

**NANO 703/703L – Fall 2018**  
**Instrumentation for Characterization of Nanomaterials**  
**Course Schedule**

WEEK	DATE	TEXT	LECTURE
1	M-8/20 W-8/22 F-8/24	TEM: PART 1-BASICS (Ch. 1-6,8,9)	Notes: Transmission Electron Microscopy Notes: Scattering & Diffraction
2	M-8/27 W-8/29 F-8/31		Notes: Elastic Scattering Notes: Inelastic Scattering Notes: Electron Sources
3	W-9/5 F-9/7		Notes: Lenses, Apertures, & Resolution Notes: Pumps & Holders
4	M-9/10 W-9/12 F-9/14	TEM: PART 2-DIFFRACTION (Ch. 11-14,16-21)	Notes: The Instrument Notes: Electron Diffraction Notes: Reciprocal Space
5	M-9/17 W-9/19 F-9/21		Notes: Diffracted Beams Notes: Dynamical Diffraction
6	M-9/24 W-9/26 F-9/28		Notes: Diffraction from Crystals Notes: Diffraction from Small Volumes
7	M-10/1 W-10/3 F-10/5		Notes: Indexing Diffraction Patterns Notes: Kikuchi Diffraction Notes: Convergent Beam Diffraction
8	W-10/10 F-10/12		Review: Exam I Notes: Uses of CBED
9	M-10/15 W-10/17 F-10/19	TEM: PART 3-IMAGING (Ch. 22-26,38,30,31)	Notes: Amplitude Contrast Notes: Phase Contrast Notes: Column Approximation
10	M-10/22 W-10/24 F-10/26		Notes: Planar Defects Notes: Strain Fields
11	M-10/29 W-10/31 F-11/2		Notes: High-Resolution Imaging Notes: Image Simulation Notes: Electron Tomography
13	M-11/5 W-11/7 F-11/9	TEM: PART 4-SPECTROMETRY (Ch. 32-34)	Notes: Energy-Dispersive X-Ray Spectrometry Notes: Quantitative EDX
14	W-11/14 F-11/16	XRD: Properties of X-Rays	Review: Exam II Notes: X-Ray Diffraction
15	M-11/19		Notes: Intensity Factors
16	M-11/26 W-11/28 F-11/30		Notes: Powder XRD Notes: XRD of Epitaxial Films
17	M-12/3	Conclusion	Review-Final

Exam I: W-10/10, 7:00-8:50 PM, EP 251A  
Exam II: W-11/14, 7:00-8:50 PM, EP 251A  
Final: TBD

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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

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Note: Experiment list is subject to change.