Course Website: [http://nstg.nevada.edu/TEM/CHEM793.htm](http://nstg.nevada.edu/TEM/CHEM793.htm)

Prerequisites: Basic Physics and Basic Materials Science


Other References:


Preview study: The topic of each lecture will be given in advance. Students are encouraged to pre-study using textbook.


Course Overview:

This course will cover the theory and application of Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM) including electron optics, interference phenomena, interpretation of SEM and TEM image and TEM diffraction pattern, TEM high resolution image, electron energy spectroscopy analysis, and sample preparation. The objective of this course is to understand the principles of SEM and TEM, to know how to prepare SEM and TEM sample, to obtain the SEM and TEM image, and to be able to interpret the SEM and TEM image and electron spectroscopy. Students are encouraged to use their own samples from their undergoing projects to do the term project.

Tentative Course Schedule:

a. TEM section including (>95% hour):
   1. Electron optics and electron properties
   2. TEM principle, electron scattering, instrumentation, electron diffraction and crystallography
   3. TEM imaging, mass-thickness contrast, diffraction contrast, HRTEM, STEM, and other techniques
   4. TEM Spectroscopy, EDX and EELS
   5. TEM hand-on lab and lab report presentation

b. SEM Section including: (5% hour)
   1. Electron Optics.
   2. SEM Principal and Application
   3. SEM Image Mode, electron backscatter image, and secondary electron image

Grading: A+: 95-100%; A: 90-94%; A-: 85-89%; B+: 80-84%; B: 75-79%; B-: 70-74%
   C: 65-70%; D: 60-64%; E: 0-50%

Midterm exam.................. 20%, Oct. 20, 08, Monday, close note
Final exam....................40%, Dec. 10, 08, Wednesday, open note

Lab report presentation ...30%, Nov. 26, 08, Wednesday (poster)

Homework........... ..........10% Weekly