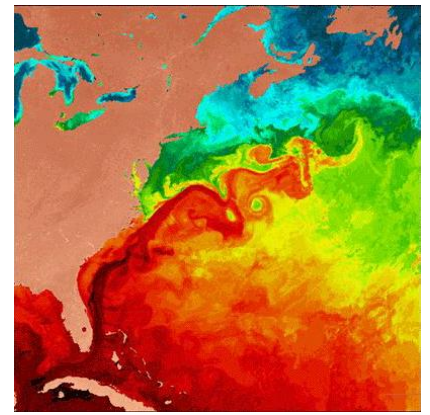




Syllabus
Physical Oceanography
OEAS 405/505/604
Fall 2023



Instructor: Tal Ezer (683-5631; tezer@odu.edu)

Office: CCPO, Innovation Research Park I, 4111 Monarch Way, Room 3217

Office Hours: Mon/Wed 09:00am-11:00am (email to schedule any other time)

Class time: Tuesday, Thursday, 9:15am-10:30pm. **First class: Tuesday, August 29.**

Place: Room 3200, CCPO, Research Bldg. I, 4111 Monarch Way

All class notes & homework will be posted at: http://www.ccpo.odu.edu/~tezer/405_604/

Learning Outcomes: Students will acquire a broad knowledge of the field of Physical Oceanography and learn how scientists in this field collect, analyze, and present data for their research. Students will learn about ocean measurements, seawater properties, and the equations of motion that drive ocean currents, ocean circulation, waves, tides, and other oceanic processes.

Prerequisites: One semester of calculus and two semesters of physics, hydraulics, or similar courses.

Official Textbook –

Knauss and Garfield, 2017: Introduction to Physical Oceanography, Third Edition. or

Knauss, 1997: Introduction to Physical Oceanography, Second Edition.

Other useful books-

Stewart, (electronic version, 2008): Introduction to Physical Oceanography (available online: https://www.colorado.edu/oclab/sites/default/files/attached-files/stewart_textbook.pdf)

Pickard & Emery, 1982: Descriptive Physical Oceanography

Pond & Pickard, 1983: Introductory Dynamic Oceanography

Mellor, 1996: Introduction to Physical Oceanography

Supporting resources: online data, journal articles, computer models, satellite remote sensing, etc.

Grading:

- Homework assignments: 50%
- Exam #1 (21-Sep-2023): 15%
- Exam #2 (26-Oct-2023): 15%
- Exam #3 (07-Dec-2023): 20%

– Assignment must be returned on time for full grade (due in 1 week)

– Students are expected to follow ODU’s “Honor Pledge” and “Classroom Conduct” (see *University Policies*: <https://online.odu.edu/admissions/policies-and-student-responsibilities>)

Fall 2023 classes schedule and Knauss book chapters for each topic

Date	Topic	Book Chapter
T-29-AUG	First Class – Introduction to Physical Oceanography	1
R-31-AUG	What properties we observe in the ocean and how	1
T-05-SEP	Properties of seawater & distribution in oceans	2
R-07-SEP	Equation of state, stability and stratification	2
T-12-SEP	Air-sea interaction and heat transfer	3
R-14- SEP	Local heat balance and the seasonal thermocline	3
T-19- SEP	Water and salt balances	4
R-21-SEP	Exam #1	1-4
T-26-SEP	Continuity equation, mixing and turbulence	4
R-28-SEP	Equations of motions- pressure gradient & friction	5
T-03-OCT	Equations of motion- Coriolis effect and vorticity	5
R-05-OCT	Effects of rotation, Inertial & Geostrophic flows	6
T-10_OCT	Fall Break- no class	
R-12-OCT	Geostrophic current calculations	6
T-17-OCT	Baroclinic and barotropic flows	6
R-19-OCT	Ekman transport	6
T-24-OCT	General ocean circulation theory	6
R-26-OCT	Exam #2	4-6
T-31-OCT	Major ocean currents – Atlantic Ocean	7
R-02-NOV	Major ocean currents – Pacific and El Nino	7
T-07-NOV	Election Day- no class	
R-09-NOV	Thermohaline circulation and water masses	8
T-14-NOV	Waves- wind driven	9
R-16-NOV	Waves- tsunami & other waves	9
T-21-NOV	Astronomical Tides- theory	10
R-23-NOV	Thanksgiving Holiday- no class	
T-28-NOV	Tides- observations and prediction	10
R-30-NOV	Coastal ocean	10
T-05-DEC	Estuaries & semi-enclosed sea	11
R-07-DEC	Exam #3	all