**HYDROGEOCHEMISTRY**

**GLY 5245, Section 401C; GLY4930, Section 4208**

**Spring, 2019**

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| **Topics** | **Topics** |
| Introduction | Units and data presentation - GWB |
|  | Hydrologic cycle and geochemistry |
| Chemical Background | Thermodynamics |
| Math review & the total differential |
|  | Gibbs Free energy and activities |
|  | Activity coefficients |
|  | Complexes |
| Inorganic carbon | PCO2 and alkalinity |
|  | Carbonate mineral equilibrium |
| Thermo Modeling | PHREEQC |
| Kinetics | Introduction |
|  | Rate laws |
|  | Natural examples |
| Redox equilibrium | Valence states and SHE |
|  | Oxidation- reduction half reactions |
|  | Eh-pH diagrams |
| Redox examples | Organic carbon, photosynthesis and respiration |
| Clays | Clay mineralogy |
|  | Cation exchange |
|  | Water Isotopes – H & O\* |
| Gas exchange: | Age of water\* |
|  | Exam |

\*If time

**Important dates:**

March 5 & 7: No class: Spring Break

TBD: Class will also be canceled for one week end of March/beginning of April

April 23: Exam

**Note:** *This schedule may, and probably will, change during the semester.*