

**SIO 175 Syllabus Fall 2021**  
Analysis of Oceanographic/Atmospheric Data  
TuTh 9:30-10:50am, Lab Tu 11-11:50am

**Instructor:** Mark Merrifield, mamerrifield@ucsd.edu

**Teaching Assistant:** Andrew Parlier, cparlier@ucsd.edu

**Office Hours:** Mark, Friday 10-11am or by appointment

**Prerequisites:** MATH 18 or MATH 20F or MATH 31AH or consent of instructor

**Overview:** Oceanic and atmospheric observations produce large data sets with signals of interest typically embedded in some form of random noise. To extract useful information requires skills in statistical methods and scientific computing. We will examine oceanographic and atmospheric processes captured in real-world observations using Matlab as our analysis platform.

**Topic areas and Grading:** The course will be divided into four roughly two-week topic areas:

1. Describe variability – study the local ocean using Scripps Pier data
2. Establish relationships - correlation and regression analyses of time series from the equatorial Pacific Ocean
3. Detect patterns - global datasets and empirical orthogonal functions
4. Examine oscillatory signals - waves across a coral reef using Fourier transforms

Each topic area will include a homework assignment that will apply analysis techniques discussed in lecture. Group and individual assistance with the homework assignments will be provided in the Lab session. For the final project, you will analyze a dataset of your choosing and produce a written and oral report of your findings. The course grade is based on homework assignments (70%) and the final project (30%).

**Course Website:** Assignments, example programs, additional reading material, and grades will be posted on Canvas.

**Suggested Textbooks:** available on ScienceDigest

Thomson, R. E. and W. J. Emery, 2014: Data Analysis Methods in Physical Oceanography, 3rd edition, Elsevier.

Menke, W., and J. Menke, 2016: Environmental Data Analysis with Matlab, 2nd Edition, Elsevier.

Hahn, B. H., and D. T. Valentine, 2017: Essential MATLAB for Engineers and Scientists, 6th edition, Elsevier.

**Course Policy and Academic Integrity:**

1. The students and instructors will adhere to the UCSD Policy on Integrity of Scholarship (<http://senate.ucsd.edu/Operating-Procedures/Senate-Manual/Appendices/2>).
2. Lectures will be delivered via Zoom. You are notified that these lectures will be recorded, and that this program uses video and audio recording or other personal information for the purpose of facilitating the course and/or test environment. UC San Diego does not allow vendors to use this information for other purposes. Recordings will be deleted when no longer necessary.
3. You may discuss homework problems with fellow students, but all submitted assignments must reflect your own work.

4. The homework is due at the time specified on the assignment uploaded to Canvas. Late homework will receive a point reduction.
5. Asking questions during the lectures is encouraged and appreciated.

**Disability Resources:** Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD). Students should present their AFA letters to the instructor at least two weeks prior to an exam to ensure that accommodations may be arranged.

Contact the OSD for further information:  
University Center 202 behind Center Hall  
T: 858.534.4382  
E: [osd@ucsd.edu](mailto:osd@ucsd.edu)  
W: <http://disabilities.ucsd.edu>