



MSCI 311/311L: Hydrographic Techniques

Fall 2019; Lecture MWF 11:00 - 11:50; Science Annex II Room 220
Lab W 2:30 - 5:20; Science Annex II Room 220

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Office Hours: MWF 12:00-2:00 pm or by appointment.

Webpage: Moodle course management system.

Text: 'MATLAB Recipes for Earth Sciences' by Trauth and Sillmann.

Pre-requisites: MSCI 111/111L, MATH 131 and STAT 201/201L.

CATALOG DESCRIPTION: Introduction to standard coastal oceanographic equipment, with a focus on physical measurements. Students become familiar with instrument use and communication through research projects. Students plan and execute projects, download and analyze data, and present results. Three lecture hours per week. F.

OBJECTIVES: Upon completion of this course, students should be able to use scientific equipment (including YSIs, CTDs, ADCPs, HOBO data loggers, etc.) effectively to achieve a desired scientific result. Students should be able to formulate a sampling plan for field work, communicate with instrumentation, and use MATLAB computing software to analyze and visualize collected data sets. Students should also be able to communicate the results of their investigations both verbally and in writing through reports and presentations.

STUDENT LEARNING OUTCOMES: Upon completion of this lecture and laboratory, students should be able to:

1. Demonstrate how to communicate with and obtain data from common oceanographic instrumentation.
2. Formulate a plan for sampling and data collection that balances resources and desired outcomes.
3. Use MATLAB computing software to load and analyze/interpret real world marine data sets.
4. Evaluate and critique methods from a published research paper.
5. Synthesize and present collected results to others.
6. Meet the following EL student learning outcomes:
 - a. SLO 1.1. Students will demonstrate the knowledge and skills obtained through participation in experiential learning activities that are relevant/pertinent to their academic programs and/or career goals.
 - b. SLO 2.1. Students will demonstrate a high level of comprehension and skill in connecting theory with practice which is correlated to their level of participation in experiential learning activities.

GRADING POLICY: The lecture and laboratory are separate co-requisites (3 credits and 1 credit), and you will receive a grade for each. In practice, a single overall grade will be assigned for MSCI 311 and MSCI 311L (you get the same grade for both). Grading for this course is based on projects (including both written drafts and presentations), written assignments which include labs, weekly quizzes and in-class assignments, and attendance / participation. Project work will be team-based, with some adjustment to final grades based on peer and instructor evaluation of individual effort levels. The percentage weight for each type of assessment is outlined below.

50%	Swash and estuary projects (worth 20% and 30%, respectively)
35%	Assignments
10%	Quizzes
5%	Attendance & Participation

- Projects are described in more detail below. Project grade encompasses written drafts, final written product, and oral presentations. Project work will be completed in teams with grades adjusted based on peer and instructor evaluation.
- Assignments include both in-class written assignments as well as lab exercises. These will often be due at the end of a class or lab period. Late assignments will be penalized 15% if turned in by the start of the next lecture (or by Monday's lecture for lab assignments). Assignments will not be accepted beyond these dates, allowing me to return your graded work in a prompt manner.
- Quizzes will be given weekly and must be completed on Moodle by the due date to receive credit.
- Attendance & Participation: Will be calculated on a percentage scale based on lecture attendance.
- Grading scale: A (≥ 90), B+ (88.0-89.9), B (80.00-87.9), C+ (78.0-79.9), C (70.0-77.9), D+ (68.0-69.9), D (60-67), F (< 59.9).

ATTENDANCE POLICY: Attendance is critical for this course, as we will be actively working on both projects and assignments during class time. Arrive on time, so as not to disrupt your classmates. Daily attendance will be recorded on Moodle, it is your responsibility to check this weekly and let me know if it is not accurate. Makeup assignments will only be scheduled in the case of an excused absence that I have been notified of ahead of time. Excused absences are defined in the University Catalog. I may excuse other types of absences, but only if you clear it with me *ahead of time*. If you miss a class, it is your responsibility to inform me in a timely manner (within 24 hours), find out what you missed, and make up the material if it is an excused absence. Participation is essential for both lecture and laboratory and it will be difficult to succeed if you miss class. Late assignments will not be accepted beyond the next class period, and will receive reduced credit (15% off of earned grade).

STUDENT CONDUCT: *Coastal Carolina University is an academic community that expects the highest standards of honesty, integrity and personal responsibility. Members of this community are accountable for their actions and reporting the inappropriate action of others and are committed to creating an atmosphere of mutual respect and trust.*

Violations of the Student Code of Conduct (including but not limited to academic dishonesty – cheating and plagiarism) will not be tolerated and may result in removal from the course and a grade of FX. Any such violations will be dealt with in strict accordance with Coastal Carolina University guidelines. FX grades cannot be removed through the Repeat Forgiveness Policy. For information on the Code of Student Conduct, please see your Student Handbook.

CLASSROOM POLICIES: We will be using computers during both lecture and lab in order to advance your understanding of the relevant topics. Computers are to be used as a scientific tool, not a distraction or toy. If computers are being used for purposes not related to this class, they will be taken away and you will receive a zero on any assignment in progress. Be respectful of me and of your classmates and turn off and put away cell phones during class time.

