MedE/EE/BioE 168abc SYLLABUS

Title of course sequence
Biomedical Optics: Principles and Imaging

Textbook
L. V. Wang and H.-i Wu, *Biomedical Optics: Principles and Imaging* (Wiley, 2007). ISBN: 978-0-471-74304-0.

Course outline
MedE/EE/BE 168 abc. Biomedical Optics: Principles and Imaging. 9 units (4-0-5) each; parts a and b are taught in second and third terms in odd academic years starting 2019-20 and part c is taught in second terms in even academic years starting 2020-21. Prerequisites: instructor's permission. The contents are split as follows.

a) Principles of optical photon transport in biological tissue. Topics include a brief introduction to biomedical optics, single-scatterer theories, Monte Carlo modeling of photon transport, convolution for broad-beam responses, and radiative transfer equation and diffusion theory.
b) Optical sensing and microscopy. Topics include hybrid Monte Carlo method and diffusion theory, and sensing of optical properties and spectroscopy (absorption, elastic scattering, Raman scattering, and fluorescence), ballistic imaging (confocal microscopy, two-photon microscopy, super-resolution microscopy, etc.), and optical coherence tomography.
c) Optical imaging. Topics include Mueller optical coherence tomography, diffuse optical tomography, photoacoustic tomography, ultrasound-modulated optical tomography, optical time reversal (wavefront shaping/engineering), ultrafast imaging, etc.

Grade basis

Homework/Group projects:	70%
Exam:	30%

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Previous Wikipedia projects:
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