

Course title: Physics and Chemistry of the Oceans

Term: Fall 2018; Tue/Thu 12:00-13:15; L1116

Instructor: Taka Ito (EST-1102, taka.ito@eas.gatech.edu)

Main Text: *Descriptive Physical Oceanography*, By L. D. Talley, G. L. Pickard, W. J. Emery and J. H. Swift, Academic Press, 2011.

Secondary Text: *Ocean Biogeochemical Dynamics*, By J. L. Sarmiento and N. Gruber, Princeton University Press, 2006.

Course Overview: The objective of this course is to provide a broad view of the oceans for advanced undergraduate and graduate students interested in marine sciences. The course material covers fundamental principles of physical and chemical oceanography, focusing on the basic processes and mechanisms including principles of fluid dynamics, thermodynamics, aquatic chemistry, gas transfer, photosynthesis and respiration. These principles are applied to large-scale ocean circulation and biogeochemical cycling.

Evaluation: homework (40%), attendance/participation* (10%), a mid-term exam** (20%), and a term paper (30%)

*Absences for acceptable causes (attending job interviews, conferences, field work, medical appointments, etc) are not penalized.

** Closed book, 70 min exam. One-page, double-side summary sheet is allowed.

Course outline and schedule

Week	Contents (relevant chapter of the main text)	HW (Thu)
<i>Part 1. Thermodynamics and fluid mechanics</i>		
1 (8/21, 23)	Seawater Properties (ch.1-3)	
2 (8/28, 8/30)	Oceanographic data and water masses (ch. 4)	#1 due
3 (9/4, 6)	No class	#2 due
4 (9/11, 13)	Mass, salt and heat budget (ch.5)	<i>Term Paper topic</i>
5 (9/18, 20)	Fluid dynamics principles (ch.7)	#3 due
6 (9/25, 27)	Ekman/Geostrophy (ch.7)	#4 due

Red font indicates no class.

Week	Contents (reading)	HW (Thu)
7 (10/2, 4)	Thermal wind/Dynamic topography (ch.7)	#5 due Outline
8 (10/9, 11)	Ocean gyres	#6 due
9 (10/16, 18)	Large-scale ocean circulation	#7 due
10 (10/23, 25)	Review/ Midterm 1	
Part 2. Ocean biogeochemistry		
11 (10/30, 11/1)	Mixed layer and seasonal cycle	
12 (11/6, 8)	Ocean productivity	#8 due 1st draft
13 (11/13, 15)	Nutrient cycle	#9 due
14 (11/20)	Air-sea gas transfer	#10 due Review comment due
15 (11/27, 29)	Global carbon cycle	#11 due
16 (12/4)	Changing ocean circulation and biogeochemistry	Final draft (12/8)

Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit <http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Campus Resources for Students

In your time at Georgia Tech, you may find yourself in need of support. Below you will find some resources to support you both as a student and as a person.

Academic support

- Center for Academic Success <http://success.gatech.edu>
 - 1-to-1 tutoring <http://success.gatech.edu/1-1-tutoring>
 - Peer-Led Undergraduate Study (PLUS) <http://success.gatech.edu/tutoring/plus>
 - Academic coaching <http://success.gatech.edu/coaching>
- Residence Life's Learning Assistance Program <https://housing.gatech.edu/learning-assistance-program>
 - Drop-in tutoring for many 1000 level courses
- OMED: Educational Services (<http://omed.gatech.edu/programs/academic-support>)
 - Group study sessions and tutoring programs
- Communication Center (<http://www.communicationcenter.gatech.edu>)
 - Individualized help with writing and multimedia projects
- Academic advisors for your major <http://advising.gatech.edu/>

Personal Support

Georgia Tech Resources

- The Office of the Dean of Students: <http://studentlife.gatech.edu/content/services>; **404-894-6367**; Smithgall Student Services Building 2nd floor
 - You also may request assistance at https://gatech-advocate.symplicity.com/care_report/index.php/pid383662?
- Counseling Center: <http://counseling.gatech.edu>; **404-894-2575**; Smithgall Student Services Building 2nd floor

- Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention. Their website also includes links to state and national resources.
- *Students in crisis may walk in during business hours (8am-5pm, Monday through Friday) or contact the counselor on call after hours at 404-894-2204.*
- Students' Temporary Assistance and Resources (STAR):
 - <http://studentlife.gatech.edu/content/need-help>
 - Can assist with interview clothing, food, and housing needs.
- Stamps Health Services: <https://health.gatech.edu>; 404-894-1420
 - Primary care, pharmacy, women's health, psychiatry, immunization and allergy, health promotion, and nutrition
- OMED: Educational Services: <http://www.omed.gatech.edu>
- Women's Resource Center: <http://www.womenscenter.gatech.edu>; 404-385-0230
- LGBTQIA Resource Center: <http://lgbtqia.gatech.edu/>; 404-385-2679
- Veteran's Resource Center: <http://veterans.gatech.edu/>; 404-385-2067
- Georgia Tech Police: 404-894-2500

Statement of Intent for Inclusivity

As a member of the Georgia Tech community, I am committed to creating a learning environment in which all of my students feel safe and included. Because we are individuals with varying needs, I am reliant on your feedback to achieve this goal. To that end, I invite you to enter into dialogue with me about the things I can stop, start, and continue doing to make my classroom an environment in which every student feels valued and can engage actively in our learning community.