

Las Positas College
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Course Outline for ELEC 59

OPTICAL ELECTRONICS

Effective: Fall 2016

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:

	<u>MIN</u>
Lecture Hours:	18.00
Lab Hours:	54.00
Total Hours:	72.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

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. **Lecture** -
- B. **Lecture** -
- C. **Demonstration** -
- D. **Lab** - Laboratory experiments

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: