

PROGRAM ALL FIELDS REPORT

Basic Program Information

Program Title	Advanced Optics and Photonics Technology
Discipline	PALT
Award Type	Certificate of Achievement
Justification for Proposal	<p>Silicon Valley houses some of the largest and pioneering optics and photonics manufacturing firms in the world, like Coherent Optics and Spectra Physics, along with national labs that utilize optics heavily, like SLAC. These and many other firms ranging from small to large, produce a variety of critical optics and photonics hardware like solid state lighting, lasers, lenses, coatings, etc. that are found in virtually every high-tech device we use. Examples range from personal use devices like cell phones, computers and TVs, to applications in health, transportation and environmental monitoring, and the aerospace and defense industry. In addition, such optical technologies are also heavily used in virtually every manufacturing sector, and is central to manufacturing technologies such as additive or 3D manufacturing. The industry has been severely handicapped due to the lack of a United States program that can train technicians to work in the optics and photonics industry. The Silicon Valley industry successfully collaborated on a program with San Jose City College to create a laser technician program. But the severe shortage in optics and photonics technicians and engineers continues to be a huge challenge to them. An annual need of upwards of nearly 200 trained optics and photonics engineers, technicians and specialists is typically forecasted but has been impossible to fill. Thus far, industry has been carrying out the training themselves and this has lead to increased cost and lower productivity. For these reasons, industry leaders have approached Cañada College to create a Photonics and Laser Technology program.</p>
Career Opportunities	<p>Photonics and lasers technology relates to generating and harnessing light and other forms of radiant energy. This technology can be applied to numerous other fields of technology and entertainment, including personal devices (displays, touchscreens), alternative energy (Solar), manufacturing (3D and laser additive manufacturing), health care, telecommunication, environmental monitoring, homeland security, aerospace, solid-state lighting, and many others. Due to the diverse applications of this technology, the optics and photonics job opportunities available to all students with optics and photonics skills are varied. The primary occupations for students skilled in optics and photonics relates to the development and operation of optics and photonics equipment and technology and job titles include Laser and/or Photonics Technicians.</p>
Description	
Program Description	<p>This program provides advanced hands-on skills and training in industry-relevant science and engineering principles of the field of Photonics and Laser technology (PALT). PALT deals with the generation, harnessing, sensing and manipulation of light and other forms of radiant energy (solid state lighting, lasers, lamps, LED's etc.) through various mechanical, optical, and electrical systems. This field plays a vital role in driving the innovation in many industries. For example, applications of optics and photonics occur in sectors like optical data communications, imaging, health, aerospace, military, environment, entertainment and lighting and displays. They also occur in manufacturing sectors like life sciences, health care, transportation, security and safety.</p>

Program Learning Outcomes/Assessments

A. Apply knowledge of math, science, and engineering to identify, formulate, and solve optics and photonics problems.

Assessment: Assessment Methods 1. Quiz, homeworks and exams 2. Peer-to-peer and group discussions

B. Communicate effectively and work well in situations that require teamwork.

Assessment: 1. Work in teams to successfully complete laboratory work. 2. Work in teams to record, analyze and graphically present laboratory work. 3. Work in teams to prepare technical document reporting on laboratory or design work. 4. Work in teams to prepare oral and/or poster presentations of laboratory work.

C. Design and perform tests or experiments, analyze and interpret data, and prepare a report summarizing the results of the tests or experiments.

Assessment: ? Work individually or in a team to complete engineering design project involving computer modeling or laboratory work. ? Work individually or in a team to prepare technical document reporting on design project.

D. Use techniques, skills, and modern engineering and computer tools necessary for optics and photonics engineering practice.

Assessment: 1. Quiz, homeworks and exams 2. Peer-to-peer and group discussions 3. Completion of laboratory experiments 4. Completion of specialized optics and photonics software tools (like MATLAB or ZEMAX)

Conditions of Enrollment

Requisite Type	Prerequisite
Course # and title	
Placement Criteria	Prerequisite
Multiple Measures	Students should have basic exposure to math and physics subjects at high-school level
condition_title	

Courses

Major: Core Requirements

Complete Core Courses, 27 units

PALT 401	Introduction to Photonics and Laser Technology	2
PALT 402	Geometrical Optics	4
PALT 403	Optics and Photonics Modeling and Design	3
PALT 404	Wave Optics	4
PALT 405	Introduction to Laser Technology	3
PALT 406	Components and Devices in Photonics and Laser Technology	2
PALT 407	Optical Coating Technology	3
PALT 408	Optical Fibers	3
PALT 409	Advanced Photonics Technology	3

Total Units	27
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Codes/Dates

State Approval Date	
CC Approval Date	01/22/2021
Board of Trustees	
Display CurricUNET Calculations	No
Effective Term	Fall 2021
TOP Code	
Originator	Ramki Kalyanaraman
Origination Date	07/30/2020
Comments	
Need For Change	<p>Silicon Valley houses some of the largest and pioneering optics and photonics manufacturing firms in the world, like Coherent Optics and Spectra Physics, along with national labs that utilize optics heavily, like SLAC. These and many other firms ranging from small to large, produce a variety of critical optics and photonics hardware like solid state lighting, lasers, lenses, coatings, etc. that are found in virtually every high-tech device we use. Examples range from personal use devices like cell phones, computers and TVs, to applications in health, transportation and environmental monitoring, and the aerospace and defense industry. In addition, such optical technologies are also heavily used in virtually every manufacturing sector, and is central to manufacturing technologies such as additive or 3D manufacturing. The industry has been severely handicapped due to the lack of a United States program that can train technicians to work in the optics and photonics industry. The Silicon Valley industry successfully collaborated on a program with San Jose City College to create a laser technician program. But the severe shortage in optics and photonics technicians and engineers continues to be a huge challenge to them. An annual need of upwards of nearly 200 trained optics and photonics engineers, technicians and specialists is typically forecasted but has been impossible to fill. Thus far, industry has been carrying out the training themselves and this has lead to increased cost and lower productivity. For these reasons, industry leaders have approached Cañada College to create a Photonics and Laser Technology program.</p>
Proposal Type	Cañada New Program
Academic Year	