

PHGN 300: Modern Physics Syllabus

Instructor:

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Lectures:

Mondays, Wednesdays and Fridays @ 2:00pm-2:50pm – Meyer Hall 220

Textbook: “Modern Physics for Scientists and Engineers” (3rd edition)
(suggested) From S.T.Thornton and A.Rex. Publishers: Thomson, Brooks/Cole

Overview / Course objective:

PHGN300 is the third in a series of three courses: PHGN100, PHGN200, and PHGN300, which are designed as a natural progression to introduce students to the fundamental ideas of physics. In PHGN100, you focused on describing the motion of mechanical objects. You were also introduced to many central concepts that will follow you throughout your study of physics: force, energy, momentum, kinematics, etc. In PHGN200, you became familiar with the fundamental physical laws of electromagnetic phenomena which underlie the structure of matter, electronics, and optics. PHGN300 is an introduction to Modern Physics. It introduces science and engineering students to the foundations and principles of modern physics, such as relativity, quantum mechanics and their applications. The basic objective of this course is to familiarize the students with the concepts, theories and models behind many applications of our present technological society. It is an essential step in the education of a modern engineer or scientist.

Another primary goal of this sequence is a maturation of students' critical thinking, analysis, and learning skills. In order to be a successful scientist or engineer, certain skills are emphasized: self-motivated learning, organization, communication skills, being able to learn from written documents, critical thinking skills, mathematical and general logic, and taking responsibility for one's progress and actions. In particular, taking responsibility for yourself is supremely important to function as a professional in any career. This is especially true in science and engineering, but is still true for those students who will not be engineers. We will push students to grow in these areas. Developing these skills can be a stressful process, but we feel that these skills are just as important as the actual material taught in the courses. We will attempt to ease the student into more responsibility, but the student can count on more and more responsibility being put on their shoulders as they progress through these courses. By the time a student finishes PHGN300, we expect them to truly take responsibility for their own education and to act as responsible, self-sufficient adults in their respective profession.

Challenges:

This course may not be as math intensive as PHGN200, but still requires some solid math skills. One of the challenges in this course is to grasp the concepts and consequences of relativity and quantum mechanics. Formula crunching can only take you so far, if you do not understand what you are doing at the first place.

Course delivery:

The course will be delivered using Powerpoint presentations (with occasionally use of the blackboard). A portable document format (PDF) version of the lectures will be available shortly before the delivery in class. A link to the class notes is accessible from the instructor's webpage and from the course catalog (PHGN300 – Modern Physics). The instructor encourages the students to take their own notes during class.

Modern Physics website: <http://www.mines.edu/Academic/courses/physics/phgn300/>

Homework:

Homework will be assigned and graded on a regular basis (30% of the final grade). Individual homework will be graded out of 10. Failure to return a homework assignment on time without a valid reason (determined by the instructor) will result in a zero mark.

Exams:

Three exams will be scheduled: two mid-term exams (each 20% of the final grade) and a final exam (30%). The conditions of the exam (open book, limited documents, no documents...) will be discussed in class.

Grades:

(A:90-100%, B:80-89%, C:70-79%,D:60-69%,F<59%)

As mentioned above, the final grade will be calculated as follows:

1. Homework: 30%
2. Midterm exams: $2 \times 20\% = 40\%$
3. Final Exam: 30%

Homework: Past experience shows that students tend to underestimate the influence of their homework average in their final grade.

Error in grading: If you think a mistake was made in the course of grading your assignment, the complaint should be put in writing and returned together with your original assignment to the instructor. The instructor will then review the assignment and correct the grading error, if applicable.

Office Hours:

My official office hours are posted in front of my office. However, feel free to come in if the door is open.