

## PHYC 585: Measures of Learning in Physics

### Course Description

Students will review basic laws and related mathematical models which underlie physics. They will review typical exam content areas (blueprints), questions and problem identification and solution skills. The course will be conducted in recitation format with students being assigned readings and homework which will be discussed in class. The GRE in Physics will be taken by graduate students and will be counted as part of the course grade. (1 credit hours)

### Course Objectives

At the end of this course students should be able to:

1. list fundamental laws and skills which are likely to be tested on standardized exams in physics
2. use fundamental mathematical skills required to solve problems and answer questions about these fundamental laws
3. describe question formats to be expected on standardized exams in physics
4. successfully complete standardized exams in physics

### Course Rationale

Basic concepts and principles in physical science courses are repeated a number of times in introductory and intermediate courses. These concepts are applied in a variety of situations and with increasingly complex mathematical applications. Undergraduate majors often encounter these same concepts as lab assistants and graders. Standardized examinations such as the Major Field Test in Physics and the Graduate Record Examination Physics Exam focus on these basic concepts and principles. Student scores on these exams are used as major criteria when ranking students for selection into graduate programs and when making decisions about financial aid. This course will prepare students to take standardized exams in physics such as the Major Field Test in Physics and the Graduate Record Exam in Physics. Students will be required to take the GRE examination in Physics constructed by the Educational Testing Service which will count as part of the course grade.

### Course Content, Format, and Bibliography

#### *Content*

- Mechanics
- Electricity and Magnetism
- Modern Physics
- Thermodynamics
- Quantum Mechanics

Electromagnetic Theory

Advanced Topics

Solid State Physics

Astrophysics

Nuclear Physics

Optics

Electronics

High Energy/Elementary Particles

*Format*

Students will be assigned readings and homework problems. Lectures will be conducted in a recitation format with students describing and demonstrating question and problem solution strategies and skills. At least one course exam will be administered. Students will be required to take the GRE examination in Physics constructed by the Educational Testing Service which will count as part of the course grade.

This course is taught as a dual undergraduate/graduate course. Students will be required to complete activities appropriate for the level of the course in which they are enrolled. Student performance on homework, exams and/or labs will be evaluated using different standards for undergraduate and graduate students.

*Bibliography*

Bayman, Benjamin F. and Hamermesh, Morton, "A Review of Undergraduate Physics," (John Wiley & Sons, New York, 1984)

Educational Testing Service, "Graduate Record Examinations Physics Test Practice Book," (Educational Testing Service, 2004) <http://ftp.ets.org/pub/gre/Physics.pdf>

Educational Testing Service, "Major Field Test in Physics Sample Questions," [http://www.ets.org/Media/Tests/MFT/pdf/mft\\_samp\\_questions\\_physics.pdf](http://www.ets.org/Media/Tests/MFT/pdf/mft_samp_questions_physics.pdf)