PHOE 162: Introduction to Fiber Optics

AMIP-Technician Training Program
Bridgewater State University

Spring 2021

Instructor: Dr. Elif Demirbas   **Office:** DMF 227

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Class Meeting Dates/Times: 3/22/21 - 4/16/21   ;   Tuesday, Wednesday, Thursday, 5:30 pm - 8:30 pm

Class Meeting Location: DMF 278

Catalog Description

Students will develop experience working with lasers, fiber optics and fiber optics applications that are commonplace for the photonics and optical technician. Fiber optics theory including index of refraction, materials, single and multi-mode operation, as well typical fiber optics applications including cleaning, cleaving and splicing will be covered.

Broader Introduction to PHOE 162:

PHOE 162 is a course in the third semester the Certificate of Apprenticeship Training in Advanced Technologies – Photonics (CATAT-Photonics) training program. As such, we are building on all the foundational skills common to advanced technician training. The purpose of the course is to get you ready to work in your Apprenticeship and Capstone Experiences.

PHOE 162 is both an introductory theory and hands-on lab course for lasers, fiber optics and fiber optics applications that are commonplace for the photonics and optical technician based on SPIE Photonics publication and PASCO learning kit and experiments. Laser fundamentals, safety and operation will be covered along with fiber optics theory (index of refraction, materials, single and multi-mode operation) and applications: attenuation, sensors, analog and digital transmission and communication.   Also, fiber preparation (cleaning, cleaving and splicing with industry tools all using off-the shelf discrete optical components that will be used in the Photonics Technician workplace and lab. Optical system set up, including alignment, interferometers and test and measurement (component and system characterization) will also be covered.   Trouble shooting and lab-based problem solving will be emphasized coordinating skills interpreting data sheets, schematics and systems specifications. Throughout, safety through laser and optics fundamentals and compliance to protocols, safe practices and procedures will be emphasized.

This class blends online and in-class learning, with a heavy emphasis on lab skill development. You will use Blackboard to access AMATROL course modules which provide video lectures and brief quizzes that

test whether you are ready for class. In class, we will have more detailed discussions, demonstrations of techniques and equipment, and plenty of lab bench time.

Student Learning Outcomes: As a result of successful completion of this course you will be able to

- Outcome 1: work problems and develop solutions using foundational ideas in lasers and fiber optics,
- Outcome 2: be proficient at fiber optics preparation, repair and applications, and
- Outcome 3: be proficient in testing and measurement for fiber optics systems tests using off-the shelf components and tools.

These course level learning outcomes will help you achieve the overall program level learning outcomes listed below.

- Program Level Outcome: Laser and Fiber Optics theory and experimental foundations.
- Program Level Outcome: Problem solving, technical communication and safety in Photonics and Optics technician work place.

Safety: Safety is an essential component of this and all classes. How to be safe will be covered at the beginning of the class and we will continue to follow OSHA-10 standards. Students violating safe practices will be asked to leave the class for the remainder of the class period. Removal from class more than one time for non-safe working practices will fail the class.

Evaluation: You will demonstrate your learning through online quizzes, brief in class tests, and through lab work. Your course grade will be determined by

Safety quizzes	10%
Weekly Lab Notebook	30%
Weekly Lab work	30%
Final Lab Project	20%
Attendance	10%