

Marine Chemistry (SIO 260), Winter Quarter 2014

Instructors: **Kathy Barbeau** (Sverdrup Hall 3119, x24339, [kbarbeau@ucsd.edu](mailto:kbarbeau@ucsd.edu)),  
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Meeting Time and Place: **MWF, 11-11:50**. Vaughan Hall, 100

Requirements: Grades will be based on homework (30%), a closed-book written midterm (30%) and a closed-book written final exam (40%). Study sessions will be scheduled as well.

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*, 3<sup>rd</sup> Ed.  
Pilson, *An Introduction to the Chemistry of the Sea*  
Pankow, *Aquatic Chemistry Concepts*  
Broecker and Peng, *Tracers in the Sea*  
Chester, *Marine Geochemistry*  
Sarmiento and Gruber, *Ocean biogeochemical dynamics*

Course website on TED: pdf versions of each lecture will be posted on the course website after each lecture. 2012 lecture series also available. Homework sets, homework answers, and additional materials will be posted as necessary.

<b>Seawater Composition, Geochemical Balance and Tracers</b>	
Jan 6 (mon)	Introduction & general chemical concepts (Martz & Barbeau)
Jan 8 (wed)	Residence time/circulation (Martz)
Jan 10 (fri)	Salinity/physical properties/CTD demo (Martz)
Jan 13 (mon)	Geochemical cycles – weathering and river fluxes (Barbeau)
Jan 15 (wed)	Geochemical cycles – hydrothermal vents (Barbeau)
Jan 17 (fri)	Isotopic tools – stable carbon and nitrogen isotopes (Barbeau)
Jan 20 (mon)	MLK Holiday
Jan 22 (wed)	Isotopic tools - radioactive isotopes (Barbeau)
<b>CO<sub>2</sub> System, Redox Chemistry</b>	
Jan 24 (fri)	Introduction to acid-base equilibria (Martz)
Jan 27 (mon)	CO <sub>2</sub> equilibria in seawater (Martz)
Jan 29 (wed)	Air-Sea Gas Exchange (Martz)
Jan 31 (fri)	The Oceanic CO <sub>2</sub> system (Martz)
Feb 3 (mon)	Redox Chemistry I (Barbeau)
Feb 5 (wed)	Redox Chemistry II (Barbeau)
Feb 7 (fri)	In-class review (Martz & Barbeau)
Feb 10 (mon)	MIDTERM
<b>Water Column and Sediment Biogeochemistry</b>	
Feb 12 (wed)	Nutrient Distributions, Redfield ratio (Barbeau)
Feb 14 (fri)	Nutrient Cycles (Barbeau)
Feb 17 (mon)	Presidents' Day Holiday
Feb 19 (wed)	Micronutrients (Barbeau)
Feb 21 (fri)	Production (Yui Takeshita)
Feb 24 (mon)	Respiration (TBD)
Feb 26 (wed)	Calcite and opal (TBD)
Feb 28 (fri)	Trace element geochemistry (Barbeau)
March 3 (mon)	Marine organic geochemistry (Barbeau)
March 5 (wed)	Diagenesis and preservation of organic carbon (Barbeau)
March 7 (fri)	The sedimentary record (Martz)
<b>Changing Oceans, Review</b>	
March 10 (mon)	Ocean stratification and suboxic zones (Barbeau)
March 12 (wed)	Anthropogenic CO <sub>2</sub> (Martz)
March 14 (fri)	In-class review (Martz & Barbeau)

Final exam – March 17 (Monday), 11:30 am