



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Practical Transmission Electron Microscopy Lab

MATSCEN 6741

Credit Hours:

2.00 - 2.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture
Lab

Course Description:

Transmission Electron Microscopy with emphasis on practical methods.

Prerequisites and Co-requisites:

Prereq: Grad standing; or permission of instructor.

Course Goals / Objectives:

- Operation, alignment, and calibration of the TEM
 - Electron Diffraction, Bright Field, Dark Field, and STEM imaging.
 - X-ray analysis in the S/TEM.
 - Biological sample imaging and preparatory imaging for cryo-TEM
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Course Topics:

- Basic Operation I--SEM vs. TEM, identification of column parts, gun operation, saturation, gun tilt/trans, condenser aperture, condenser stig
 - Basic Operation II--Eucentric height, rotation center, objective aperture, focus (grain, fresnel fringes), Objective stig. FEG vs. Thermionic
 - Imaging--Taking photos, exposure, film exchange, loading & developing
 - Diffraction--basic powder diffraction, reciprocal space
 - Objective aperture--function of Objective aperture, BF/DF, CTF, defocus
 - STEM--microprobe/nanoprobe, HAADF
 - Kikuchi Lines/Orientation; Negative staining
 - EDX; Screening of Negatively Stained Sample
 - EELS; Tissue Sample Preparation I
 - HRTEM/HRSTEM; Tissue Sample Preparation II
 - Image Analysis--MIPAR, ImageJ/FIJI, Photoshop
 - Tomography; Preparation of Cryo-EM Samples
 - Titan condenser system; Screening of Cryo-EM Samples (Lecture only)
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Designation:

Elective