

NANO 703/703L – Fall 2017
Instrumentation for Characterization of Nanomaterials
Course Schedule

WEEK	DATE	TEXT	LECTURE
1	M-8/21 W-8/23 F-8/25	TEM: PART 1-BASICS (Ch. 1-6,8,9)	Notes: Transmission Electron Microscopy Notes: Scattering & Diffraction
2	M-8/28 W-8/30 F-9/1		Notes: Elastic Scattering Notes: Inelastic Scattering Notes: Electron Sources
3	W-9/6 F-9/8		Notes: Lenses, Apertures, & Resolution Notes: Pumps & Holders
4	M-9/11 W-9/13 F-9/15	TEM: PART 2-DIFFRACTION (Ch. 11-14,16-21)	Notes: The Instrument Notes: Electron Diffraction Notes: Reciprocal Space
5	M-9/18 W-9/20 F-9/22		Notes: Diffracted Beams Notes: Dynamical Diffraction
6	M-9/25 W-9/27 F-9/29		Notes: Diffraction from Crystals Notes: Diffraction from Small Volumes
7	M-10/2 W-10/4 F-10/6		Notes: Indexing Diffraction Patterns Notes: Kikuchi Diffraction Notes: Convergent Beam Diffraction
8	W-10/11 F-10/13		Review: Exam I Notes: Uses of CBED
9	M-10/16 W-10/18 F-10/20	TEM: PART 3-IMAGING (Ch. 22-26,38,30,31)	Notes: Amplitude Contrast Notes: Phase Contrast Notes: Column Approximation
10	M-10/23 W-10/25 F-10/27		Notes: Planar Defects Notes: Strain Fields
11	M-10/30 W-11/1 F-11/3		Notes: High-Resolution Imaging Notes: Image Simulation
13	M-11/6 W-11/8	TEM: PART 4-SPECTROMETRY (Ch. 32-34)	Notes: Energy-Dispersive X-Ray Spectrometry Notes: Quantitative EDX
14	M-11/13 W-11/15 F-11/17	XRD: Properties of X-Rays	Review: Exam II Notes: X-Ray Diffraction
15	M-11/20		Notes: Intensity Factors
16	M-11/27 W-11/29 F-12/1		Notes: Powder XRD Notes: XRD of Epitaxial Films
17	M-12/4	Conclusion	Review-Final

Exam I: W-10/11, 7:00-8:50 PM, EP 251A
Exam II: W-11/15, 7:00-8:50 PM, EP 251A
Final: TBD

EXPERIMENT	LOCATION
TEM Magnification Calibration	EP 112
TEM Diffraction Calibration	EP 112
TEM Analysis of Nanoparticles	EP 112
TEM Analysis of Carbon Nanotubes	EP 112
TEM Sample Prep I-Ultramicrotomy	EP 211
TEM Sample Prep II-Polishing, Dimpling, Ion Milling	EP 240
Atomic Force Microscopy	MI 127
Raman Spectroscopy	MI 234
Optical Spectroscopy-Absorbance and Photoluminescence	EP 211
Double-Crystal X-Ray Diffraction	EP 109
Scanning Electron Microscopy	MI 234
Ellipsometry	EP 211
Convergent Beam Electron Diffraction	EP 112
TEM Dark-Field Imaging	EP 112
Scanning TEM/Energy Dispersive X-ray Spectrometry	EP 112
Transmission Electron Tomography	EP 112
other	To Be Announced

Note: Experiment list is subject to change.