

**Syllabus SIO 176 – Spring 2020**  
**Observational Physical Oceanography**

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TA Robert Sanchez: rmsanche@ucsd.edu

*Lectures:* Tuesday/Thursdays 11:00-12:20 pm – Zoom online  
*Lab Times:* Wed 11 am  
*Office Hours* –Wed 10 am

*Additional Office Hours:*

Prof Straneo: email to schedule additional office hour meetings  
TA Sanchez: email to schedule additional office hour meetings

Consult Canvas for course materials and announcements.  
There is no assigned textbook for this course. Readings will be assigned throughout the course and posted on Canvas.

*Course Description:*

This course gives an introduction to the methods and measurements used by observational physical oceanographers to design field experiments, collect and analyze data. Topics covered include: 1) instruments and platforms; 2) basic physical oceanographic concepts, including the equation of state; 3) data calibration and analysis. The course will involve lectures, virtual trips to labs including guest participants, student presentations and projects.

*Credit & Homework*

Grades will be based on the midterm (1/4), homeworks and in-class presentations (1/2), and a final project report + presentation (1/4).

*Midterm Exam:* Tuesday May 5<sup>th</sup> during class time

*Project Presentations:* June 2 and June 4

*Research Project Report:* due June 11

### **Week 1 - Introduction and Temperature Sensors**

Course introduction and logistics discussion.

Lab Session: Matlab Tutorial for beginners - Bobby Sanchez

Temperature Sensors and Expendable Probes XBTs

### **Week 2 Temperature and Salinity**

Thermistors, XBTs, Observation to Variable, XBT exercise

Lab Session: Programming an RBR CTD

Conductivity Sensors – Contact Method

### **Week 3 Velocity**

ADCP - the instrument and data analysis

Lab Session: Experiment #1 - Buoyancy - Experiments

Conductivity Sensors - Inductive

### **Week 4 Pressure**

Pressure sensors and tide gauges

Lab Session: Tilt Current Meters Lowell Instruments

Example Application: Sea Level Rise

### **Week 5 Density**

Equation of state

Lab Session: Tutorial the equation of state TEOS 10

Dynamic Height

### **Week 6**

Mid-Term Exam

Lab Session: Cruise Planning

Introduction to platforms

### **Week 7 Lagrangian Platforms**

Global Surface Drifters

Lab Experiment: Measuring Velocity

Rafos and Argo Floats

**Week 8 Eulerian Platforms**

Moorings

Lab Session: Project Start

Ice-Tethered Platforms

**Week 9 Autonomous Platforms**

Wave Glider

Lab Session: Project Q&A

Autonomous surface/subsurface vehicles

**Week 10**

Project Presentations

**Week 11 - Final project due**

Project due date