

**COURSE OUTLINE**  
**PHOT-220**  
**Advanced Topics in Photonics**  
**3 Credits**

**HOWARD COMMUNITY COLLEGE**

**Description**

As the field of photonics rapidly evolves, new technologies will be introduced to keep the student abreast of the state of the art in the photonics industry. Students will be introduced to advanced topics, as per their area of interest, such as integrated optical devices, holography, advanced laser topics, optical switches, Dense Wavelength-Division Multiplexing (DWDM), etc., in a seminar format. Guest speakers will be invited to present and supplement the classroom seminars. Each student will be required to pursue individual areas of interest culminating in a mentored applications-oriented photonics project and presentation to the class. Emphasis is placed on selecting, planning, implementing, testing and presenting the project. Prerequisites: ELEC-213 and PHOT-200. (3 hours weekly)

**Overall Course Objectives**

Upon completion of this course, the student will be able to:

1. Apply advanced principles of physics as related to the field of photonics.
2. Integrate concepts of electronics, optical physics and lasers, detection and measurements, telecommunications, and possibly fiber optics communications to design a photonics project.
3. Explain and discuss, with a vocabulary of applicable terms, advanced photonics applications.
4. Demonstrate familiarity with general terminology and materials used in working on a photonics project.
5. Develop skill in selecting, planning, implementing, testing and presenting (both written and oral) a photonics project.
6. Apply principles and equations used in physics and electronics to solve problems encountered while working on the photonics project.
7. Develop skill in integrating physics, electronics, etc., concepts to design a photonics project, obtain satisfactory results and formulate correct scientific conclusions.
8. Utilize Internet search skills to gather and assimilate information on the Web related to the photonics project chosen.
9. Observe all safety regulations while working on the photonics project.
10. Write a technical project research paper related to the photonics project pursued.
11. Prepare and present a 15-20 minute oral PowerPoint (or similar computer presentation) to the class on a photonics project to include visual aides.

## **Major Topics**

- I. Advanced Topics in Photonics (as determined by class projects and interest)
  - A. Integrated Optical Devices
  - B. Advanced Topics in Lasers
  - C. Dense Wavelength-Division Multiplexing (DWDM)
  - D. Optical Switches
  
- II. Photonics Project
  - A. Project Selection/Planning
  - B. Working on the Project
  - C. Testing the Project
  - D. Documentation
  
- III. Project Report
  - A. Project Goals
  - B. Design/Technical Overview
  - C. Project Specifications
  - D. Test Procedures
  - E. Results and Conclusions
  - F. Bibliography and References
  - G. Oral Presentations

## **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member, but will be based upon the student's work, testing, documentation, write-up and presentation of the photonics project.

Writing/Speech: In preparing the final photonics project report, the student will learn skills in writing a technical report and making an oral presentation.

## **Other Course Information**

This course is required for the Photonics Technology Program.