Suggested Text
Any version of “Optics” by Eugene Hecht is suggested, but not required.

Required Reading
Course notes

Prerequisites
None

Learning Objectives
The goal of this class is to introduce basic concepts of various advanced imaging techniques in the biomedical and material research field. The brief principle of each technique will be explained, and the most important applications of these techniques will be introduced.

Course Topics
- Basic principle of optics
  - Electromagnetic waves, Maxwell’s equation, scattering, reflection, refraction, polarization, interference and diffraction.
- Optical microscope
  - Phase contrast, differential interference contrast (DIC) and confocal microscopy.
  - Super resolution fluorescent micro/nanoscopy.
  - Surface plasmon resonance imaging and near-field scanning optical microscope (NSOM).
  - Infrared spectroscopy and imaging, Raman spectroscopy, SERS and TERS.
- Electron microscopy
  - Scanning electron microscope.
  - Tunneling electron microscope.
- Other types of microscopy.
Expected Course Outcomes:
Students who successfully complete this course are expected to meet the following course outcomes.

- Students will understand the fundamental of optics imaging.
- Student will understand the basic principle of different types of start-of-the-art optical imaging and sensing techniques.
- Student will learn principle of electron microscope and other advanced imaging techniques.
- Students should be able to relate their knowledge in this course with their own research and real world problems.

Grading Policy
Grades will be determined on the basis of final project, exam, homework grades, and attendance as follow:

- Homework (four times) 25%
- Midterm exam 20%
- Attendance 5%
- Final presentation 50%

Grade Point Rule
The following approximate grade point scale will be used in determining your grade. This scale may be modified somewhat, but is included here so that you will have a general idea of how well you are doing in the course. The final grade scale will be determined at the end of the semester.


Academic Honesty Policy
Students in this course are expected to follow the Academic Honesty Policy of the University of Houston. It is your responsibility to know and follow this policy. You must sign the Academic Honesty Statement on the last page of this handout, detach it, and submit it to your instructor by Wednesday, August 30, 2017. If you fail to do this, you may be dropped from the course. See the policy on the web at http://catalog.uh.edu/content.php?catoid=21&navoid=5723.

Religious Holy Days
Students whose religious beliefs prohibit class attendance on designated dates or attendance at scheduled exams may request an excused absence. To do this, you are strongly encouraged to request the excused absence, in writing, by Wednesday, August 30, 2017. Please submit this written request to your instructor to allow the instructor to make appropriate arrangements. For more information, see the catalog at http://catalog.uh.edu/content.php?catoid=21&navoid=5543.

**Students with Disabilities**

Students with recognized disabilities will be provided reasonable accommodations, appropriate to the course, upon documentation of the disability with a Student Accommodation Form from the Center for Students with Disabilities. To receive these accommodations, you must request the specific accommodations, by submitting them to the instructor in writing, by Wednesday, August 30, 2017. Students who fail to submit a written request will not be considered for accommodations. For more information, see the web at http://www.uh.edu/csd/.

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The information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

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Academic Honesty Statement

I have read the University of Houston Academic Honesty Policy available on the web at
http://catalog.uh.edu/content.php?catoid=21&navoid=5723
I agree to abide by the provisions of this policy.

Name: (Please print) __________________________________________

Signature: ___________________________________________________

Date: ________________________________________________________

Please detach this page, and submit it to the instructor by
Thursday, August 30, 2018. If you fail to do this, you may be
dropped from the course.