

Proposed Syllabus for GEO304

Introduction to Geochemistry (304): Planet Earth 01:460:304:01 Fall 2015

Low and high temperature geochemistry, element distribution, geochemical structure of the Earth, Laboratory exercises include sample materials, preparation techniques, mass spectrometry, data collection, reduction and interpretation.

Textbook (purchase is optional, but useful if you want to continue with Geochemistry)

Geochemistry (W. M. White: RU library electronic textbook)

Principles and Applications of Geochemistry (G. Faure)

Instructors BT - Brent Turrin; RM – Rick Mortlock; MF – Mark Feigenson; LG – Linda Godfrey

Tues. 12:00-13:20

Thurs. 12:00-15:00

September

Lecture 1: Chapter 1: class introduction: scientific notation, useful conversions

Lecture 2: Chapter 1 Structure of Atoms, finding your way around the periodic table –in-class problems set (BT)

Lecture 3: Chpt 2- Equilibrium, Thermodynamics, pH (LG)

Lab 1: Chpt-2 Water sampling (LG)

Lecture 4: CO₂, weathering and low temp systems (LG)

Lecture 5: low temp stability fields, distribution coefficients (LG)

Lab 2: Optical ICP lab in DCMS or EPS (LG)

Lecture 6 Chemical Structure of the Earth: Element Distribution (BT)

October

Lab 3: Thermodynamics heat capacity LAB (LG)

Lecture 7: High temp Phase Diagrams (MF)

Lab 4: Field trip: Sampling of Palisades Sill (BT)

Review for Midterm

Lecture 8: MIDTERM

Lecture 9: Trace Metals (REE, lattice substitutions) (MF)

Lab 5: Micro-Probe or Laser Ablation ICP-MS Lab (analysis of igneous rock samples)
(BT/TBA)

Lecture 10: 10.11 Formation of the Elements, Cosmic Abundances (BT)

Lecture 11 Chapter 8 Isotopes, Intro to Radiogenic Isotopic Systems and Sr-Rb geochronology
(RM)

November

Lecture 12: Chapter 8 cont with U-Th geochronology (RM)

Lecture 13 Chapter 9 Stable Isotopes (RM)

Lab 6: Isotopic Systems: Sr isotope lab chemical separations (LG/RM)

Lab 6 continued: Sr isotope analyses by Multi-collector ICP-MS

Lecture 14: Marine Geochemistry- chemistry of the oceans (RM)

Lecture 15 2nd Mid-term Exam/ assignments for oral presentations

Thanksgiving Recess

December

Week 1: Researching class presentation topics

Week 2/3: Class Presentations

Grading:

Mid-terms 20% each

Problem sets and Lab 30%

Class presentation 30%