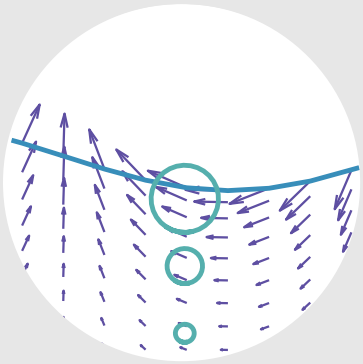

OCEAN WAVES AND TIDES

OE 754/854

Instructor Info

Prof. Nathan Laxague

MWF 9:30 am - 10:30 am

Chase 121D

603-862-4023

http://unh-cassll.github.io

Nathan.Laxague@unh.edu

Lecture Info

Prereq: PHYS 407; MATH 527 & 528 *or* MATH 525 & 526

Monday, Wednesday, & Friday

8:10 am - 9:00 am

Kingsbury N343

Text Info

Dean & Dalrymple
Water Wave Mechanics for Engineers and Scientists,
2nd Ed., World Scientific, 1991,
ISBN 978-9810204211

Overview

OE 754/854 is an upper division undergraduate/first year graduate-level course on wave and tidal theory for engineers and scientists.

Wave-related topics include: Small amplitude wave theory, standing and propagating waves, transformation in shallow water, energy, random seas, forces on structures, and scaling of physical models in wave tank experiments.

Tide-related topics include: Tidal forcing and tidal dynamics. Description of tides in the ocean, tidal generating forces, equilibrium tide, dynamics of tides in coastal waters, and an introduction to the mathematical basis of tidal analysis.

Examples are taken from UNH research in the Chase wave tank and field observations in the Gulf of Maine.

Material

Required Text

Dean & Dalrymple, *Water Wave Mechanics for Engineers and Scientists*, 2nd Ed., World Scientific, 1991, ISBN 978-9810204211

This textbook is available in paperback and is plentiful, having been reprinted many times since its first printing in 1991.

Other

Any other required reading materials will be provided through Canvas.

Class Attendance & Preparation

You will be expected to attend class prepared for the lecture and ready to take notes for yourself. Often, this will include reading the textbook as assigned from one class to the next. If you need to miss class for a planned University-related activity, please let me know ahead of time. For more information, please see the Attendance and Class Requirements policy in the SRRR. In the event that you need accommodation for a religious or cultural holiday/observance, you are encouraged to make that request as early in the semester as possible.

Grading Scheme

15%	Homework Assignments (x10, lowest score dropped)
50%	Midterm Exams (25% per exam)
35%	Final Exam

	A	B	C	D	F
+		87-89	77-79	67-69	
	93-100	83-86	73-76	63-66	<60
-	90-92	80-82	70-72	60-62	

Graded Assignments

- When we have homework, it will be assigned at the end of lecture and due (via upload through Canvas) one week later. Late homework will be marked down 10% per day, up to two days past the due date. Homeworks submitted after 11:59 PM Friday will get a zero. *There will be no exceptions to this rule*. The lowest individual homework grade will be dropped.

- Midterm and Final examinations will be adminstered in person, in Kingsbury N343.

Exam Scheduling

Exams will be proctored in Kingsbury N343 during marked exam dates/times. Individuals with an excused, officially documented reason for absence on exam day will take the exam remotely over Zoom concurrently with the in-person exam. It is my goal to create a learning experience that is as accessible as possible. If you anticipate any issues related to the testing requirements of this course or need accommodations, please either discuss them directly with me or in conjunction with the Student Accessibility Services Office within the first week of classes to explore alternative options.

Academic Integrity

You are required to comply with all University policies regarding Academic Honesty: https://catalog.unh.edu/srrr/academic-policies/academic-honesty/. Suspected violations of academic honesty are handled following Section 9.7, Procedures for Dealing with Academic Misconduct in the Student Rights, Rules, and Responsibilities Handbook, and may result in probation, deferred suspension, suspension, or expulsion. Do honest work; anything else deprives yourself of a learning opportunity that you only have for a short time.

Conduct and Respect for Peers

All participants in OE 754/854 (including myself and the students) shall treat each other with respect and collegiality. We endeavor to create a welcoming, friendly, and inclusive environment for everyone. To do otherwise marginalizes individuals who are here to learn and grow. Participation is of great importance to an intellectually vibrant class experience. To this end, in order to ensure a climate of learning for all, disruptive or inappropriate behavior (repeated outbursts, disrespect for others, etc.) may result in exclusion (removal) from this class.

Accommodations for Students with Disabilities

The University is committed to providing students with documented disabilities equal access to all university programs and facilities. If you think you have a disability requiring accommodations, please contact Student Accessibility Services (SAS) at 201 Smith Hall. If you have received an accommodation letter for this class, please contact me immediately so we can discuss the necessary arrangements. SAS may be contacted at https://www.unh.edu/diversity-inclusion/student-accessibility, (603) 862-2607, sas.office@unh.edu.

Lecture Schedule

WEEK	OVERALL TOPIC	BOOK CHAPTER
Week 1	Fluid mechanics fundamentals	Chap. 2
Week 2		
Week 3	Small amplitude wave theory	Chap. 3
Week 4		
Week 5	Engineering wave properties	Chap. 4
Week 6		
Week 7		
Week 8		
Week 9		
Week 10	Long waves (including tides)	Chap. 5
Week 11		
Week 12		
Week 13		
Week 14	Random seas	Chap. 7
Week 15	Forces on structures	Chap. 8
Week 15	Nonlinear properties	Chap. 10

Assignment/Exam Schedule

ASSIGNMENT/EXAM	WEEK ASSIGNED	WEEK DUE	TIME & LOCATION
Homework 01	2	3	-
Homework 02	3	4	-
Homework 03	4	5	-
Homework 04	5	6	-
Exam 01	6	-	12:40 PM - 2:00 PM, KING N343
Homework 05	6	7	-
Homework 06	7	8	-
Homework 07	8	9	-
Exam 02	10	-	12:40 PM - 2:00 PM, KING N343
Homework 08	11	12	-
Homework 09	12	13	-
Homework 10	15	16	-
Final Exam	December 15, 2025	-	1:00 PM - 3:00 PM, KING N343

Graduate Student (OE 854) Term Paper

In order to receive credit for OE 854—the graduate-level version of the course—students are expected to complete a term paper in addition to satisfying the other course requirements. This paper should constitute a review of the scholarly literature relevant to one of the topics covered during the semester. Seed publications for a handful of these topics are provided in the table below. While there is no formal length requirement, for a paper to receive credit it should be lengthy enough to contain a thoughtful review of the literature.

SUBJECT	CITATION
Water Wave Theory	Craik, A. D. (2004). The origins of water wave theory. *Annual Review of Fluid Mechanics*, 36(1), 1-28.
Wave-Current Interaction	Wolf, J., and Prandle, D. (1999). Some observations of wave–current interaction. *Coastal Engineering*, 37(3-4), 471-485.
Engineering Wave Properties	Peregrine, D. H. (1983). Breaking waves on beaches. *Annual Review of Fluid Mechanics*, 15(1), 149-178., 37(3-4), 471-485.
Tides and Estuarine Physics	MacCready, P., and Geyer, W. R. (2010). Advances in estuarine physics. *Annual Review of Marine Science*, 2(1), 35-58.
Stokes Drift	van den Bremer, T. S., and Breivik, Ø. (2018). Stokes drift. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 376(2111), 20170104.