Las Positas College
3000 Campus Hill Drive
Livermore, CA 94551-7650
(925) 424-1000
(925) 443-0742 (Fax)

Course Outline for ELEC 59

OPTICAL ELECTRONICS

Effective: Fall

I. CATALOG DESCRIPTION:
ELEC 59 — OPTICAL ELECTRONICS — 2.00 units

Fundamental principles of light, geometric and wave optics, sources of light, displays, optical sensors, fiber optics, and opto-isolators. System applications of optical electronics. Prerequisite: Electronics Technology 50 or equivalent. 1 hour lecture, 3 hours laboratory.

1.00 Units Lecture 1.00 Units Lab

Prerequisite
ELEC 50 - Fundamentals of Electronics
or

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Grading Methods:
Letter or P/NP

Discipline:

	MIN
Lecture Hours:	18.00
Lab Hours:	54.00
Total Hours:	72.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 3

III. PREREQUISITE AND/OR ADVISORY SKILLS:
Before entering the course a student should be able to:

A. ELEC50

IV. MEASURABLE OBJECTIVES:
Upon completion of this course, the student should be able to:

1. describe the basic characteristics of light
2. use simple lenses for gathering or collimating light
3. choose the best light source for an application
4. use a character display to display numbers or other symbols
5. describe how CRTs function as graphical displays
6. use a typical optical sensor to detect a light signal
7. use fiber-optics to transmit digital and analog circuits
8. use an electro-optic isolator to couple isolated electronic circuits

V. CONTENT:
A. The nature of light and optical measurements.
B. Geometric optics—lenses, mirrors, absorption, and dispersion.
C. Wave optics—polarization, interference, and diffraction.
D. Sources—incandescent and fluorescent lamps, LEDs, and lasers.
E. Displays—character displays and graphic displays; the CRT
F. Sensors—photoconductive and photovoltaic detectors, imagers.
G. Optical transmission—optical isolators and fiber-optics.
H. Optical systems, including fiber-optic communication links.

VI. METHODS OF INSTRUCTION:
A. **Demonstration** -
B. **Lab** - Laboratory experiments
C. **Lecture** -
D. **Lecture** -

VII. TYPICAL ASSIGNMENTS:
A. Reading: 1. Read Electro-Optics, Chapter 2. Discuss the differences between laser light and light from an LED. B. Writing: 1. Describe how a CRT display works. C. Laboratory: 1. Build a circuit using optical components that will automatically turn on a lamp when the room becomes dark.

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes
3. Class Participation
4. Home Work
5. Lab Activities
6. Other:
    a. Weekly assignments
    b. Class participation
    c. Lab assignments
    d. Quizzes
    e. Final examination

B. **Frequency**

1. Weekly quizzes
2. Weekly reading and homework
3. One final examination

IX. TYPICAL TEXTS:

1. Electro-optics, Heathkit EB-611 and accompanying workbook

X. OTHER MATERIALS REQUIRED OF STUDENTS: