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

IN

Basic physics and chemistry of light interaction with matter

Pre-requisites
• CHEM111; PH142 with a minimum grade of C

OUT

• Know sources of optical imaging in biomedical systems

Concepts:
• Optical contrast mechanisms: Absorption, Refraction, Diffraction, Interference, Scattering, Nonlinear Interactions.
• Optical imaging and microscope system models.
• Fluorescence, florescent 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.

• 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

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