

# ECE/BIOM 403: Intro to Optical Techniques in Biomedical Engineering

IN

OUT

Basic physics and chemistry of light interaction with matter

## Concepts:

- Optical contrast mechanisms: Absorption, Refraction, Diffraction, Interference, Scattering, Nonlinear Interactions.
- Optical imaging and microscope system models.
- Fluorescence, fluorescent lifetime, vibrational spectroscopy.

## Applications:

- Advanced microscopes for new types of histology and histopathology.
- Optical tweezers, gene sequencing, pulse oximetry, interventional microscopy, methods for detecting cancer and other diseases.

## Pre-requisites

- CHEM111; PH142 with a minimum grade of C

- Know sources of optical imaging in biomedical systems

- Identify the physical principles of optical imaging for histopathology, cell biology, molecular biology, and other applications

- Study optical techniques for technologies such as gene sequencing, pathogen detection, investigation of diseases such as cancer

- Identify the latest advances in sensitive molecular detection and super resolution microscopy