**MAT 571L Introduction to Electron Microscopy**

**2023 Spring Laboratory exercises**

**Labs for Microscopy:**

**Lab #1 Introduction of the microscope @SEM**

The column, detectors and their functions (show the faraday cage in front of the ET SE detector and introduce BSE detector to show its location), mention the coincidence point of EDS and BSE. vacuum system, the computers for imaging and EDS)

**Lab #2 Specimen Preparation and introduction of the sample**

into the scope. (prepare one solid sample and one powder sample with and without coating, turning on the microscope and finishing the session)

**Lab #3 Imaging** **Parameters**

(effect of working distance on resolution, depth of focus, and ranges of accelerating voltages**) Lab Report # 1**

**Lab #4 Imaging in SEM.**

SE detectors, their difference, use the metallic sample to show the effect of EHT on SE vs BSE contributions, and on fiber samples, surface vs penetration effects.) **Lab report #2**

**Lab #5 Imaging with SE and BSE detector**

(Cement sample, effect of EHT and aperture on BSE efficiency, and SE and BSE resolution) **Lab report#3**

**Lab #6 Analytical Electron Microscopy EDS coupled with BSE**

(Cement sample, point analysis, mapping, quantitative EDS correlation to BSE contrast) **Lab Report #4**

**Lab #7 TEM (hopefully) the microscope and its operation in imaging,**

ALUMINA CERAMIC SAMPLE Poly-X

**Lab #8 TEM (hopefully) diffraction**

(ALUMINA CERAMIC SAMPLE Poly-X **Lab report #5** extra points)