Physics 303, Modern Physics

Dr. Tate Wilson

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Class Schedule: MWF, 10:40 - 11:50 AM
Lab Schedule: TBA
Classroom: Main 113
Laboratory: Rankin 101
Credits: 4

Overview: An introductory course in modern physics including special relativity, quantum mechanics, atomic physics, particle physics, general relativity, and cosmology.

Course/Learning Objectives:

1. Understand the historical development of modern physics (is that an oxymoron?).
2. Gain facility with the applications of relativity and quantum mechanics to practical problems.
3. Build on your ‘toolbox’ of mathematical methods to apply to all physics and engineering problems.
4. Build familiarity (through the laboratory exercises) with the design and implementation of sophisticated measurement techniques.
5. Build familiarity (through the laboratory exercises) with professional data and error analysis.
6. Build familiarity (through the laboratory exercises) with professional presentation of scientific findings.

Schedule: This is a very tentative schedule of the material we will cover in the beginning of the semester, based on chapters in the textbook. We will cover all the material in chapters 1 - 9 of the textbook, and portions of chapters 14 - 16 as time allows.

Assessment: Assessment of all learning objectives will mainly be in the form of quizzes and exams. While the homework is essential for your learning, it will be graded mainly for completeness. Reading quizzes will also be used to help you stay ahead of the lectures. Your work in the laboratory will be assessed separately by your lab instructor and included in your final grade with the weighting as follows.
Grading:
Quizzes 5%
Exams 30% 24 Feb and 7 Apr
Final Exam 20% 5 May, Main 113
Homework 25%
Laboratory 20%

Letter Grades: All scores will be weighted and averaged and compared to this scale:
A (93-100), AB- (88-92), B (83-87), BC (78-82), C (70-77), D (60-69), F (<60)

Quizzes: There will be a multiple choice quiz due each week on the course eLearning site, covering the reading for the coming week. To get the most out of the lecture, it is essential that the material is already familiar. In addition there will be a quiz each week in class, with questions very much like those on the exams. These serve to give you practice handling exam type problems in an exam-like setting, without the stress.

Homework Assignments: The homework assignments will be used to guide your studying for the exams. If you have completed and understood the homework, you should be prepared for the exams. Therefore the homework will be graded mostly for completeness. You are strongly encouraged to work together on the homework, but make sure that you understand all of the results.

Laboratory: The laboratory portion of the course will meet weekly at dates/times that will be determined after the start of the semester. The lab activities will include replicating some of the historical experiments described in your text, using modern equipment to observe non-classical phenomena, and instrumentation design. Your grade in the lab portion of the course will consist of your lab notebook (which will be collected weekly by the instructor) as well as written and oral reports of your findings from the experiments preformed. The process and due dates for these items will be discussed early in the semester. Weekly attendance in lab is expected, however I understand unforeseen events may occur. If you need to miss lab for any reason, you should contact the lab instructor (ggabriel@carrollu.edu) as soon as possible. Make-up labs, if necessary, will be discussed on a case-by-case basis.

The modern physics course serves as a launching pad for you as future scientists, whether your preferred discipline is physics, engineering, chemistry, biology, or something else. With that in mind, it is our hope that you use this class to forward not only your experimental skills, but also your intellectual curiosity. You are all encouraged to find ways to challenge yourself both in and outside of lab, and to use your instructors as a resource to help you in these endeavors.

Exams: There will be two mid-semester exams covering the topics immediately preceding the exams. The exam questions will be straight from the homework with slight modification. Completing and understanding the homework is the best way to prepare for the exams.

Final Exam: The final exam (5 May, Main 113) will be much like the mid-semester exams, except it will be cumulative and longer.

Academic integrity: The Carroll University Academic Integrity Policy is located in the student handbook: https://my.carrollu.edu/ICS/icsfs/Student_Handbook_14-15_Updated. Please familiarize yourself with it. Carroll University emphasizes that students have an obligation to conduct their academic work with honesty and integrity. All acts of academic misconduct are serious. If you have any questions about appropriate citations, please ask.

Accommodations: Students with disabilities who may need accommodations or any student considering obtaining documents should make an appointment with the Walter Young Center (262-524-7621) no later than the first week of class.

The instructor and the University reserve the right to modify, amend, or change the syllabus (course requirements, grading policy, etc.) as the curriculum and/or program require(s).