January – May, 2006

GEOS 3463 Petrology

Description: Petrology is the study of the origin and composition of igneous, metamorphic and sedimentary rocks, with an emphasis on microscopic description and interpretation. Laboratory course. Field trip. Prerequisite: GEOS 3461.

The catalog description notwithstanding, this semester we will forgo the sedimentary petrology owing to the fact that John Holbrook spends a good chunk of his sed-strat course on this. Thus, we will focus on igneous and metamorphic petrology. What I will try and do this semester is mix things up a bit to approach things from a more integrated plate tectonic perspective, rather than the traditional Ig, then met (then sed, as I used to).

The objective of this course is to enable you to understand some of the principles of how igneous and metamorphic rocks are formed and their associated compositions, structures and textures. By the end of the term, you will be able to apply the knowledge you have gained to identify and interpret the geology around you. Subsidiary skills will involve use of GEOREF and Science Citation Index, EXCEL, WORD, POWERPOINT and FileMaker Pro software. Although not a requirement for Field Camp, you should also find that recalling the material you encounter in this course will greatly assist you in Field Camp.

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Time: Lectures: Monday and Wednesday, 2.00 to 3.15 pm
Labs: Monday and Wednesday, 3.30 to 5.00 pm

Location: FO 2.222

Textbooks: Required:

- Winter, J.D., An introduction to Igneous and Metamorphic Petrology

Recommended:

- MacKenzie, W.S. and Adams, A.E., 1994. A Color Atlas of Rocks and Minerals in Thin Section.

Field Trip: There will be a field trip. This is typically to the Llano Uplift (dates to be determined).

Grading: **Lectures – 50%**
Quiz 1 – 15%
Term Paper – 30%
Final Exam – 30%
Homework assignments – 25%

Final exam will be on Monday May 1st at 2.00 pm in FO 2.2226

Labs – 50%
Quiz 1 – 30%
Final lab quiz – 30%
Lab assignments – 40%

Syllabus

Date	Class#	Lectures	Laboratories
Jan 9 (M)	1	Assignment – self paced	
Jan 11 (W)	2	Assignment – self paced	
Jan 16 (M)		MLK day (no class)	
Jan 18 (W)	3	Introduction and classification of igneous rocks	Hand out keys, quickie quiz
Jan 23 (M)	4	Igneous and metamorphic thermodynamics	TBD
Jan 25 (W)	5	Phase diagrams – I - igneous	TBD
Jan 30 (M)	6	Phase diagrams – II - metamorphic	TBD
Feb 1 (W)	7	Chemical Petrology I	Introduction to Jigsaw concept
Feb 6 (M)	8	Chemical Petrology II	Preparing for Jigsaw – introduction to petrography cart, EXCEL, and Filemaker
Feb 8 (W)	9	Generation and modification of melts	Mafic volcanics – I
Feb 13 (M)	10	MOR – I	Mafic volcanics – II
Feb 15 (W)	11	MOR – II	Teach mafic volcanics
Feb 20 (M)	12	MOR – III	Felsic volcanics – I
Feb 22 (W)	13	Hotspots and Plumes – I	Felsic volcanics – II
Feb 27 (M)	14	Hotspots and Plumes – II	Teach felsic volcanics
Mar 1 (W)	15	Hotspots and Plumes – III	Plutonic rocks –I
		SPRING BREAK Mar 7-12	Plutonic rocks – II
Mar 13 (M)	16	Quiz 1	Teach plutonic rocks
Mar 15 (W)	17	Island arcs – I	Review of Igneous rocks in TS
Mar 20 (M)	18	Island arcs - II	
Mar 22 (W)	19	Hydrothermal and geothermal metamorphism	Quiz – take home – due March 27
Mar 27 (M)	20	Continental arcs	Contact/hydrothermal metamorphic rocks -
Mar 29 (W)	21	Continental arcs and paired metamorphic belts – I	Contact/hydrothermal metamorphic rocks -
Apr 3 (M)	22	Continental arcs and paired metamorphic belts – II TERM PAPERS DUE – NO EXTENSIONS	Teach contact/hydrothermal metamorphic rocks
Apr 5 (W)	23	Continental Alkaline rocks – I	Regional metamorphic rocks – I
Apr 10 (M)	24	Continental Alkaline rocks – II	Regional metamorphic rocks – II
Apr 12 (W)	25	Class presentations – I	Teach Regional metamorphic rocks
Apr 17 (M)	26	Class presentations – II	Review of metamorphic rocks
Apr 19 (W)	27	Meteorites	Samples from NASA
Apr 24 (M)	28	Review – pulling it all together	Final Lab Exam
May 1 (M)	2.00 pm	Final Exam (3 hours, comprehensive)	