Course Syllabus

Course Information
(course number, course title, term, any specific section title)
GEOS 2409: Rocks and Minerals, Fall 2017

Professor Contact Information
(Professor's name, phone number, email, office location, office hours, other information)
W. I. Manton, Room ROC 2.301C, Phone 972-883-2441, email: manton@utdallas.edu
Office Hours: Wednesdays & Fridays 2-5pm or by appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions
(including required prior knowledge or skills)

Pre- or co-requisite GEOS 1303 (Physical Geology) & GEOS1103 (Physical Geol. Lab)

Course Description
The title is historic. Crystals, minerals and rocks is more accurate, because before you can understand minerals you have to know something about crystals and before you can understand rocks you have to know something about minerals.
Part 1: Crystallography Concept of a space lattice and unit cell. The 14 Bravais lattices. Indexing lattices. The crystal systems. Symmetry elements. Plotting planes and axes on a stereogram. The 32 crystal classes. Miller indices and crystal faces. Crystal forms. Plotting poles to forms on a stereogram. The forms present in some selected crystal classes, including positive and negative forms, first and second order forms, and left and right-handed forms. Twinned crystals.
Part 2: Mineralogy Division into rock-forming minerals and ore minerals. Identifying minerals by macroscopic physical properties. Classification of the non-silicate minerals by chemical composition and the most important representatives of each class. The rock-forming silicate minerals: felspars, felspathoids, olivines, pyroxenes, amphiboles, garnets, and micas. Accessory silicate minerals. The clay minerals. Ionic radius, coordination number, Pauling's rules and the classification of silicate minerals based on their internal structure.
Part 3: Petrology Igneous processes and the classification of igneous rocks. Magmatism and tectonics. Sedimentary rocks, clastic and non clastic including the evaporites. Concept of sedimentary facies. Maturity of a clastic sediment. Sedimentary structures. Metamorphic rocks. Concept of metamorphic facies. Contact metamorphism. Regional metamorphism and the development of metamorphic fabric. Retrograde metamorphism. Cataclastic rocks breccias, cataclasites, mylonites and pseudotachylites. Kinematic indicators.

Student Learning Objectives/Outcomes

1. The principles of symmetry that underpin the crystalline state
2. The use of the stereographic projection
3. The naming of the faces present in each crystal class
4. The chemical formulae and the names of naturally occurring oxides, halides, carbonates,
sulphates and phosphates
5. The chemical formulae and the names of the principal silicate minerals of igneous and metamorphic rocks
6. Ability to recognize minerals in hand specimen
7. How silicate minerals are classified based in their internal linking of SiO_4 tetrahedra.
8. The recognition and field classification of igneous, sedimentary and metamorphic rocks
9. Interpretation of textures and fabrics

Required Textbooks and Materials

(1) Klein & Dutrow's Mineral Science 23e (Wiley)
(2) Simon & Schuster's Guide to Rocks and Minerals.

Suggested Course Materials

For mineralogy and petrology labs, a 10x or 12x hand lens and a small-bladed pocket knife.

Assignments & Academic Calendar

(Topics, Reading Assignments, Due Dates, Exam Dates)

Aug 22 through Sept 19	Lectures on Crystallography Labs on crystal models	Sep 28 through Oct 31	Lectures on mineralogy Labs on mineral identification	Nov 15 through Dec 5	Lectures on petrology Labs on rock identification
Sep 26	**Test 1 Crystallography (includes both lecture and lab topics)**	**Nov 2**	**Test 2 Mineralogy (includes both lecture and lab topic**		**Final Date not yet assigned**

Grading Policy

(including percentages for assignments, grade scale, etc.)

95-100 A+	**81-85 B+**	**66-70 C+**
91-95 A	**76-80 B**	**61-65 C**
86-90 A	**71-75 B-**	**56-60 C-**

Course & Instructor Policies
(make-up exams, extra credit, late work, special assignments, class attendance, classroom citizenship, etc.)
Tests will be taken only during the scheduled in-class period, unless the instructor agrees to reschedule an individual's test as the result of a prior agreement, or a doctor's excuse certifies the student was too ill to attend class the day of the examination. If you have health problems, or extenuating circumstances, please contact the instructor as soon as possible so arrangements can be made.

Technical Support

If you experience any problems with your UTD account you may send an email to: assist@utdallas.edu or call the UTD Computer Helpdesk at 972-883-2911.

Field Trip Policies
Off-campus Instruction and Course Activities

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean. Below is a description of any travel and/or risk-related activity associated with this course.

Comet Creed
This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.