

Spring 2021

## **MTEN 613-102: Characterization of Materials**

Mirko Schoenitz

Follow this and additional works at: <https://digitalcommons.njit.edu/cme-syllabi>

---

### **Recommended Citation**

Schoenitz, Mirko, "MTEN 613-102: Characterization of Materials" (2021). *Chemical and Materials Engineering Syllabi*. 175.

<https://digitalcommons.njit.edu/cme-syllabi/175>

This Syllabus is brought to you for free and open access by the NJIT Syllabi at Digital Commons @ NJIT. It has been accepted for inclusion in Chemical and Materials Engineering Syllabi by an authorized administrator of Digital Commons @ NJIT. For more information, please contact [digitalcommons@njit.edu](mailto:digitalcommons@njit.edu).

# MTEN613, Characterization of Materials

NJIT, Spring 2021 Syllabus

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

online via Webex: <https://njit.webex.com/meet/schoenitnjit.edu>

**Instructor:** Mirko Schoenitz,  
Email: [schoenit@njit.edu](mailto:schoenit@njit.edu)  
Phone: office 973-596-5260, cell 609-902-3445  
Course materials: [canvas.njit.edu](http://canvas.njit.edu)  
"Office hours"

Mo-Fr 10am-5pm 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](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](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 %)

**Exams:** Exams will be administered using *Canvas+Lockdown browser+Respondus*.

Date	Topics	Assigned reading
21-Jan	Introduction/Overview: materials structure and matter-radiation interactions	--
28-Jan	Electron Microscopy I: SEM, Microanalysis	Zhang Ch. 7, Leng Ch. 4 & 6
4-Feb	Electron Microscopy II: TEM	Leng Ch. 3
11-Feb	Probe Microscopy: STM, AFM	Zhang Ch. 4
18-Feb	Surface Analysis: XPS, AES	Zhang Ch. 3 (+Ch. 2)
25-Feb	Diffraction I: XRD, Phase ID	Zhang Ch. 5
4-Mar	Diffraction II: Phase Analysis, Rietveld	TBA
	(research paper selection for presentation is due)	
11-Mar	Midterm	
25-Mar	Vibrational Spectroscopy: IR, Raman	Leng Ch. 9
1-Apr	Thermal Analysis I: Fundamentals	Zhang, Ch. 10
8-Apr	Thermal Analysis II: Kinetic analysis	TBA
15-Apr	Mechanical testing	TBA
22-Apr	Optical Microscopy	Zhang Ch. 11, Leng, Ch. 1
29-Apr	Research Presentations	
13-May	Final	