

Physics 231: Physics for Scientists & Engineers II
Spring 2008 - 4 credits

Instructor: Prof. Matthew Enjalran	Off.Hrs: M 12:00 pm - 1:00 pm
Off: Jennings Hall 115	M 3:00 pm - 4:00 pm
Email: enjalranm1@southernct.edu	Tu 11:00 am - 12:00 pm
Phone: 392-5444	W 12:00 pm - 1:00 pm
Web: http://home.southernct.edu/~enjalranm1/	Th 11:00 am - 12:00 pm
	Th 3:00 pm - 4:00 pm

Lectures: M,W,F 9:10am - 10:00am, Jennings Hall 114

Labs:

- 01 Th 9:35am - 12:10pm, Jennings Hall 107.
- 02 Th 1:50pm - 4:25pm, Jennings Hall 107.

Texts:

- (Required) *Understanding Physics*, by K. Cummings, P.W. Laws, E.F. Redish, and P.J. Cooney, John-Wiley & Sons, ISBN 0-471-37099-1.
- (Required) *Understanding Physics, Student Solution Manual*, John-Wiley, ISBN 0-471-46439-2.
- (Required) *Physics Laboratory Manual*, 2nd Ed., by D.H. Loyd, Brooks/Cole, ISBN 0-03-024561-3
- (Recommended) *Mathematics for Physics Students*, Schaum's Outlines, R.V. Steiner and P.A. Schmidt, McGraw-Hill, ISBN 0-07-146158-2

Holidays: Presidents' Birthdays, Friday - Monday, February 15 - 18, 2008; Spring Break, Saturday - Sunday, March 15 - 23, 2008.

Assignments: There will be regular reading and problem set assignments from the text, *Understanding Physics*. There may also be additional reading material provided throughout the semester. The problem sets and corresponding reading material will be posted on our class web page at <http://home.southernct.edu/~enjalranm1/physics231/phy231.html>. (You can also find a copy of this syllabus at the class web site.) The problems will not be collected and graded, but it is strongly recommended that you work as many of the assigned problems (even more) as possible. In order to develop an understanding of the basic principles of physics, one must be able to apply the physical concepts to solve either abstract or realistic problems. These assignments provide an opportunity for you to develop your problem solving skills. We will periodically discuss assigned problems in lecture and others will be covered in the recitation periods, see below. Solutions will be provided for those problems not covered in the *Student Solutions Manual*. These additional solutions will be placed in a binder in the physics department library, Jennings Hall 138.

Note on Labs: Your first meeting will occur on the second week of instruction, Thursday, January 31. A laboratory syllabus will be provided at that time explaining the laboratory exercises and policies. **Please note, there may be changes to the laboratory exercises, so consult the official laboratory schedule posted on the class web-page.** There will be 12 laboratory assignments, with the best 11 counted towards your grade. Hence, you can drop your lowest lab score. The 12 laboratory periods will be divided into 8 traditional laboratory assignments and 4 recitation periods (problem solving sessions). Please note, the laboratory is a very important component of this course. Unexcused absences from the lab will result in a zero for that lab. Because you can drop your lowest lab score, there will be no make-up labs. Material discussed in the lab is fair game for exams and quizzes. **Finally, if you fail the laboratory, you will fail the course. A passing laboratory grade is $\geq 60\%$.**

Grading: Your grade in this course will be determined by your performance in the laboratory, on reading quizzes (answered via the web), in-class quizzes and exams, and a final exam. Reading quizzes (11) will always be due on the Wednesday morning before class, 9:00am. The reading quiz question will be posted on the class web page by the Tuesday afternoon before it is due. You should submit your answer to me via email (enjalranm1@southernct.edu). Your lowest reading quiz score will be dropped; hence there will be no make-up reading quizzes. In-class quizzes (4) will be given on Fridays at the beginning of class. They will consist of one question (possibly with multiple parts) and you will have approximately 15 minutes to complete the quiz. Your lowest quiz score will be dropped; hence there will be no make-up quizzes. In-class exams (2) will take the entire class period, approximately 50 minutes. Both exams will count toward your course grade. You will be able to make-up an exam provided you contact me in advance or if there exist extenuating circumstances. Unexcused missed exams will be awarded a score of zero. The final exam date is fixed (8:00am - 10:00am, Wednesday, May 14), so plan ahead to make the final exam. See the schedule below for the dates of the quizzes and exams.

