LASER/ELECTRO-OPTICS TECHNOLOGY

School of Physical Sciences and Technologies

Interim Dean: William L. Kelly
Academic Chair: Kiana Tabibzadeh
Faculty: Roy McCord

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 LasersLab	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
Corequisite: LET 200L
This course introduces the student to the elements and operation of a laser, the properties of light, and the fundamentals of atomic and molecular structure as applied to laser systems. The helium-neon laser is studied in detail, and other laser systems are surveyed. Safety procedures regarding the use of the laser systems are stressed. NR

LET 200L: Introduction to Lasers Laboratory
1 Unit
3 hours lab
Corequisite: LET 200
This laboratory course introduces students to the measurement of laser output parameters such as beam diameter, divergence, and irradiance. The course covers the cleaning of optical surfaces, the alignment of a laser resonator, and basic laser safety. Throughout, the course stresses appropriate techniques for taking, recording, and analyzing data. NR

LET 210: Fundamentals of Optics
3 Units
3 hours
Corequisite: LET 210L
This is a comprehensive course in geometrical and wave optics. Topics include reflection and refraction, matrix optics, thin and thick lenses, interference, diffraction, and polarization. The principles of fiber optics and holography are introduced, and selected topics in magneto- and electro-optics are discussed. 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. Experiment topics will include refraction, thin and thick lenses, diffraction, and interference. Students will learn how to perform basic fiber-optics measurements using an optical power meter and an Optical Time Domain Reflectometer. The course also introduces basic holographic techniques. NR

LET 220: Introduction to Fiber Optics
4 Units
3 hours 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