

LASER/ELECTRO-OPTICS TECHNOLOGY

SCHOOL OF PHYSICAL SCIENCES AND TECHNOLOGIES

Dean: (vacant)

Academic Chair: Kiana Tabibzadeh

Faculty: Dr. Larry DeShazer

CURRICULUM

Courses are offered in the theory and practice of laser and electro-optic technology. The curriculum emphasizes principles of laser optics, operations, devices, measurement techniques, systems, and applications. Students are taught how to build, service, and operate lasers for a variety of applications.

CERTIFICATE OPTION

- **Certificate of Competency in Fundamental Photonics**

CERTIFICATE OF COMPETENCY: FUNDAMENTAL PHOTONICS

This certificate program is a short-term course of study that provides a basic introduction to modern photonics. It is suited for students who wish to test a potential career area, add career skills to open a new career path, or enhance their capabilities in an existing career in the photonics industry.

There are many career paths in photonics for individuals completing the courses in the program. Field service technicians travel to a customer's site and troubleshoot, repair, and provide maintenance on medical or industrial lasers. Sales representatives of companies producing lasers need a base of information to assist the customer in understanding the technology and benefits of the product. Manufacturing quality control technicians monitor the quality of components throughout the manufacturing process. Optical fabrication technicians make optical components according to an engineering specification. Research technicians are involved in building electro-optical systems to the design specifications of engineers and scientists. Typically, these positions pay well and provide a challenging work environment.

CERTIFICATE REQUIREMENTS

Students must complete all courses in this certificate program at Irvine Valley College with a grade of "C" or better.

Complete the following courses:	Units
LET 200 Introduction to Lasers	3
LET 200L Introduction to Lasers Lab	1
LET 210 Fundamentals of Optics	3
LET 210L Fundamentals of Optics Lab	1
LET 220 Introduction to Fiber Optics	3
TOTAL UNITS:	11

COURSES

LET 200: Introduction to Lasers

3 Units

3 hours lecture

Corequisite: LET 200L

This course introduces the student to the properties of light, the basic principles of modern photonics, elements and operation of a laser, and the fundamentals of atomic and molecular structure as applied to laser systems. The course reviews individual laser systems in detail, with particular focus on safety procedures involved in the use of lasers. NR

LET 200L: Introduction to Lasers Laboratory

1 Unit

3 hours lab

Corequisite: LET 200

This laboratory course introduces the student to the measurement of laser output parameters such as beam diameter, divergence, and irradiance. Lab exercises cover laser resonator and laser optical system alignment, basic laser safety, properties of light, the basic principles of modern photonics, elements and operation of a laser, and the fundamentals of atomic and molecular structure as applied to laser systems. The course reviews individual laser systems in detail, with particular focus on safety procedures involved in the use of lasers. NR

LET 210: Fundamentals of Optics

3 Units

3 hours lecture

Corequisite: LET 210L

This is a comprehensive course in geometrical and wave optics. Topics include reflection and refraction, thin and thick lenses, interference, diffraction, and polarization. The course introduces the principles of fiber optics and holography and addresses selected topics in magneto- and electro-optics. NR

LET 210L: Fundamentals of Optics Laboratory

1 Unit

3 hours lab

Corequisite: LET 210

This laboratory course introduces students to geometrical and wave optics and methods of conducting tests and measures. Experiment topics will include refraction, thin and thick lenses, diffraction and interference. Students will perform basic fiber optic operations and measurements. NR

LET 220: Introduction to Fiber Optics

4 Units

3 hours lecture, 3 hours lab

Recommended Preparation: Math 8 and Math 124 strongly recommended.

This course introduces the student to the properties and transmission of light, the characteristics and control of the laser, the fabrication of optical fiber, and fiber-optic transmission. Topics include internal and external laser modulation, light coupling to the fiber, fiber waveguide dispersion, attenuation and scattering phenomena, connectors, couplers, splitters, amplifiers, photodetectors, and receivers for digital and analog applications. Field trips may be required. R-E-1