We will be working together this semester to learn new instruments and study our local coastline. I welcome discussions and questions outside of class as well as in it. If my office door is open feel free to stop in, particularly during office hours, or set up an appointment over email to schedule a time to meet.

Tools and equipment will be provided for all field experiences. Expect to get wet and/or sandy when we are visiting the swash zone or on the boat. Always prepare for possible foul weather and wear “expendable” clothing for these trips.

The research projects are a critical component of this course. During the semester, you will design, implement, and present (orally and in writing) a mini-project in the swash zone and a larger project focused on a local estuary. It will be made clear what resources are available to you for these projects, and the questions will be driven by your team. Teams will remain the same throughout the semester and projects will receive one team grade, with each team turning in one written product at each stage. Class and lab time will be provided to you for work on these projects. This is your chance to practice being a scientist and doing genuine field work, and if you dedicate yourself to generating good results it will be a successful semester for all of us. Guidance will be provided at each stage of the project to make expectations clear prior to each due date. Final presentations will be in the format of poster sessions during the final exam period and/or at the Marine Science symposium.

Your second projects will be based off of data collected aboard our research vessel, the Coastal Explorer. The boat trip will require a full day on the water, as it incorporates both travel to and from Georgetown and time for sampling in Winyah Bay. A letter to be excused from class/work that day will be provided. Make sure you put this date on your calendar now, as participation is critical to your success in this course.

LABORATORY SAFETY: Students are expected to know about chemical hygiene plan documents, chemical inventory and storage, emergency equipment, use of protective measures, standard operating procedures for their lab room and procedures in case of an accident. Students must follow posted safety measures or given instructions in regard to appropriate clothing (close-toed shoes, appropriate length garments, protective gear) - students not conforming to these rules will be asked to leave and cannot return until they are in compliance. Students unable to complete the lab or field trip will not receive credit. If posted, students may not bring food or drink into the lab room and items will be disposed of if in the lab room.

Coastal Carolina University is committed to equitable access and inclusion of individuals with disabilities in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Individuals seeking reasonable accommodations should contact Accessibility & Disability Services (843-349-2503 or <https://www.coastal.edu/disabilityservices/>).

Date	Topic	Reading	Assignments	Lab (Wednesdays)
Aug 21	Introduction, analysis tools, programming	Ch. 2	Assignment 1 (Moodle)	Programming skills and MATLAB
Aug 23			MATLAB intro	
Aug 26	Instruments, data acquisition	Ch. 1	MATLAB assignment	Instrument Communication
Aug 28			Instrument presentations	
Aug 30				
Sep 2	Labor Day holiday		Singleton Outlines	Sampling Plans / Data Acquisition
Sep 4	Intro to Singleton Swash		Types of Variables	
Sep 6	Developing a sampling plan		Singleton methods	
Sep 9	Data processing, statistical methods & error	Ch. 2	MATLAB assignment	Singleton field trip I
Sep 11				
Sep 13				
Sep 16	Using scientific references MATLAB for data analysis	Chs. 3-4	MATLAB assignment	Statistics / Data Analysis
Sep 18			Journal methods	
Sep 20				
Sep 23	Refining sampling plans Statistics in Excel	Ch. 5	Excel statistics	Singleton field trip II
Sep 25				
Sep 27				
Sep 30	Singleton data analysis Boat trip prep		Singleton Results & Concl.	Singleton project work
Oct 2				
Oct 4			Student Holiday	
Oct 7	Presenting scientific data		Write-up: Singleton	
Oct 9	Wednesday, Oct. 9 Winyah Bay boat trip 8 am – 5 pm			
Oct 11	Singleton presentations		Presentation: Singleton	
Oct 14	Estuaries, introduction to Winyah Bay		Winyah Bay outlines	External data part I
Oct 16				
Oct 18			Instruments, accuracy and precis.	
Oct 21	Sampling plans		Winyah Bay sampling plans	Winyah Bay sampling plans
Oct 23				
Oct 25				
Oct 28	Gathering the data Spatial Analysis	Ch. 7	Winyah Bay methods	Winyah Bay data analysis
Oct 30				
Nov 1				
Nov 4	Exploring online data sets		Winyah Bay results	External data part II (Online data sets)
Nov 6				
Nov 8				
Nov 11	Winyah Bay data analysis		Winyah Bay discussion	No Lab
Nov 13			Reflection assignment	
Nov 15				
Nov 18	Presenting data: telling a story			Winyah Bay synthesis
Nov 20				
Nov 22				
Thanksgiving Break, Nov. 25-29				
Dec 2	Winyah Bay project work			Winyah Bay project work
Dec 4			Posters due for printing	
Dec 6				
MSCI student symposium, Monday Dec. 9				
Dec 10 (Tues)	Final Exam, 11:00 am		Final Written Report due	

*** Schedule subject to change to meet student needs. The readings listed are from the required text. Additional readings from other sources will be distributed or assigned in class.*