Spring 2022

MTEN 613-102: Characterization of Materials

Mirko Schoenitz

MTEN613, Characterization of Materials

NJIT, Spring 2022 Syllabus

1/15/2022

Time and Location: Thursday, 6pm-9pm ---

- Jan 18-Jan 30, 2022: online via Webex: https://njit.webex.com/meet/schoenitnjit.edu
- after Jan 30, 2022: in person in Kupfrian Hall 208

Instructor: Mirko Schoenitz,
Email: schoenit@njit.edu
Phone: office 973-596-5260, cell 609-902-3445
Course materials: canvas.njit.edu
"Office hours"
Mo-Fr 10am-5pm in person (YCEES 218), or by phone, or via Webex;
I will be available with 24 h notice – I may be available on shorter notice.

Books:

(recommended, available electronically at NJIT library)

- *Materials Characterization, Introduction to Microscopic and Spectroscopic Methods*, Leng, Y., Wiley, 2013: https://primo.njit.edu/permalink/01NJIT_INST/dcbe8h/alma994911658605196
- *ASM Handbook Vol 10: Materials Characterization (2019 Edition)*: https://primo.njit.edu/permalink/01NJIT_INST/dcbe8h/alma992240273405196

(also useful)

Materials Characterization Techniques, Zhang, S., Li, Lin., Kumar, A., CRC Press, 2009
Introduction to the Principles of Materials Evaluation, Jiles, D.C., CRC Press, 2008

Grading: Exams (30 % each), research presentation (30 %), weekly assignment (10 %)

Date	Topics	Assigned reading
20-Jan	Introduction/Overview: materials structure and matter-radiation interactions	--
27-Jan	Electron Microscopy I: SEM, Microanalysis	Zhang Ch. 7, Leng Ch. 4 & 6
3-Feb	Electron Microscopy II: TEM	Leng Ch. 3
10-Feb	Surface Analysis: XPS, AES	Zhang Ch. 3 (+Ch. 2)
17-Feb	Probe Microscopy: STM, AFM	Zhang Ch. 4
24-Feb	Diffraction I: XRD, Phase ID	Zhang Ch. 5
3-Mar	Diffraction II: Phase Analysis, Rietveld	TBA
	(research paper selection for presentation is due)	
10-Mar	Midterm	
24-Mar	Vibrational Spectroscopy: IR, Raman	Leng Ch. 9
31-Mar	Thermal Analysis I: Fundamentals	Zhang, Ch. 10
7-Apr	Thermal Analysis II: Kinetic analysis	TBA
14-Apr	Mechanical testing	TBA
21-Apr	Research Presentations 1	
28-Apr	Research Presentations 2	
12-May	Final	

Academic Integrity:

For exams, any attempts at cheating will be reported to the Dean of Students. For everything else, including homework collaboration is greatly encouraged.

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