

GLY5246 – Geochemistry
Course Information Fall 2015

Dr. Rachel Walters

Credits: 3

Pre-requisites: Physical Geology GLY2010C, General Chemistry CHM2046

Room/Time: Williamson Hall Rm 218, MWF 11.45am-12.35pm.

Office Hours: Open door or email.

Office: Williamson 377

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Required Text: *Geochemistry* by William D. White. Free access on UF e-brary.

Course Description:

This course will provide you with the geochemical knowledge and tools to unravel geochemical signatures in order to solve geological problems. General topics include cosmochemistry, trace element systems, radioactive and stable isotope systems, geochronology and the interaction of all these systems with geological processes.

Course Objectives:

1. Develop an understanding of the origin and evolution of the Earth's major geochemical reservoirs and be able to apply these as a starting point for predicting geochemical signatures.
2. Predict major element and trace element behavior during a range of geological processes and apply basic models of element partitioning to constrain those processes.
3. Apply knowledge of radiogenic and stable isotope systematics to source, mixing and geochronological problems.
4. Develop the following geochemical skills:
 - a. Evaluate the quality of published geochemical articles.
 - b. Choose appropriate data and comparisons to solve a geological problem.
 - c. Mine geochemical data from the literature and public databases
 - d. Assess the quality of data
 - e. Assign geological useful metadata
 - f. Visualize data
 - g. Analyze data
 - h. Apply basic models.
5. Develop a basic understanding of analytical methods used to obtain geochemical data and be able to choose the appropriate method to solve a geological problem.
6. Improve communication in a team and life-long learning and research skills.

The **primary goal** for this course is for you to be able to use geochemical data to solve geological problems.

Course Design:

I will be using a Team Based Learning approach to teach this course. Due to the small number of students you will form one team for the semester. Course content will be broken into 7+ units with assigned readings. Each unit will start with an Individual Readiness Assurance Test (IRAT) and Team Readiness Assurance Test (TRAT) based

on the readings and any other resources. These tests will be short and will take the form of multiple-choice questions. The same test will be completed individually and as a team. Pre-test readings are designed to provide you with the base knowledge to understand each topic. Class activities will then focus on conceptual understanding and application of the content through discussion and teamwork. Aspects of the application activities will be handed in for individual and team grading.

Canvas e-learning Site:

I will post course materials, schedules, surveys, quizzes, readings, assignments etc. to the Canvas e-learning site: <https://lss.at.ufl.edu/> . Make sure that you check the site and sign up for notifications. All class announcements will be made through the site.

Expectations:

I will put considerable effort into developing this class and therefore, I expect the same from you. It is important to me that you leave this course with a sound understanding of all the major concepts. You need to keep up with readings as it will be **impossible to catch up**. I am here to help as much as you need – you just need to ask.

Class Participation:

Class participation is very important – you should be actively engaged in asking and answering questions and listening to other answers given. There will be no judgment on whether you should know something or not. There will always be someone who will benefit from your questions. The more engaged you are, the more you will get out of this class. There will be team-based class activities and peer review will form part of your class participation grade.

Attendance and Absences:

You are expected to attend **ALL** classes, do the assigned readings and any other preparation tasks. If you are going to be absent please email me **before** the scheduled class time. If you are late on a test day you will not be given extra time. If you are late/absent for a RAT and provide a reasonable written excuse for any extenuating circumstances (illness, family emergencies etc), I will provide a make-up test for the individual grade and you will receive the team grade. The class will decide if absentees will receive the team grade portion of the RAT for unexplained absences or lateness.

Late Work:

Late work will be accepted up to five working days (M-F) after the original deadline with a deduction of 5% for each day i.e. if your work is graded at 90% and it is 3 days late you will received a grade of 60%. After this, **NO** late work will be accepted. Please provide a written excuse for any extenuating circumstances (illness, family emergencies etc).

