

**GEOL 262/362 Geochemistry
Syllabus 2018**

	Date	9 am Lecture	12 pm Lecture	Lab/Field/Tutorial
Water-Rock Reactions	Week 1 July 9	Course introduction, equilibrium constants, mass & charge balance CEM	Enthalpy, entropy, free energy, activity-composition relations CEM	Organize lab groups CEM Field trip group 1: Sat 14 July water sampling & prep CEM
	Week 2 July 16	Hydrothermal solubility of ore & vein minerals JMP	Hydrothermal wallrock alteration JMP	Hi-T tutorial JMP
	Week 3 July 23	Chemical weathering, Eh-pH diagrams CEM	River & groundwater compositions, carbonate equilibria CEM	Lo-T & water data tutorial CEM; PS1 due Fri 29 July
Trace Elements	Week 4 July 30	Nucleosynthesis, periodic properties, distribution coefficients CEM	Crystal-chemical controls on trace element distribution CEM	Field trip group 2: rock sampling JMP; LR (group 1) due Fri 3 Aug
	Week 5 August 6	Trace elements in weathering environments CEM	Trace elements in natural waters CEM	Lo-T tutorial CEM
	Week 6 August 13	Trace elements: partial melting JMP	Trace elements: magma crystallization & mixing JMP	Hi-T & mineral data tutorial JMP; PS2 due Fri 17 Aug
Radiogenic Isotopes	Week 7 August 20	Radioactive decay, decay & age equations CEM	Rb-Sr isotope system CEM	Field trip group 3: Sat 18 Aug sampling CEM; LR (group 2) due Fri 24 Aug
	MID-SEMESTER BREAK, August 27 – 31			
	Week 8 September 3	Rb-Sr & Sm-Nd isotope systems CEM	U-Pb isotope system, age of Earth, zircon dating JMP	Hi-T tutorial JMP
	Week 9 September 10	Sr isotopes in rivers CEM	Nd isotopes in seawater CRR	Lo-T & Sr isotope data tutorial CEM; PS3 due Fri 14 Sep
Stable Isotopes	Week 10 September 17	Stable isotope mass fractionation CEM	Stable isotopes of C, O, H & S CEM	Field trip group 4: Sat 15 Sep , sampling CMM; LR (group 3) due Fri 21 Sep
	Week 11 September 24	Oxygen isotopes in hydrothermal systems JMP	Stable isotopes in magmatic processes JMP	Hi-T tutorial JMP
	Week 12 October 1	Stable isotopes in low-T environments CMM	Stable isotopes in low-T environments continued CMM	Lo-T & stable isotope data tutorial CMM; PS4 due Fri 5 Oct
Week 13 October 8				LR (group 4) due Fri 12 Oct

Coordinator: Candace Martin (1s10); Instructors: Chris Moy (2s4), Mike Palin (1s9), Christina Riesselman (Gn1); Demonstrators: TBA

Text (recommended): Robin Gill, Chemical Fundamentals of Geology and Environmental Science, Wiley-Blackwell (2014)

Lectures: Quad 1, 9:00 & 12:00 M; Labs: 1s6, 14:00-16:50 M

Assessment: 4 x 10% = 40% Problem Sets (PS), 1 x 15% Lab Report (LR), 45% Final Exam.

Workload guidelines:

activity	number	x	hrs each =	total hrs	marks
lecture	12	weeks	2	24	
lecture prep	12	weeks	5	60	
field & labwork	1		12	12	
lab write-up	1		10	10	15%
prob sets	4		10	40	40%
final exam			3	30	45%
exam prep	9	hr prep/ hr exam			
total	18	pts	10	176	ok

