GEOL 5806 - Modular Graduate Course in Exploration Geochemistry

Mineral Exploration Research Centre, Harquail School of Earth Sciences, and Goodman School of Mines

All Lectures and Labs will be delivered on-campus in the Executive Learning Centre and live via Zoom

	DAY	START	END	TOPIC	SPEAKER	Lecture Contact Hours	Lab Contact Hours
0	Thu 08 Dec 2022	0900	1030	**Introduction to ioGAS**	**Michael Lesher** (HES/MERC)	1.5	
	Optional	1030	1100	Break			
	ioGAS Tutorial	1100	1200	**Working with ioGAS**	**Michael Lesher** (HES/MERC)	1.5	
		1200	1300	Break			
		1300	1430	**Practical Exercise: Analysis of a Silicate Lithogeochemistry Database**	**Michael Lesher** (HES/MERC)	1.5	
		1430	1500	Break			
		1500	1700	**Practical Exercise: Analysis of a Sulfide Geochemistry Database**	**Michael Lesher** (HES/MERC)	1.5	
1	Fri 09 Dec 2022	0900	1030	**Analytical methods**	**Marcus Burnham** (Geo Labs)	1.5	
		1030	1100	Break			
		1100	1230	**Analytical methods**	**Marcus Burnham** (Geo Labs)	1.5	
		1230	1330	Break			
		1330	1430	**QCQA** (Standards, Reference Materials, Precision/Accuracy, Failure Monitoring)	**Jennifer Hargreaves** (Geo Labs)	1.5	
		1430	1500	Break			
		1500	1700	**Lab 1 - QAQC**	**Burnham and Hargreaves** (Geo Labs)		1.5
2	Sat 10 Dec 2022	0900	0930	**Data preparation**	**Michael Lesher** (HES/MERC)	1.5	
		0930	1030	**Preliminary considerations in data analysis, lithogeochem data, censored data, data transformations**	**Cliff Stanley** (Acadia)	1.5	
		1030	1100	Break			
		1100	1230	**Sampling & geostatistics, sampling theory, geostatistical overview**	**Cliff Stanley** (Acadia)	1.5	
		1230	1330	Break			
		1330	1500	**Major/trace element geochem, basic lithogeochem, conserved element diagrams, discriminating lithologies, classification, strategy for analysis**	**Cliff Stanley** (Acadia)	1.5	
		1500	1530	Break			
		1530	1700	**Lab 2 - Lithogeochemistry**	**Cliff Stanley** (Acadia)		1.5
3	Sun 11 Dec 2022	0900	1030	**Molar element ratio analysis theory 1, closure, theorem of geochemical material transfer, diagrams and projective geometry**	**Cliff Stanley** (Acadia)	1.5	
		1030	1100	Break			
		1100	1230	**Molar element ratio analysis theory 2, calculations, testing cogenetic hypotheses, PER & GER diagrams and examples**	**Cliff Stanley** (Acadia)	1.5	
		1230	1330	Break			
		1330	1500	**Molar element ratio analysis theory 3, hydrothermal alteration, custom norms**	**Cliff Stanley** (Acadia)	1.5	
		1500	1530	Break			
		1530	1700	**Lab 3 - Pearce element ratio analysis and general element ratio analysis**	**Cliff Stanley** (Acadia)		1.5
4	Mon 12 Dec 2022	0900	1030	**Alteration mass balance**	**Michael Lesher** (HES/MERC)	1.5	
		1030	1100	Break			
		1100	1230	**Lab 4 - Alteration mass balance**	**Michael Lesher** (HES/MERC)		1.5
		1230	1330	Break			
		1330	1500	**Stable isotopes**	**Matt Leybourne** (QU)	1.5	
		1500	1530	Break			
		1530	1700	**Lab 5 - Stable isotopes**	**Michael Lesher** (HES/MERC)		1.5
5	Tue 13 Dec 2022	0900	1030	**Radiogenic isotopes**	**Matt Leybourne** (QU)	1.5	
		1030	1100	Break			
		1100	1230	**Lab 6 - Radiogenic isotopes**	**Michael Lesher** (HES/MERC)		1.5
		1230	1330	Break			
		1330	1500	**Till geochemistry & indicator minerals**	**Chris Beckett-Brown** and **Beth McClegnahan** (GSC)	1.5	
		1500	1530	Break			
		1530	1700	**Transport through cover**	**Matt Leybourne** (Queen's)	1.5	
6	Wed 14 Dec 2022	0900	1030	**Stream sediments and lake sediments**	**Matt Leybourne** (Queen's)	1.5	
		1030	1100	Break			
		1100	1230	**Aqueous geochemistry**	**James Kidder** (GSC)	1.5	
		1230	1330	Break			
		1330	1500	**Aqueous isotope geochemistry**	**James Kidder** (GSC)	1.5	
		1500	1530	Break			
		1530	1700	**Lab 7 - Surficial geochemistry**	**Chris Beckett-Brown** and **Beth McClegnahan** (GSC)		1.5
7	Thu 15 Dec 2022	0900	1030	**Primary (igneous) and secondary (alteration) lithogeochemistry in VMS exploration**	**Steve Piercey** (Memorial)	1.5	
		1030	1100	Break			
		1100	1230	**Hydrothermal sediment geochemistry/isotopes**	**Steve Piercey** (Memorial)	1.5	
		1230	1330	Break			
		1330	1500	**New developments and future trends in VMS lithgeopchemistry/mineral chemi**	**Steve Piercey** (Memorial)	1.5	
		1500	1530	Break			
		1530	1700	**Diamond exploration geochemistry**	**Dave Crabtree** (Geo Labs)		1.5
8	Fri 16 Dec 2022	0900	1030	**Case study: Exploration geochemistry of unconformity U deposits**	**Steve Beyer** (Queen's)	1.5	
		1030	1100	Break			
		1100	1230	**Lab 8 - Uranium**	**Steve Beyer** (Queen's)		1.5
		1230	1330	Break			
		1330	1530	**Case study: Exploration geochemistry of porphyry Cu deposits**	**Robert Lee** (MDRU/UBC)	1.5	
		1530	1600	Break			
		1600	1700	**Lab 9 - Porphyry Cu deposits**	**Robert Lee** (MDRU/UBC)		1.5
9	Sat 17 Dec 2022	0900	1030	**Case study: Exploration geochemistry of orogenic Au deposits**	**Stephane Perrouty** (HES/MERC)	1.5	
		1030	1100	Break			
		1100	1230	**Lab 10 - Orogenic Au deposits**	**Stephane Perrouty** (HES/MERC)		1.5
		1230	1330	Break			
		1330	1500	**Case study: Machine learning**	**John McGaughey** (MIRA)	1.5	
		1500	1530	Break			
		1530	1700	**Machine learning demo**	**John McGaughey** (MIRA)	1.5	
10	Sun 18 Dec 2022	0900	1030	**Fractal and multifractal modeling and the relevant uncertainty analysis**	**Behnam Sadeghi** (Carnegie Inst Sci)	1.5	
		1030	1100	Break			
		1100	1230	**Mineral exploration VMS and Au case studies**	**Behnam Sadeghi** (Carnegie Inst Sci)	1.5	
		1230	1330	Break			
		1330	1500	**Design and implementation of effective geochemical exploration programs**	**Ross Sherlock** (HES/MERC)	1.5	
		1500	1515	**Course evaluation** (via D2L)			
Totals						49.5	16.5 66.0