

Marine Chemistry (SIOG 260), Winter Quarter 2016

Instructors: **Kathy Barbeau** (Sverdrup Hall 3119, x24339, kbarbeau@ucsd.edu),
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TA: **Margot White**, margotw42@gmail.com

Meeting Time and Place: **MWF, 11-11:50**. Vaughan Hall, 100

Requirements: Grades will be based on homework and projects (70%), and a closed-book written final exam (30%).

Primary text: Emerson and Hedges: *Chemical Oceanography and the Marine Carbon Cycle* (Cambridge University Press). Available in various formats on Amazon.com.

Additional useful texts: Millero, *Chemical Oceanography*
Pilson, *An Introduction to the Chemistry of the Sea*
Pankow, *Aquatic Chemistry Concepts*
Broecker and Peng, *Tracers in the Sea*
Chester and Jickells, *Marine Geochemistry*
Sarmiento and Gruber, *Ocean biogeochemical dynamics*

Course website on TritonEd: pdf versions of each lecture will be posted on the course website after each lecture. Homework sets, homework answers, and additional materials will be posted as necessary.

TA-led problem sessions: Thursdays, 12:30-1:30 pm, OAR conference room

| Seawater Composition and Chemistry - Martz | |
|---|--|
| Jan 4 (mon) | Introduction & general chemical concepts (Martz & Barbeau) |
| Jan 6 (wed) | Residence time/circulation (E&H Ch1-2) |
| Jan 8 (fri) | Geochemical cycles – weathering, rivers (E&H Ch 1-2) |
| Jan 11 (mon) | Geochemical cycles – hydrothermal vents (E&H Ch 1-2) |
| Jan 13 (wed) | Salinity/physical properties (E&H Ch 1,3) |
| Jan 15 (fri) | Thermodynamics Background I (E&H Ch 3) |
| Jan 18 (mon) | <i>MLK Holiday</i> |
| Jan 20 (wed) | Thermodynamics Background II (E&H Ch 3) |
| Jan 22 (fri) | Acid-Base equilibria (E&H Ch 4) |
| Jan 25 (mon) | Ocean CO ₂ system (E&H Ch 4) |
| Jan 27 (wed) | Kinetics (E&H Ch 9) |
| Jan 29 (fri) | Gases in the ocean (E&H Ch 10) |
| Feb 1 (mon) | Calcite and opal (E&H Ch 12) |
| Feb 3 (wed) | Carbon cycle (E&H Ch 11) |
| Feb 5 (fri) | Anthropogenic CO ₂ (E&H Ch 11) |
| | Biogeochemical Cycles - Barbeau |
| Feb 8 (mon) | Ocean biology and chemical cycles - overview |
| Feb 10 (wed) | Tracers I (E&H Ch 5) |
| Feb 12 (fri) | Tracers II (E&H Ch 5) |
| Feb 15 (mon) | <i>Presidents' Day Holiday</i> |
| Feb 17 (wed) | Production (E&H Ch 6) |
| Feb 19 (fri) | Respiration (E&H Ch 6) |
| Feb 22 (mon) | Nutrient stoichiometry, Redfield (E&H Ch 6) |
| Feb 24 (wed) | Macronutrient cycles (reading TBD) |
| Feb 26 (fri) | Micronutrients (reading TBD) |
| Feb 29 (mon) | Trace element geochemistry (reading TBD) |
| March 2 (wed) | Organic geochemistry (E&H Ch 8 + reading TBD) |
| March 4 (fri) | Sediment diagenesis (E&H Ch 12) |
| March 7 (mon) | Sedimentary record (E&H Ch 7) |
| March 9 (wed) | Anthropogenic impacts on biogeochemical cycles (reading TBD) |
| March 11 (fri) | In-class review (Martz & Barbeau) |

Final exam – March 14 (mon) 11:30 am - 2:30 pm, location TBA