Standard Course Syllabus
Department of Electrical and Computer Engineering (ECE)

294_04 Freshman Lasers and Photonics Laboratory

ABET Classification

EE Program of Study
This course IS NOT an EE core course.
This course CANNOT be used as an EE technical elective.

CpE Program of Study
This course IS NOT a CpE core course.
12 hours of CpE technical electives must be on a prescribed list.
This course IS NOT on that list.

Catalog Description
Experimental application of photonics to solving engineering problems: fiber optics, lasers, solar cells, liquid crystals, optical sensing, acousto-optics.

Level Credits Class Meeting Pattern
U 2 1, 2-hr lab

Course Prerequisites
Preq: Must be a rank 1 ENG student.

Quarters of Offering
Wi Qtr.

General Info, Cross-listings, Exclusions, etc.

Cross-listed with:

General Info:

Exclusion:

Courses that require this as a direct prerequisite: n/a

Prereq by topic: n/a

Learning Outcomes (with ABET Criterion 3 Student Outcomes for Undergraduate Courses)
1. Students will learn laser safety.
2. Students will learn principles of modern optics and photonics.
3. Students will design and carry out experiments.
4. Students will practice teamwork and technical writing.
5. Students will develop life-long learning skills.

Text(s) and Other Course Materials Author(s) Publisher
Lab manual from Uniprint.

References (supplemental reading)

Topics and (# of Lectures)
Laser safety (1)
Labs (students do a subset of the following):
Fiber optics
Solar Cells
Liquid Crystals
Acousto-Optics
Lasers

Optical Sensing

**Representative Lab Assignments**

Optical sensing: Choose a measurand you would like to measure, such as temperature, humidity, rotation speed, blood pulse, earthquakes, etc. Design a sensor that uses light in some way. Build it, and measure its sensitivity and dynamic range. Discuss in your report improvements you would make if you could do the experiment again.

Fiber Optics: Students design and build an experiment to measure the coupling loss in dB between two optical fibers under the following types of misalignment: longitudinal, lateral, and angular. The learn to strip and cleave bare fiber ends, couple light into the fiber, couple the output light to a photodetector, and align optical apparatus. Students then build a fiber optic data link and experiment with splice misalignment.

**Grading Plan**

Safety quiz: 10%
Lab practice (instructor's judgment): 10%
Written laboratory reports: 35%
Laboratory notebook: 10%
Library problems: 10%
Homework: 20%
Team evaluations: 5%

This course is graded S/U. A final course grade of C- or better, and every assignment turned in, are required to pass.

**Relationship to ABET Criterion 3 Student Outcomes (a-k)**

Criteria 3 (a),(b)

**Relationship to Additional ABET Student Outcomes**

Course Supervisor: Anderson
Date of Approval of Standard Syllabus by Area: August 21, 2009
Most Recent Course Evaluation:
Most Recent Area Review: