Introduction to Geochemistry (304) Fall 2020

Low and high temperature geochemistry, element distribution, geochemical structure of the Earth, Laboratories (demonstrations) of sampling, preparation techniques, mass spectrometry; students undertake data, reduction and interpretation, problem sets, report writing and on-line student presentations

Requirements:
Computer with excel, word and powerpoint (or their equivalent). Download the student version of the Geochemists Workbench (free), details to follow.

Textbook (purchase is optional, but encouraged if you have a continuing interest in Geochemistry)

Geochemistry (W. M. White: RU library electronic textbook)
Principles and Applications of Geochemistry (G. Faure)

Instructors RM – R. Mortlock; LG – L. Godfrey
Teaching Assistant – Orion Farr
HW = homework assignment

Tues. 12-3pm
Thurs. 12-3pm

Fall classes begin Tues 09/01. All course material will be presented live via WEBEX during the scheduled meeting time. Lectures will be recorded and posted on Sakai for anyone who has to be absent or was unable to log-in or lost broad band connection.

September

Week 1 (09/01) Units. Formation of the elements, radioactive decay [HW1]

(09/03) Class exercise (Excel review, error propagation)

Week 2 (09/08) no class

(09/10) Review HW1. Structure of atoms, trends in the periodic table, magnetism

Week 3 (09/15) Thermodynamics I class exercise [HW2]

(09/17) Thermodynamics II: Equilibium

Week 4 (09/22) Review HW2. LAB1 Heat Capacity

(09/24) Cosmochemistry,

Week 5 (09/29) Structure of Earth, bulk properties from meteorites, reservoirs (major element)

October

(10/01) Review LAB1 Trace element (in)compatibility, trace elements and reservoirs, radiogenic isotope systems, melting, model ages [HW3]

Week 6 (10/06) LAB2: French Creek mine and data

(10/08) Review HW3. Economic geology (mineral ores, brine), geoarchaeology

Week 7 (10/13) Weathering and clays, 2-component mixing with Sr isotopes, adsorption [HW4]

(10/15) pH, redox, stability fields.

Week 8 (10/20) LAB2 review. LAB3 water chemistry.

(10/22) Discuss projects for final presentation.

Week 9 (10/27) Review HW4 Class exercise with GWB HW5

(10/29) Stable Isotopes I

November

Week 10 (11/03) ELECTION DAY – VOTE Review HM5 Stable Isotope lab (LAB4) and class exercise

(11/05) Stable Isotopes II. HW6

Week 11 (11/10) Marine Geochemistry I

(11/12) Discuss LAB 4, return LAB4

Week 12 (11/17) Review HW6. Marine geochemistry II HW7

(11/19) Marine sediments and dating

Week 13 (11/24) Review HW7

(11/26) Thanksgiving

December

Week 14 (12/01) Class presentation

(12/03) Class presentation

Week 15 (12/08) Class presentation

(12//10) Classes end

Reading Days 12/11, 12/14

Final Exam 12/15-22