

**PHY 321 INDEPENDENT STUDY / 1-3 credits.** Directed study on an individual basis covering topics from advanced physics. Prerequisite: PHY 210/240, PHY 220/250 and permission of the instructor. Course may be repeated for up to 3 credits.

**General Education Objectives (proposed)**

1. Students can apply critical thinking to pose and answer questions.
2. Students can use the processes and methods of science and mathematics to demonstrate how reproducible results give rise to the discovery of fundamental laws and the development of theories.
3. Students can articulate a basic knowledge of current scientific understanding of the universe and the scientific and mathematical laws that govern it.
4. Students can summarize, interpret, analyze, and critically evaluate data and reports relating to the natural sciences and mathematics.

Topics in Phy321 have varied in the periods it has been taught. During the first time it was presented, the topic was microwave interference, and scattering. The student that participated in this particular course did not complete the course. During the most recent periods, the emphasis has been upon group research projects involving ferroelectric crystals. Presently three students have participated in this course and for Fall 2010, an additional three students will participate. The topics will involve growth and electronic measurement of ferroelectric crystals. As a result of this course, students obtain a more direct self-motivated approach to research typically as part of a team and this course is additionally intended to provide students with experiential learning. Evaluation of the work consists of weekly progress updates showing evidence of research progress, a more formal compilation of results at the end of the course and a formal oral presentation. Because of the very nature of research in the sciences as opposed to research in other areas of liberal arts, it is essential that the research be performed under the direction of a faculty member.