

# Photonics and Laser Technology

## Associate of Applied Science Degree

Students completing the AAS in Photonics and Laser Technology will learn the scientific principles of optics, fiber-optics, and lasers. Technicians will be instructed on the processes and equipment incorporating these devices in electronic and electro-optics systems. This training will prepare students to become technicians who work on products or devices in manufacturing, communications, defense, homeland security, medical, information technology, energy, environmental monitoring, lighting, displays, and entertainment. This Associate of Applied Science in Photonics and Laser Technology (AAS PLT) will prepare students for entry level employment as a photonics or photonics-related technician.

This curriculum will first present a foundation of electronics curriculum core, which is critical to the success of the student in the photonics/laser technology portion of the program and in general in the photonics/electro-optic industry. A large portion of the electronics curriculum is hands on and students will spend a portion of their first year in an electronics lab. Photonics and optics will be introduced in the 2nd semester of course work. Along with gaining a strong electronics background, students will spend more than 40 percent of their time in the lab training on a variety of industrial lasers and optical systems to prepare the student for easy transition into the photonics work force.

### Graduates are prepared to:

- Work as a technician in the optics, laser, and photonics support field. Students will have demonstrated knowledge in laser systems, electronics, optics and electro-optics. In particular, graduates will be prepared for a variety of careers in design and manufacturing, materials processing, communications, medical applications, semiconductor fabrication, optical systems, electronics, military applications, sales, and education.
- Demonstrate a foundation in electronics that includes electronic components and circuitry knowledge base.
- Function in a professional manner in their field, and use, maintain and clean equipment and tools required in the field of optics, lasers, and photonics.
- Analyze, configure, test, measure, troubleshoot and assist with problems that arise in a professional optics, lasers, and photonics, environment.
- Communicate technical ideas, procedures, and results with professionals in written, oral or graphic format.

Graduates will have knowledge of the following optics intensive components:

- Nature of light
- Optical Components
- Physics of Lasers and Laser Operation
- Materials Processing Systems
- Applied Mathematics
- Geometric optics
- Optical Devices and Principles of Operation
- Fibers and Fiber Optics
- Optical and Electro Optical Systems for Precision Measurements and Alignments
- Applied Physics
- Wave optics
- Optical Support and Positioning Equipment

- Optics of Imaging and Display
- Holography
- Applied Biology and Chemistry

*Above program learning outcomes are derived with permission from OP-TEC's National Photonics Skill Standards for Technicians document.*

| Year 1  | Credits      |        |
|---|--------------|--------|
|   | Fall         | Spring |
| PLTT 100 - Introduction to Photonics and Advanced Manufacturing               | 3            |        |
| ETEC 101 - AC/DC Electronics with Lab   | 4            |        |
| PHSX 103IN - The Physics of How Things Work                                   | 3            |        |
| M 121Q - College Algebra  | 3            |        |
| WRIT 121 - Introduction to Technical Writing or WRIT 101W - College Writing I | 3            |        |
| PLTT 101 - Fundamentals of Light and Lasers                                   |              | 5      |
| ETEC 106 - AC Circuit Analysis  |              | 3      |
| ETEC 113 - Circuits Lab   |              | 1      |
| DDSN 135 - SolidWorks I   |              | 3      |
| COMX 222 - Professional Communication   |              | 3      |
| Year Total:   | 16           | 15     |
| Year 2  | Credits      |        |
|   | Fall         | Spring |
| PLTT 201 - Laser Systems and Applications I                                   | 5            |        |
| ETEC 250 - Solid State Electronics I  | 4            |        |
| Technical Elective  | 6-8          |        |
| DDSN 235 - SolidWorks II  |              |        |
| ITS 280 - Computer Repair Maintenance   |              |        |
| ITS 164 - Networking Fundamentals   |              |        |
| MCH 122 - Introduction to CAM   |              |        |
| BMGT 210 - Small Business Entrepreneurship                                    |              |        |
| BMGT 215 - Human Resource Management  |              |        |
| MART 145RA - Web Design   |              |        |
| WLDG 110 - Welding Theory I   |              |        |
| WLDG 111 - Welding Theory I Practical   |              |        |
| CAPP 156 - Microsoft Excel  |              |        |
| PLTT 202 - Laser Systems and Applications II                                  |              | 5      |
| ETEC 245 - Digital Electronics  |              | 4      |
| MFTG 205 - Manufacturing Process  |              | 3      |
| PLTT 298 - Internship/Cooperative Education                                   |              | 2      |
| Year Total:   | 15-17        | 14     |
| <b>Total Program Credits:</b>   | <b>60-62</b> |        |