Course Number: TC 357
Title: The Physics of National Security

Instructor: Roy Schwitters, Sid W. Richardson Foundation Regents Chair in Physics #4, Department of Physics, College of Natural Sciences

Description:
This seminar concentrates on the physical principles that underlie technical issues in national and global security. The course is aimed at students interested in security matters who have a background in quantitative methods. The relevant physical principles will be developed in class and reading, and applied to modern security problems involving such topics as nuclear weapons, space, surveillance, and communications. The purpose is to provide analytical tools and experience for students to understand and to be able to critically evaluate the technical facts that underlie important national policy issues. Topics to be covered include:

- Applications of Newton's laws to rockets, earth-bound satellites and missile defenses
- Applications of Einstein's special relativity to clocks, radar, the global positioning system and nuclear energy
- Other topics as time permits

Texts/Readings:
Readings will include reports on specific national security matters, such as the recent American Physical Society report on missile defense (http://prola.aps.org/abstract/RMP/v76/i4/p1307_1), the AAAS report on new nuclear weapon designs (http://cstsp.aaas.org/files/RL32929.pdf), the Garwin Archive at the Federation of American Scientists (http://www.fas.org/rlg/) and textbooks such as Physics for Future Presidents: The Science Behind the Headlines by Richard A. Muller and Megawatts and Megatons: The Future of Nuclear Power and Nuclear Weapons by Richard L. Garwin and Georges Charpak.

Assignments:
The seminar will consist of lectures and discussion with regular problem assignments and quizzes on the physics material developed in class. The second major effort in the seminar will be the preparation of a term paper and a class presentation on the scientific basis, credibility and outstanding questions related to some national security issue or technical approach that could be applied to national security. 50% of the grade will be based on the term paper, presentation, and participation in class; 25% will be based on problem assignments and 25% on quizzes.

Biography:
Dr. Roy Schwitters, S.W. Richardson Professor of Physics, received his Ph.D. from Massachusetts Institute of Technology in 1971. He currently works in experimental high energy physics and large scale detectors.