

## **MSE 323: Materials Characterization Laboratory**

*Course description:* Laboratory exercises on materials characterization: X-ray, TEM, SEM.

*Number of credits:* 2 (1-3). This course is required.

*Course Coordinator:* Syeda Sumaiya

*Prerequisites by course:* MSE 321 or c//

*Prerequisites by topic:* Atomic structure, bonding, introduction to crystal structures, optics, interference, diffraction.

*Postrequisites:* MSE 425: *Senior Thesis I*  
MSE 426: *Senior Thesis II*

*Textbooks/other required materials:* None

*Course objectives:*

1. To provide hands-on experience with SEM
2. To provide experience on examining the fracture surfaces of materials and identifying the fracture mechanism
3. To enable students to use EDS to determine chemical composition
4. To provide experience in using EBSD in the SEM
5. To provide hands-on experience with TEM
6. To allow students to obtain, record, and index diffraction patterns from a variety of materials
7. To allow students to obtain bright field and dark field images

*Topics covered:* Materials characterization using scanning electron microscopy and transmission electron microscopy.

*Expected learning outcomes:*

1. To be able to operate a SEM in SEI mode and obtain images of fracture surfaces
2. To use these images to identify fracture mechanisms
3. To be able to use EDS for chemical identification and to use this information to identify the materials used in semiconductor device fabrication
4. To be able to obtain, record, and correctly index electron diffraction patterns
5. To be able to obtain a range of images and correctly interpret them

*Class schedule:* None

*Laboratory schedule:* One 3-hour laboratory session per week, for one semester.

*Contribution to meeting the professional component:* Engineering Topics

*Relationship of course to student outcomes:* Meets ABET EC2019, Criterion 3 program outcomes: 1,3,5,6,7,8,9,10,11

*Prepared by:* Teresa Fuller and Dr. David Field      *Date:* Sept 20, 2024

Additional WSU policies found here:

<https://syllabus.wsu.edu/university-syllabus/>