

Physics 5801: Engineering Physics Design II

Description:

Continues training in engineering-physics design. Preliminary designs are refined and prototypes are fabricated and tested. Technical communication skills, both written and oral, are employed throughout.

Semester Offered: Sp

Credit Hours: 3

Level: U

Meeting Format: Weekly meetings with project advisor scheduled as needed, two presentation sessions scheduled mid and end of semester. 2-3 hours lab per week (typically), scheduled as needed.

Prerequisites:

Physics 5800: Engineering Physics Design I; senior standing in Engineering Physics.

Recommended Texts:

Engineering Design: A Project-Based Introduction by C.L.Dym and P. Little

Pocket Book of Technical Writing for Engineering and Scientists by L. Finkelstein

The Art of Oral Scientific Presentation by R.H. Anholt

A Guide to Writing as an Engineer by Beer and McMurrey

The Craft of Scientific Writing by M. Alley

Course Objectives:

1. Students will learn methods needed to explain complex technical material to diverse audiences in clear and understandable ways. ABET Criteria(a),(f),(g),(h),(i).
2. Students will learn how to make effective written and oral presentations. ABET Criteria (c),(e),(i).
3. Students will learn the principles of engineering design as applied to a capstone experience. ABET Criteria (c),(e),(i).
4. Students will research and design a complex system. ABET Criteria (c),(e),(i).
5. Students will learn to work effectively in teams. ABET Criteria (d).
6. Students will learn to develop management skills needed to oversee the design of complex engineering projects, with consideration to economic, environmental, sustainability, manufacturability, ethical, health and safety, social and political issues. ABET Criteria (c),(d),(e),(f),(h).

Topics:

Technical writing: reports, proposals, audience, manuals, etc.

Oral Presentations: graphics, multimedia.

Teamwork: organization, brainstorming, meetings.

Design: the design process with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

Capstone Project:

This course is the second half of the Engineering Physics Capstone requirement, and students are expected to already be in one of two groups:

1. The Course Capstone Project: where they work as part of a team on a project provided by the course supervisor.
2. A Individual Capstone Project: where they work with a faculty or industry mentor on their own project.

Capstone Schedule:

1. Course Capstone Students: Weekly team meetings to be scheduled. Individual capstone students are expected to meet with their project advisors on a near-weekly schedule. Absences will be noted and will negatively affect your grade.
2. Mid semester status presentations typically in week 7 or 8.
3. Final presentations in last week of semester.
4. Final writeup due during exam week.

Grading for Course capstone members

- 20% participation at group meetings
- 20% mid-semester presentation
- 20% final presentation
- 20% final writeup
- 20% group evaluation

Grading for Individual capstone members

- 20% mid-semester presentation
- 20% final presentation
- 20% final writeup
- 40% project advisor evaluation