wire, torque on current loop (22.1–22.5)	<b>Assignment #4</b> <b>Due Sep. 22</b>	
5 Sep. 21	Ampere's law, solenoids, magnetism in matter (22.6–22.8) <b>23. Magnetic Flux &amp; Faraday's Law of Induction</b> EMF, magnetic flux, Faraday's law, Lenz' law (23.1–23.4)	<b>Assignment #5</b> <b>Due Sep. 29</b>	<b>MID-TERM I</b> <b>Friday, Sep. 25</b> <b>6-8 pm</b> <b>Chapters: 19-22</b>
6 Sep. 28	mechanical work and electrical energy, generators and motors, inductance, RL circuits, energy stored in magnetic field, transformers (23.5–23.10)	<b>Assignment #6</b> <b>Due Oct. 6</b>	
7 Oct. 5	<b>24. AC Circuits</b> Alternating voltages, capacitors in AC circuits, RC circuits Inductors in AC circuits, LRC circuits, resonance (24.1–24.6) <b>25. Electromagnetic Waves</b> Generation and propagation of EM waves (25.1–25.2)	<b>Assignment #7</b> <b>Due Oct. 13</b>	

<b>WEEK and DATE</b>	<b>CHAPTER, TOPICS and TEXTBOOK SECTIONS</b>	<b>HOMEWORK PROBLEMS</b>	<b>EXAM SCHEDULE</b>
8 Oct. 12	EM wave spectrum, Energy and momentum in EM waves, EM wave polarization (25.3–25.5)  <b>26. Geometrical Optics</b> Reflection, images in plane mirror, spherical mirrors (26.1–26.3)	<b>Assignment #8</b> <b>Due Oct. 20</b>	
9 Oct. 19	ray tracing, refraction lenses, thin-lens equation, dispersion (26.4–26.8)  <b>27. Optical Instruments</b> The human eye, the camera, lenses in combination (27.1–27.2)	<b>Assignment #9</b> <b>Due Oct. 27</b>	
10 Oct. 26	<b>30. Quantum Physics</b> Blackbody radiation and Planck's hypothesis, photons and photoelectric effect, photons, Compton effect, wave-particle duality (30.1–30.5)	<b>Assignment #10</b> <b>Due Nov. 3</b>	<b>MID-TERM II</b> <b>Friday, Oct. 30</b> <b>6-8pm</b> <b>Chapters: 22-26</b>
11 Nov. 2	uncertainty principle, quantum tunneling (30.6-30.7) <b>31. Atomic Physics</b> Early atom models, hydrogen spectrum, Bohr atom, wave picture of Bohr atom (31.1–31.4)	<b>Assignment #11</b> <b>Due Nov. 10</b>	
12 Nov. 9	quantum mechanics of the Hydrogen atom, multi-electron atoms, periodic table, (31.5–31.6)	<b>Assignment #12</b> <b>Due Nov. 17</b>	
13 Nov. 16	atomic radiation (31.7) <b>32. Nuclear Physics and Nuclear Radiation</b> Nuclear structure, radioactivity (32.1-32.2)	<b>Assignment #13</b> <b>Due Nov. 24</b>	
14 Nov. 23 (Holiday: 26-27)	half-life and radioactive dating, nuclear binding energy, nuclear fission, (32.3–32.5)	<b>Assignment #14</b> <b>Due Dec. 1</b>	
15 Nov. 30	nuclear fusion, elementary particle physics, open modern physics problems (32.6–32.9)	<b>Assignment #15</b> <b>Do not hand in the HW</b>	
16 Dec. 7	FINAL EXAM WEEK		<b>FINAL EXAM</b> <b>During final-exam week.</b>