

Physics 260 Modern Physics
Gustavus Adolphus College
Spring Semester 2009

Instructor: Dr. Dennis C. Henry
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Office: Olin 213
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Textbook: Modern Physics for Scientists and Engineers (2nd Edition), Taylor, Zafiratos & Dubson,
(Prentice-Hall, 2004)

COURSE DESCRIPTION

"An introduction to the elementary theoretical aspects of special relativity, quantum mechanics, atomic and nuclear physics, and a few selected topics from solid state physics and particle physics. The course presents the structure of these theories and how they differ from corresponding classical theories, and some historical and philosophical aspects of the theories. Class discussion and demonstrations. Prerequisites: PHY-240, concurrent enrollment in PHY-230 or permission of instructor. Spring Semester."

COURSE POLICIES AND EVALUATION

1. **Class Meetings and Attendance:** The class will meet five times per week for lecture, class discussion, solving problems, a few demonstrations, and exams. Regular and prompt attendance at all classes and exams is expected. Students will be expected to read the assigned text sections *before* coming to class, and will be held responsible for informing themselves of all announcements and assignments made in the classroom and by e-mail. Short "pop quizzes" over the assigned readings may be used to encourage class preparation. Students must advise the instructor in writing during the first week of class of any scheduled athletic, music, or other college activities that will require their absence during the semester. Such written notice does not imply a waiver of course requirements or an agreement to reschedule exams.
2. **Homework:** Problems from the text and supplementary problems will be assigned regularly, both for class discussion and to be turned in for grading at the beginning of the class. WebAssign will not be used in this course. Homework solutions should be neat and organized, with all steps clearly shown. Late homework due to circumstances beyond the control of the student may be accepted at the discretion of the instructor and with some reduction in credit. See Item 5 on academic honesty on reverse side.
3. **Exams:** There will be four exams and a comprehensive two-hour final exam. There will be no separate mid-term exam. The exam with the lowest score will be dropped from the calculation of the final grade. Permission to take an exam at other than the announced time to accommodate college activities will be at the discretion of the instructor. Requests to reschedule or make up exams for non-emergency personal reasons will be declined. *Do not make advance travel commitments with the expectation that such requests will be granted.*
4. **Evaluation:**

Hour exams (top three)	60%
Final exam	22%
Homework	18%

(over)

Final course grades will be assigned using the following scale as a guide only:

93-100%	A	72-75	C+		
90-93	A-	63-72	C		
87-90	B+	60-63	C-		
78-87	B	57-60	D+		
75-78	B-	50-57	D	0-50	F

Assignment of the final letter grades will also take into account the instructor's subjective evaluation of the student's attendance, class participation, quality of independent work, and evidence of improvement.

5. **Academic Honesty Policy:** When you submit any work for grading in this course you are certifying that you are the author of that work. Any collaborations or insights from others must be clearly cited. There will be opportunities for collaboration on problems in class and on those numerous ungraded problems that are assigned for class discussion and exam review. Certain assignments or parts of assignments will be designated as "no collaboration", in the spirit of a take-home exam. Your instructor will discuss the application of the academic honesty policy and the Honor Code and will provide a statement that each student will be requested to sign as confirmation of understanding and acceptance of the policy.
6. **Decorum:** The use of laptop computers, cell phones, "Blackberries", cameras, personal audio devices, and other such equipment is prohibited in the classroom of this course. Please set cell phones to ring silently.
7. **Incompletes:** A grade of Incomplete will only be given when course requirements are not completed due to circumstances beyond the control of the student. [College policy]
8. **Office Hours and Assistance:** Office hours are MTWF 10:30-11:20 AM. I will also often be available during chapel period and other times by appointment. I will make every effort to be in the office or nearby during office hours for individual assistance and advising. If I am away temporarily or working on demonstration setup I will put a note on the door. In general, if I'm in the office and the door is open, you should feel free to stop in. If I can't help you then, I'll suggest some later time. **Don't wait until the last minute to ask for help!** "By then it is usually too late." I can sometimes respond within a few hours to brief e-mail questions, but there is no guarantee how quickly. Students with personal emergencies should contact me by e-mail or phone. Home phone: 931-2784.
9. **Disability Services:** The Academic Operations Committee has recommended that faculty incorporate current catalog language about Disability Accommodations into course syllabi:

"Section 504 of the Rehabilitation Act of 1973 and the Americans With Disabilities Act (1990) work together to ensure 'reasonable accommodation' and non-discrimination for students with disabilities in higher education. A student who has a physical, psychiatric/emotional, medical, learning, or attentional disability that may have an effect on the student's ability to complete assigned course work should contact the Disability Services Coordinator in the Advising Center, who will review the concerns and decide with the student what accommodations are necessary."

Disability Services Coordinator Laurie Bickett (x6286) can provide further information.

Physics 260 Modern Physics
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Course Topics and Exam Coverage
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The Space and Time of Relativity	1
Relativistic Mechanics	2
FIRST EXAM	
Atoms	3
Quantization of Light	4
Quantization of Atomic Energy Levels	5
Matter Waves	6
SECOND EXAM	
The Schrödinger Equation in One Dimension	7
The Three-Dimensional Schrödinger Equation	8
Electron Spin (Most Topics)	9
THIRD EXAM	
Multielectron Atoms; The Pauli Principle and Periodic Table (Selected Topics)	10
Atomic Transitions and Radiation (Selected Topics)	11
Solids - Theory (Selected Topics)	13
Solids - Applications (Selected Topics)	14
The Structure of Atomic Nuclei (Selected Topics)	16
Radioactivity and Nuclear Reactions (Most Topics)	17
FOURTH EXAM	
Elementary Particles (Selected Topics)	18
COMPREHENSIVE FINAL EXAM	