The weight for each of the above components of the course towards your grade is as follows:

Reading quizzes	5%
Quizzes	15%
Exams	30%
Final exam	20%
Laboratory	30%

Course Goals: In this second part of introductory physics, we will continue to develop our conceptual understanding of the basic laws of classical physics and the essential mathematical tools to solve abstract and/or practical problems. Our emphasis for this term will be to first discuss the basic ideas of thermodynamics. This will be followed by a brief treatment of Newton's ideas of gravitation. We will then study the basics of electricity and magnetism (E&M): electro-statics, magneto-statics, and simple dynamic properties of charge and current. The topic of E&M will form the heart of the second semester and thus will occupy the majority of our class time. It is highly unlikely that the topic of optics will be covered in lecture, but there will be a laboratory exercise dedicated to the subject.

In the lecture, we will begin our study of each topic with a qualitative discussion of the physics with the goal of developing our conceptual understanding of the specific topic; this

will be followed by exercises or examples to develop and practice quantitative problem solving skills. To achieve these goals, I want to make the lecture as interactive as possible. Hence, you will be expected to participate in class by answering conceptual questions, solving simple problems, and participating in demonstrations. Also, whenever appropriate, material discussed in the laboratory will be addressed in lecture. Finally, problem sets, quizzes, and exams will be designed to emphasize and test your qualitative (conceptual) understanding and quantitative (problem solving) skills.

Just as in Physics 230, a good grasp of algebra and trigonometry and a basic understanding of differential calculus (i.e., derivatives) are necessary to fully grasp the material in this course. But now that students will either have had or will be taking integral calculus concurrently (Math 152), we will use basic integration techniques more often in our discussions. The simpler integration techniques will be demonstrated via examples in class, and you will be expected to perform calculations of similar complexity on quizzes and exams. The more complex integration methods will be treated in the recitation sections.

Disability Statement: If you are a student with a disability, before you may receive accommodations in this class, you will need to make an appointment with the Disability Resource Center, located in EN C 105A. To speak with me about accommodations, or other concerns, such as medical emergencies or arrangements in case the building must be evacuated, please make an appointment as soon as possible.

Tentative Course Schedule:

Week	Topic	Chapter	R Quiz/Quiz/Exam
1	1 st Law of Thermodynamics	19	
2	1 st Law of Thermodynamics/ Kinetic Theory	19 / 20	RQ1: 01/30
3	Kinetic Theory/ 2 nd Law of Thermodynamics	20 / 21	RQ2: 02/06; Q1: 02/08
4	2 nd Law of Thermodynamics/ Gravitation	21 / 14	RQ3: 02/13
5	Gravitation / Electric Charge	14 / 22	E1: 02/22
6	Electric Field	23	RQ4: 02/27
7	Gauss's Law	24	RQ5: 03/05; Q2: 03/07
8	Electric Potential	25	RQ6: 03/12
Spring Break 03/15 - 03/23			
9	Current & Resistance/ Circuits	26 / 27	RQ7: 03/26; Q3: 03/28
10	Capacitance	28	RQ8: 04/02
11	Magnetic Field	29	E2: 04/11
12	Magnetic Field & Current	30	RQ9: 04/16
13	Induction & Maxwell's Eqns	31	RQ10: 04/23; Q4: 04/25
14	Inductors & Magn Materials	32	RQ11: 04/30
15	Electromagnetic Oscillations & AC	33	
16	Final - Wednesday, 05/14		8:00am - 10:00am

Key:

- RQ - Reading quiz
- Q - Quiz
- E - Exam