

TEXAS A&M UNIVERSITY - CORPUS CHRISTI
COLLEGE OF SCIENCE AND TECHNOLOGY

GEOLOGY 3414 – IGNEOUS AND METAMORPHIC PETROLOGY
Spring 2009

Dr. James R. Garrison – Office: NRC, Room 3101
james.garrison@tamucc.edu
Phone: 825-2254 Cell: 877-7597

Class Time and Place: Tuesday and Thursday, 9:30 a.m. – 10:45 a.m., CS 103.

Lab Time and Place: Tuesday, 12:00 – 2:00 p.m., CS 226.

Office hours

By appointment, or any time I am in and the door is open.

Location: NRC 3101

Course Description

Geology 3414 is an introduction to the study of igneous and metamorphic found in the lithosphere, their quantitative description, nomenclature, and the geologic processes which form them. In the first half, this course covers the analysis of igneous rocks. The second half is devoted to metamorphic petrology. The course will examine the physical and chemical process of igneous and metamorphic rock formation and also look at plate tectonic processes from a petrologic perspective. Laboratory exercises will introduce numerical and graphical techniques used to solve petrologic problems, as well as the examination of igneous and metamorphic rocks in hand specimen and in thin section.

Audience

Advanced undergraduate students in Geology and Environmental Sciences

Student Learning Outcomes

This course is designed to

- gain a solid understanding of basic petrologic concepts
- develop an understanding of the chemical and physical processes involved in petrogenesis
- develop skills to interpret petrologic processes based on field and laboratory observations and physical intuition
- relate rock textural, mineralogical, and chemical processes to underlying physical and chemical principles
- gain a working knowledge of petrology terminology to read the technical literature and advanced textbooks

Required Texts

Myron G. Best., 2003, Igneous and Metamorphic Petrology, Blackwell, ISBN 1-40510-588-7

Instructional Methods and Activities

This is a senior-level undergraduate course. This implies that students are expected to demonstrate a large degree of independence in mastering the subject of this course. Attending the lecture will be one component to achieve this goal. Equally important components include reading the relevant textbook chapters prior and after they have been discussed in class, note taking during lecture, study of on-reserve items in the library, and working the home work problems. Students should therefore be prepared to devote considerable outside-of-class time to course work. A traditional rule of thumb is three hours outside of class spent in reading and preparation for each class hour. Students are expected to take their own lecture notes.

Attendance policy

Attendance on a regular basis will be essential to the successful completion of the course. There is no provision for making up late and/or missed work. It is your responsibility to obtain notes and announcements from fellow students in the event you miss a class.

Evaluation and Grade Assignment

Grade break-down is as follows:

Midterm 30%

Quizzes and class participation 10%

Lab assignments and exams 30%

Final 30%

No extra credit. Lab and lecture exams are separate.

I encourage you to work together for the purpose of mastering the general techniques taught in lab. However, what you turn in to be graded should be your own. Always, show how you obtained your results.

Lab assignments

Labs are due on the date specified on the lab assignment, usually at the beginning of next week's lab. Labs late by up to one week are -30%. More than one week late: no credit.

University policies

By enrolling in this course you agree to follow university policies as stated in the Course Catalog and in the Student Handbook, including policies concerning student conduct, integrity and honesty, and special needs. The use of cell phones is not allowed in class.

Drafting Supplies

The lab exercises (and partially the lectures) will require the use of some basic drafting supplies. Please bring these items with you to each lab session. A small tackle box has been proven useful to keep your supplies at hand.

Mechanical pencil, lead size of 0.5 mm or finer

Colored pencils (at least 10 colors)

Black ink pen/felt pen with very fine tip (e.g. Sharpie ultra fine point)

Ruler with cm/mm markings

Triangle 30°-60°-90°

Protractor or protractor-ruler

Drawing compass (cheap o.k.)

Graph paper (metric with cm/mm ruling, one tablet)

Eraser. Get a good one!

Calculator

Hand lens

Mineralogy Textbook or Reference Book with Mineral Optical Properties

Schedule of Topics (subject to change)

Lecture

Week 1,	Introduction to Petrology
Week 2,	Classification of Igneous Rocks
Week 3,	Thermodynamics
Week 4,	Silicate Melts and Volatiles in Magmas
Week 5,	Crystal-melt Equilibria
Week 6,	Chemical Dynamics of Melts
Week 7,	Magma Bodies and Their Emplacement
Week 8,	Volcanic Rocks
Week 9,	Magma Generation
Week 10,	Magma Differentiation

Mid-term

Week 11,	Metamorphic Rocks and Metamorphism
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Week 12, Petrography of Metamorphic Rocks
Week 13, Metamorphic Mineral Reactions and Equilibria
Week 14, Metamorphic Fabrics
Week 15, Metamorphism at Convergent Plate Margins
Final examination

Lab

Lab topics will correlate closely with lecture topics and provide practical exercises to illustrate and complement the lecture material