Las Positas College
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Course Outline for ENGR 15

INTRODUCTION TO OPTICAL SCIENCE AND ENGINEERING

Effective: Spring 2018

I. CATALOG DESCRIPTION:
ENGR 15 — INTRODUCTION TO OPTICAL SCIENCE AND ENGINEERING — 4.00 units

An introduction to the field of optical science and engineering. Basic concepts of the manipulation of light. Discussion of the opportunities and professional practice in the field including: application of engineering principles, ethics, and responsibilities. 3 hours lecture, 3 hours laboratory.

3.00 Units Lecture 1.00 Units Lab

Grading Methods:
Letter Grade

Discipline:
- Engineering

	MIN
Lecture Hours:	54.00
Expected Outside of Class Hours:	108.00
Lab Hours:	54.00
Total Hours:	216.00

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

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

1. identify the basic principles of imaging optics
2. describe the basic principles of spectroscopy
3. describe the application and principles of lasers
4. describe the basic principles of lasers
5. assess the career opportunities in optical science and engineering
6. identify the future applications of optics

V. CONTENT:
A. Demonstration and discussion of the principles of spectroscopy.
B. Demonstration and discussion of the principles of lasers.
C. Discussion of what optical science and engineering is, what an optical engineer does.
D. Several case studies of practical optical science and engineering projects will be demonstrated and discussed.
E. Demonstration and discussion of the application of optics to health care and the life sciences.
F. Demonstration and discussion of the application of optics to commercial camera and space-program optical applications.
G. Demonstration and discussion of the application of optics to communication
H. An overview of the B.S. program in Optical Science and Engineering.

VI. METHODS OF INSTRUCTION:
A. **Lecture** - Lectures by faculty
B. **Guest Lecturers** - Guest lecturers from local optics industries
C. **Projects** - Laboratory projects
D. **Lab** - Laboratory demonstrations
E. Homework
F. **Field Trips** - Possible field trips to local optics industries

VII. TYPICAL ASSIGNMENTS:

A. Reading and writing: Read chapter 3 in Optics, with discussion questions prepared for class participation and for submission for evaluation. B. Problem sets: Complete problems 1,2,3 and 4 and the end of Chapter 2. C. Laboratory experiments: After completing Experiment 1, “How Do Lenses Focus Light?” Write a discussion of procedures and findings for submission at the next laboratory session.

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Lab Activities

B. **Frequency**

1. Weekly assignments
2. Two or more mid-term exams
3. Final examination

IX. TYPICAL TEXTS:

1. Hecht, Eugene *Optics.* 3rd ed., Addison-Wesley, 1998.

X. OTHER MATERIALS REQUIRED OF STUDENTS: