1-2013

GEO 580.01: Special topics - Mineralogy and Petrology

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GEO 580: Topics in Mineralogy & Petrology
SEM Analysis

Instructor: Julie Baldwin
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Office Hours: W 2:00-4:00, or by appt.

Class Meetings: M 1:10-4:00 in CHCB 333

Course Overview:
The Scanning Electron Microscope (SEM) is a widely used research tool for obtaining topographical and compositional information about solid specimens. In this course, you will learn the basic techniques for studying materials in the SEM. This is a research-focused course based upon characterization of specimens provided by myself or of your own choosing.

The first portion of the course will be devoted to acquiring fundamental skills in SEM and Energy Dispersive X-ray Spectroscopy (EDS) and designing appropriate strategies for addressing focused research questions. Class meetings will be devoted to SEM theory and project discussions.

Lab time will focus on proper microscope operation and optimal acquisition of image and spectral data. In the later part of the term, you will implement your research strategies during laboratory sessions. Each person will get at least one 3-hour laboratory session to gather the data necessary to answer a focused research question. The final products will consist of a research paper written in the style of a professional research manuscript and an oral report given in the style of a professional conference presentation.

Textbook & Materials:
None required, but there will be some helpful reference books in the lab that will be available. These are helpful references:

Electron Microprobe Analysis and Scanning Electron Microscopy in Geology - S.J.B. Reed
Scanning Electron Microscopy and X-ray Microanalysis - Joseph Goldstein

Grading:
Your final grade will be based on the following grading scheme:

Project Proposal	15%
Standard Operating Procedure write-up	15%
Oral Presentation	20%
Final Paper	50%

SCHEDULE

Week	Date		Discussion Topic	Activity
1	Jan.	28	Introduction	Intro, sample prep
2	Feb.	4	SEM background	SE/BSE imaging
3		11	SEM background	CL
4		18	**President's Day Holiday**	
5		25	**No class: JB Out of Town**	Work on proposal
6	Mar.	4	Pitch and discuss project ideas	EDS
7		11	X-ray microanalysis, **Project Proposal Due**	EDS
8		18	Proposal Review Discussion	

9		25	X-ray microanalysis	EDS
10	Apr.	8	EBSD	EBSD
11		15	Environmental samples, **SOP due**	VPSEM
12		22	Project Discussion	Work on projects
13		29	Project Discussion	Work on projects
14	May	6	**Final presentations**	**Final paper due**

Policy for late work:
No late work will be accepted in this class.

Academic Integrity:
All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.
All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://life.umt.edu/vpsa/student_conduct.php.