

Introduction to Coastal and Marine Geotechnics

CGN 4905 Section STAR

Class Periods: F, Periods 7 - 9, 1:55-4:55 PM

Location: FLG 0280 & Canvas

Academic Term: Spring 2024

Instructor:

Nina Stark

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352-392-9537

Office Hours: Thursday, 1:30-2:30 PM, 265H Weil Hall or via zoom (Meeting ID: 236 384 8089)

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

N/A

Course Description

Coastal flooding, sea-level rise, and related coastal erosion, as well as increased industrial usage of the coastal zone and oceans lead to an increasing demand for qualified civil engineers with an understanding of coastal and marine processes and with knowledge of coastal and marine site investigation and characterization. This course provides an introduction to coastal and marine geotechnical engineering and introduces students to the array of geotechnical engineering considerations unique to coastal and marine projects. These considerations include subaqueous sediment dynamics, in-situ geotechnical methods, complementary survey techniques and specific applications such as for offshore renewable energy and port and navigation infrastructure. In summary the course will cover the following topics:

- Geotechnical aspects of coastal and marine engineering.
- Introduction to the coastal zone as a working environment.
- In-situ geotechnical methods and complementary techniques for investigation.
- Survey strategies.
- Local field trips for demonstrating methods, practice, and design.

Course credit: 3

Course Pre-Requisites / Co-Requisites

Good standing

Course Objectives

LO1: Demonstrate an understanding of the coastal zone and the ocean as a working and engineering environment.

On completion of the course, successful students will be able to:

- L1) Identify and explain coastal/marine processes relevant for seabed properties and dynamics.
- L2) Relate coastal and marine processes to sediment properties.
- L3) Identify and evaluate challenges and risks of surveying in coastal and marine environments.

LO2: Demonstrate an understanding of geotechnical seafloor characteristics.

On completion of the course, successful students will be able to:

- L4) Choose the most suitable surveying methods for a specific measurable and site.
- L5) Schedule and plan the deployment of a tool for a specific surveying questions.
- L6) Describe sediment strength and pore pressure profiles of subaqueous sediments.

LO3: Students will develop geotechnical survey strategies for a variety of coastal and marine environments.

- L7) Develop survey strategies for geotechnical site characterization in coastal/marine environments.
- L8) Design a survey schedule for a site characterization.
- L9) Compile a report for a site characterization.

LO4: Demonstrate an ability to acquire new knowledge as needed using appropriate learning strategies

- L10) Conduct a literature review and synthesize results.
- L11) Conduct a critical literature review.

L12) Develop a strategy to secondary parameters from measured data.

Materials and Supply Fees

N/A

Relation to Program Outcomes (ABET):

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Medium
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	High
3. An ability to communicate effectively with a range of audiences	High
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Medium
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	High
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	High
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

No specific textbook is required for this course as the topics covered in the class span over several areas of offshore and nearshore geotechnics that are not covered in a single text. Selected reading material will be made available via Canvas as required.

Recommended Materials

Selected reading material will be provided on Canvas and recommended throughout the course. Furthermore, a script developed by the instructor will be provided with most of the lectures.

Course Schedule

Week 1: Introduction to this Course and Topic / Stark

Module 1: Coastal and Marine Environments and Processes

Week 2: Beaches & the Nearshore Zone / Stark / Quiz 1

Week 3: Beaches & the Nearshore Zone / Stark / Quiz 2

Week 4: Ports, estuaries, waterways / Stark / Quiz 3

Week 5: Deep ocean & Coastal and marine Sediments / Stark / Quiz 4 / Homework 1

Week 5: Introduction into boat work / Van Natta & Pezoldt / Field trip

Module 2: Equipment and measurement techniques

Week 6: Working vessels & Sediment sampling and coring / Stark / Quiz 5

Week 7: Penetrometer Testing Part 1 / Stark / Quiz 6

Week 8: Penetrometer Testing Part 2 / Stark / Field trip

Week 9: Geoacoustic surveying / Stark / Quiz 7

Week 9: Geoacoustic surveying / Stark / Field trip

Week 10: Remote sensing / Stark / Quiz 8/ Midterm project

Module 3: Survey strategies

Week 11: TBD / Stark / Field trip

Week 11: Concepts of Survey Strategies / Stark / Quiz 9

Week 12: TBD / Stark / Field trip

Week 12: Survey strategy examples / Stark / Quiz 10/ Homework 2

Week 13: Project presentations / Class

Week 14: Survey strategy examples / Stark

Week 15: Summary & Q&A / Stark / Final exam

Attendance Policy, Class Expectations, and Make-Up Policy

Key contents of this class are provided through videos and materials available on the class' Canvas site. To unlock the second and third module, you need to have passed all quizzes with at least 80%. Homework 1 needs to be submitted at latest two weeks after completing module 1 or by March 1 (whatever comes first). The midterm project needs to be chosen by March 1 and completed by March 31. Homework 2 needs to be submitted at latest two weeks after completion of module 2 or by April 15 (whatever comes first). The final exam will be an open book take home exam that will open on April 27 and close on May 01, 2024. All graded work will be submitted via Canvas.

All key contents and graded work will be supplied via Canvas. In-person class attendance (Fridays 1:55PM – 4:55PM) is not mandatory but encouraged. In person session topics will be aligned with the weekly topics and include discussions, project work, and team work sessions. Field trips will require sign up. In-person session topics and sign-up sheets will be announced via Canvas at least a week prior to the session.

Students are required to see the instructor during office hours if their performance in graded work is under 80%. Students are encouraged to reach out to the instructor during office hours, via email, or after in-person session at any time.

If unexpected circumstances prohibit students to submit graded work within the submission windows, please contact the instructor as soon as you know about an extension. Late submissions are not accepted unless an extension has been granted. Late submissions without no extensions will lead to the removal of 25 points per day.

Students are encouraged to use laptops during in-person class session. In-person class sessions and field trips will not tolerate disruptive behavior. This may include anything that may disrupt other students from learning and includes cell phone calls and texting, etc.

Field trips may require students to travel to UF East Campus Coastal Field Lab on Waldo Rd. Students are encouraged to bring outdoor clothes for respective weather conditions for field trips. This may include rain gear, sub screen, etc.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homeworks (2)	100 each	25%
Quizzes (10)	100 each	15%
Midterm Project	100	30%
Final Exam	100	30%
		100%

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history,

academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another

and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

COVID-19

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](#) for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>;<https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.