Etiquette, Disabilities, Cheating:

All students are expected to adhere to the student honor code (<http://www.dso.ufl.edu/judicial/honorcode.php>). Cheating and plagiarism will not be tolerated. No texting, calling, radios, MP3 players, emailing or social media-ing during class. Please show courtesy to your instructor and your classmates by turning up on-time and avoiding unnecessary disturbances during class. Students with disabilities requesting classroom accommodation should contact the instructors as soon as possible to discuss appropriate accommodations. The Dean of Students Disability Resource Center website is <http://www.dso.ufl.edu/drc>.

Assessment and Grade Weighting:

There will be 7 or 8 short multiple-choice Individual Readiness Assurance Tests and Team Readiness Assurance Tests (RATs, same tests for Individual and Team) at the start of each unit. There will be 4-5 short individual problems and 1 longer individual project. There will be 4-6 team application projects conducted during class time. Team grades for tests and application projects will be the same for each team member. Class participation is graded based on peer review scores and small preparation tasks.

Grading Criteria:

Four major performance areas will determine your grade: **Individual Performance, Team Performance and Class Participation.**

Grade Weights:

1. Individual Performance (min. 20%, max. 60%)
a) Individual Readiness Assurance Tests (10% min.)%
b) Individual Problem Sets	(10% min.)%
c) Individual Project	(10% min.)%
d) Individual Assessment	(10% min.)%
Individual Performance Total: 100%	
2. Team Performance (min. 20%, max. 60%)
a) Team Readiness Assurance Tests%
b) Team Assignments%
Team Performance Total: 100%	
3. Class Participation (min. 10%, max. 30%)
a) Preparation Tasks	(10% min.)%
b) Peer Review	(50% min.)%
Class Participation Total: 100%	
Total: 100%	

Setting Grade Weights:

Grades are listed with minimum/maximum grades (for major performance areas and within performance areas). Grade weighting will be determined by an in-class exercise during the 3rd/4th week of class.

In addition to setting grade weights, you will be asked what you would like to do in the event of a team member missing all or part of a team test or activity and any caveats e.g. if they let you know in advance. If a student provides a written excuse for any extenuating circumstances (e.g. illness, family emergency) they will be awarded the team grade.

Peer Review:

There will be several opportunities for peer evaluation distributed throughout the course. Each individual will evaluate the contributions of all the other team members by assigning an average of 10 points to the other team members. For example, a member of a 7-member team will have 60 points to distribute to the other member of their team. You must give at least one score of 11 (max. 15) and at least one score of 9 or lower. Individual peer review scores will a percentage calculated for their points compared to the highest scoring team member.

Determination of Final Grades:

Raw scores will be weighted according to the grade weights for each performance area as set out in the grade weighting section. There will be no down grading. Letter grades are as follows:

A=93% or above, A-= 90-93%, B+=87-90%, B=83-87%, B-=80-83%, C+=77-80%, C=73-77%, C-=70-73%, D+=67-70%, D=63-67%, D-=60-63%, E=<60%.

Note: written excuse must be provided within 5 days of the missed activity or deadline.

Course Information and syllabus is subject to change – including the number of assignments and grading.

Unit #1 Information

Unit #1: Cosmochemistry – where it all started.

Unit #1: **RAT – Wednesday 2nd September at 11.45am**

Unit	Description	Reading
1	Cosmochemistry Origin of the elements and planetary differentiation.	TBD
2	Solid Earth Geochemistry Basic geochemical concepts, chemical differentiation of the Earth and development of major geochemical reservoirs	TBD
3	Major and Trace Element Geochemistry Behavior of major and trace elements during igneous processes.	TBD
4	Radiogenic Isotope Systems Rb-Sr, Sm-Nd, U-Th-Pb, Hf, He	TBD
5	Stable Isotope Systems C, O, S, N	TBD
6	Geochronology Ar-Ar, U-Th-Pb, Ra-Excess	TBD
7	Geological Applications	TBD
8	Introduction to Analytical Methods	TBD

All readings and unit topics are subject to change as the class progresses.

Classes Canceled:

Labor Day	September 7th
Homecoming	November 6 th
Veterans Day	November 11 th
Thanksgiving	November 25 th -27 th
Reading	December 11 th