Pasadena City College
Pasadena, California

LASER-TEC is the Center for Laser and Fiber Optics Education, founded in 2013 by the National Science Foundation (NSF) and headquartered at Indian River State College in Florida. It was established to help meet the goals of educating and sourcing domestic talent in the areas of optics and photonics. As a service to students, recent graduates, and prospective employers, Photonics Spectra *runs a profile of one of the 35 LASER-TEC colleges each month.*

LaserTech student Genell Hoechstetter mounts a photodiode to an optical breadboard as part of her studies on how to align a pinhole spatial filter to a focused beam of light.

Pasadena City College (PCC) established a curriculum in laser technology (LaserTech) to provide students with the skills required to work with precision optics, lasers, detectors, electronics, and nanotechnology. Local industry and national laboratories have supported the creation of these courses to ensure that students learn the relevant modern laboratory techniques and technologies. Local industrial partners that have interest in PCC LaserTech students come from sectors such as aerospace, advanced manufacturing, biomedicine, entertainment, communications, and defense, as well as others that develop and apply cutting-edge technologies.

Located in the heart of Southern California, PCC offers programs of study in many fundamental and in-demand technical disciplines, including geographical information systems, computer and information technology, and biotechnology. By enrolling in the PCC LaserTech program, students can learn skills via a comprehensive Associate of Science (AS) degree in Laser Technology, or via a Certificate of Achievement in Laser Technology that consists of four focused, applied courses. The AS program can be completed in as few as two years and has no prerequisites. Its laboratory-oriented optics courses were established over the past decade at Irvine Valley College (IVC), where over 150 students enrolled in LaserTech courses, and 84% of whom are still employed in a technical job that involves the hands-on skills they learned in the laboratory classroom.

Program description

Students completing the AS degree program in Laser Technology at Pasadena City College will learn fundamental scientific principles for the application of precision optics, lasers, detectors and cameras, fiber optic communications, advanced manufacturing, electronics, and optical displays. The program includes a focus on the manufacture, inspection, and test of precision optics to established standards, as well as on studies of optical components and devices fabricated via nanotechnology.

All courses are taught in a laboratory setting, where students are evaluated not by weekly homework assignments but by their ability to document industry-quality laboratory reports that demonstrate their mastery of the phenomena or technology being studied. PCC LaserTech courses start with the fundamentals of light and progress to the use of optical devices, ranging from lenses, mirrors, and prisms to lasers, fibers, and cameras.

Further study instructs students in how these devices are fabricated and tested to the highest industrial standards, and includes topics such as cleanroom cleanli-

Image courtesy of Pasadena City College.

ness and properly toleranced drawings. Finally, advanced technologies in optics are covered so that students can learn how to operate the measurement equipment required to test and troubleshoot optical assemblies and instruments.

Graduates of PCC's AS degree in Laser Technology have the skills to:

- Demonstrate applied comprehension of the basics of optical physics, including phenomena such as imaging, refraction, polarization, interference, and diffraction.
- Be able to trace the path of light through basic optical assemblies and systems.
- Understand the internal components and assembly of optical and electronic devices, including laser systems, detectors, and optical displays.
- Safely operate and maintain laser systems.
- Comfortably configure and articulate optomechanical and optical hardware in a safe manner on a laboratory breadboard or in a clean flow hood.
- Maintain, clean, and safely handle optical components, such as lenses, mirrors, and diffraction gratings in a cleanroom environment.
- Write and interpret optics drawings to the ISO 10110 international standard.
- Demonstrate a basic knowledge of electronics that includes both analog and digital components, as well as common circuit architectures.
- Analyze and troubleshoot technical issues with industrial electronics and optical hardware.
- Communicate technical concepts and document procedures and measured results via written, oral, or electronic format.

How to recruit from this college

If your company is interested in recruiting students from Pasadena City College, contact our Laser Technology professor to present your company and its employment opportunities. Please recognize that this program will not begin hands-on education until August. However, since the program was recently transferred from IVC, experienced graduates will have completed laser and electronics technology courses at IVC. The first PCC student cohort is expected to graduate with AS degrees in Laser Technology in May 2023.

Contact information

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Program websites

www.pasadena.edu/academics/divisions/natural-sciences/areas-of-study/laser-technology
www.pasadena.edu/academics/degrees-and-certificates/certificates-of-achievement/laser-technology.php