

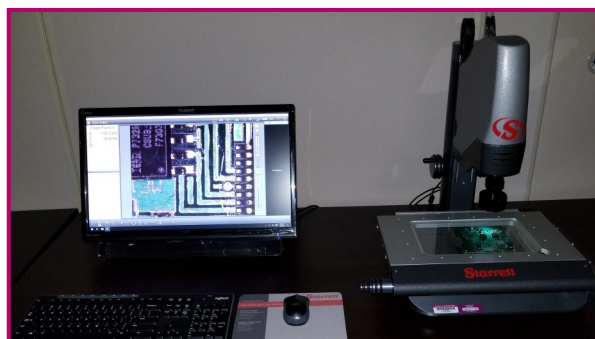


**OPSC 104 – PHOTONIC ENABLED TECHNOLOGIES**

Optics, photonics, and lasers are used in diverse industries, including aerospace manufacturing and R&D, biotechnology, medical devices manufacturing and R&D, health, communications and information technology, energy, precision machining, security, construction, research, and entertainment. This course exposes the student to applications of photonics within these industries, to instruments and techniques. By the end of the course, the student will have gained a practical appreciation of measurement, manufacturing, and application techniques along with the theory behind them. In this course the student will prepare for work in industry and research at a technical level. The student will also gain knowledge of some of the resources and references that can be used in order to get a deeper understanding of these or other applications.

**Metrology**

Optical instrumentation is now fundamental to quality control in manufacturing. To this end, companies employ dimensional metrology instruments, such as the one in the image to the right. This instrument images a manufactured component and records its dimensions, parameters related to its shape, and other measurable parameters. In employing this instrument, students employ imaging theory learned in their courses, applying it quantitatively in a real-world scenario. PRPI's industry collaborators have indicated that this is the most common photonics technology employed in Puerto Rico.



Metrology

**Polarization Microscopy**

Microscopy is an essential technology in biosciences and medical-device manufacturing industries, and even in optoelectronics. In this module, students learn that polarization complements high-magnification by enhancing contrast. Students experience the rich variety of microscopy techniques, the inner workings of the microscope and the optics that allow the design of a simple yet very powerful instrument. The course explores imaging techniques such as Bright Field, Polarization, Phase Contrast and Fluorescence, which have empowered users to make new discoveries, create new products and improve manufacturing techniques & final products.



Fiber Optics

**Fiber Optics**

In the fiber optics module, students learn the skills and theory to enter the fiber optics field. Topics covered include fiber characteristics and fabrication, optical cables types, connector inspection and cleaning, mechanical and fusion splicing, optical couplers, and fiber-optic measurement techniques (using visual fault locators, optical loss test sets, and OTDR tracing). A brief introduction to optical networks is also given. In the laboratory, students also utilize the Light Runner instrument (left) to make fiber measurements and laser beam characterization.

**Optical Coatings**

The final module of OPSC 104 is dedicated to optical coatings. Students learn coating deposition techniques, single- and multiple-layer coating design and implementation, types of coatings and filters, and design coatings to produce customized transmission and reflectance properties. Students use our Angstrom Engineering Nexdep coating system (left) to enter the data of their designs to do evaporation and sputtering deposition of metallic and dielectric materials on a glass substrate. They also learn about the operation, care, and maintenance of the system.



Optical Coatings

**This program is offered at the UMET Cupey campus, with laboratories at the PRPI labs in Barceloneta**  
**Project New Horizons: Puerto Rico Lasers and Photonics Career Pathways**  
<http://umet.suagm.edu/prpi> | [http://umet.suagm.edu/new\\_horizons](http://umet.suagm.edu/new_horizons)

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