

PHYS 2402
Modern Physics
Spring 2013

Professor: Dr. Beth Thacker
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Schedule: TR 11:00-12:20pm
Lab Times M 2:00-4:50pm or W 2:00-4:50pm

Office Hours: TR 10 – 10:50am and 12:30 – 1pm

Prerequisites: PHYS 1408 and PHYS 2401

Course Text: There will be two texts:

Spacetime Physics, Edwin Taylor and John Archibald Wheeler, W. H. Freeman; 2nd edition (March 15, 1992), SBN-10: 0716723271, ISBN-13: 978-0716723271.

Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, Robert Eisberg and Robert Resnick, Wiley; 2nd edition (January 1985), ISBN-10: 047187373X, ISBN-13: 978-0471873730.

Course Coverage: Special Relativity, Experimental evidence of microscopic properties of matter and wave-particle duality, and introduction to quantum mechanics. Other topics will be covered, time permitting.

The Nature of the Course: The course will be taught interactively. You will sometimes be asked to read ahead and be prepared to discuss the reading in class. You may be asked to make predictions or solve problems during class, often working with other students. The focus of the course is on understanding the development of the theories of special relativity and quantum mechanics based on experimental evidence and the application of those theories to make predictions and solve problems. When solving problems, the process by which you solve a problem will be more important than the final answer and you will be graded on your problem-solving process on homework, quizzes and exams.

Expected Learning Outcomes:

Students should be able to demonstrate their understanding of the material covered by their ability to solve problems and answer questions on the content covered. They should be able to demonstrate an understanding of the development, use and predictive power of models and theories that are consistent with experimental evidence.

Methods for Assessing Expected Learning Outcomes:

Learning outcomes will be assessed through quiz, homework and exam problems that require students to show their calculation and explain their reasoning and in-class discussions with their peers.

Participation: As the class will be taught interactively, class participation is required. This includes reading ahead, making predictions, solving problems and being prepared to discuss when asked. There may be pre-tests, post-tests and surveys given during class. These may not be graded, but counted as part of your participation grade. You will receive full credit, if you do them and lose participation points, if you don't. Class participation will count as 10% of your grade.

Laboratory: Laboratory is an important part of this course. The laboratory is where you will learn about the experimental basis for the development of the theory of quantum mechanics. You should understand all aspects of an experiment: why it is designed a certain way, how to take, analyze and interpret results of your data, any statistical analysis that is needed, as well as the implications of the research for the development of models and further predictions. You will be assessed by quizzes, exams and homework, as well as the taking, analysis and interpretation of data in the lab. The laboratory will count as 20% of your grade.

Homework: Homework problems will be assigned periodically. They will be graded and count as 20% of your grade.

Project: There will be a project assigned during the semester. Details on the project will be given in class. The project will count as 10% of your grade.

Exams: There will be a midterm exam after the section of the course on special relativity. There may be a second midterm exam about halfway through the section on quantum mechanics. Midterm exams will count as 20% of your grade.

Grades: The grade will be weighted as follows:

Participation	10%
Project	10%
Homework	20%
Laboratories	20%
Midterm Exam	20%
Final Exam	20%

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office in 335 West Hall or 806-742-2405.