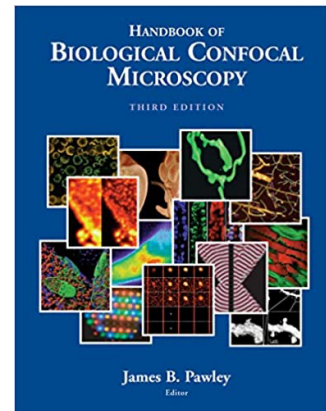


BMS 524 Syllabus

A useful reference book is Pawley, J “Handbook of Biological Confocal Microscopy” (any edition, but the last edition (3rd) is excellent)

Lectures

1. Introduction to historical aspects of Imaging:
 - a. Cover 400 years of individual invention or discovery
 - b. Places into context each discovery or invention
2. Principles of Microscopy (1)
 - a. Magnification
 - b. Nature of light
 - c. Refractive Index
 - d. Basic Microscope design
3. Principles of Microscopy (2)
 - a. Refraction
 - b. Refractive index (review)
 - c. Numerical Aperture
 - d. Resolution
 - e. Aberrations
4. Image File Formats
 - a. All aspects of the various formats used to save images
5. Principles of Fluorescence
 - a. Basics of fluorescence
 - b. Fluorescence molecules available
6. Digital Imaging (1)
 - a. Nature of images
 - b. Perception and objective evaluation
 - c. Introduction to classification
 - d. Outline of Image processing Vs Image Analysis
7. Digital Imaging (2)
 - a. Morphometry
 - b. Image Analysis
 - c. Resolution
 - d. Nyquist
 - e. Pixilation and Quantization
 - f. Point spread Function
 - g. Image Processing
 - h. Histogram operations
8. Components of a confocal microscope
 - a. Optical components



- b. Optical pathways
 - c. Optical Resolution
- 9. Live Cell Imaging
 - a. Difficulties of live cell imaging
 - b. Demonstrations of options
- 10. Sample Preparation
 - a. Fixation of samples
 - b. Fluorescent labels
- 11. Fraud in Imaging
 - a. Types of fraud
 - b. Impact and consequences of fraudulent behavior
- 12. Multispectral Imaging
 - a. AOTFs
 - b. Current multispectral systems
 - c. Advantages of multispectral imaging
- 13. (Non-linear systems if time is available)