Overview:

- Introduce students to the theory and practice of basic and advanced light microscopy techniques with emphasis on confocal laser scanning microscopy.
- Hands-on experience with research microscopes, a confocal microscope, and image analysis software.

Lectures:

1. Microscopy Basics
2. Geometrical Optics, Diffraction, Image formation
3. Contrast Generation: Darkfield, Phase, DIC
4. Widefield Fluorescence Microscopy
5. Confocal Laser Scanning Microscopy
6. Applications in Fluorescence Microscopy
7. Image Processing, 3D Image Reconstruction

Labs:

1. Microscope alignment, specimen preparation, imaging in bright field 2 weeks
2. Darkfield, phase contrast, differential interference contrast 3 weeks
3. Fluorescence Microscopy, immunofluorescence lab 2 weeks
4. Confocal microscopy, demos and student assignments 3 weeks
5. Confocal microscopy, student projects 2 weeks