

SIO141 / CHEM174 Chemical Principles of Marine Systems

Instructor: Prof. Andrew G. Dickson (adickson@ucsd.edu)

Teaching Assistant: Ms. Bina Patel (bspatel@ucsd.edu)

Lecture classes held each week, Tue/Thu, 3:30 – 4:50 PM in York 4080A

Section held each week, Wed, 10:00 – 10:50 AM in York 4080A

Mid-term exam, distributed on May 1, 2014 as an open-book, take-home exam
(due on or before May 8, 2014 – 5:00 PM) — **33% of total grade**

Final exam, June 9, 2014, 3:00 – 5:59 PM in York 4080A — **67% of total grade**

LECTURES

2014-04-01

Introduction and overview of the goals of the course

2014-04-04

Major elements, salinity, and the properties of sea water

2014-04-08

The particle cycle in the oceans: distributions of carbon, oxygen, and nutrients

2014-04-10

Residence times and concentrations of elements in the ocean

2014-04-15

Ions in solution: interactions with water

2014-04-17

In-class discussion of homework problems related to the thermohaline circulation

2014-04-22

Chemical speciation in sea water: stable oxidation states and hydrolysis effects

2014-04-24

Chemical speciation in sea water: complexation with inorganic ligands, and introduction to speciation calculations

2014-04-29

Chemical speciation in sea water: further discussion of speciation calculations, and of a paper by Turner et al. providing suitable data for such calculations

2014-05-01

Chemical speciation in sea water: redox speciation in seawater, introduction to standard potentials

2014-05-06

Chemical speciation in sea water: redox speciation in seawater, introduction to “ $p\varepsilon$ ” calculations, and the effects of speciation on redox equilibria

2014-05-08

Chemical speciation in sea water: the role of organic ligands, summary of speciation for seawater elements as a whole

2014-05-13

Chemistry and distributions of the lanthanide elements in sea water

22014-05-15

Overview of suboxic and anoxic marine systems indicating the chemical effects occurring in such systems.

2014-05-20

Discussion of ocean iron fertilization experiments.

2014-05-22

The distribution and chemical properties of ocean hydrothermal systems

2014-05-27

Overview of solution kinetics, water exchanges rates at cations, and the implications for ligand exchange rates.

2014-06-03

Overview of redox kinetics in aqueous solutions, discussions of implication for chemistry in seawater media

2014-06-05

Biological uptake processes involving microorganisms, including a discussion of copper toxicity and of strategies for iron uptake