

EEL 6935 / EEL 4935 / BME 6931: Biomedical Optical Spectroscopy and Imaging

Spring 2017

Tuesdays & Thursdays, 9.30AM – 10.45AM,
CHE 302

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Optical technologies are at the forefront of quantitative functional imaging and monitoring of diseases like strokes and cancers. This course explores the world of clinical biomedical optics, with an emphasis on the fundamental mechanics of light-tissue interaction and on the instrumentation of state-of-the-art clinical biomedical devices.

Description: This course will provide an introduction to biomedical optical spectroscopy and imaging, including principles of light-tissue interaction, theoretical & computational modeling of photon diffusion, optical medical device instrumentation, and clinical applications.

Topics/Outline

- Interaction of light with matter
- Absorption spectroscopy of non-turbid media
- Fluorescence spectroscopy
- Light Scattering
 - Light propagation in turbid media
 - Monte Carlo Simulations.
- Continuous-Wave Near Infrared Spectroscopy (CW-NIRS)
- Photon Diffusion Theory
 - Diffuse Optical Tomography
 - 3D image reconstruction of optical data
- Photon Correlation methods
 - Clinical imaging of blood flow
- Optical Imaging & Microscopy

