SYLLABUS

OCEN 672 – Coastal Engineering – Spring 2020

Campus	Section	Days	Time	Room
College Station	**600**	**M/F**	**4:10 – 5:25 pm**	**ZACH 445 (via T1V)**
Galveston	**650**	**M/F**	**4:10 – 5:25 pm**	**PMEC 145 (in person)**

Instructor

Dr. Jens FIGLUS | Associate Professor | Department of Ocean Engineering
Office Location: Powell Marine Engineering Complex (PMEC), Rm. 218, Galveston Campus
Phone: 409-741-4317 | E-mail: figlusj@tamu.edu

Office Hours: By appointment. I will make an effort to be present on the College Station campus on some class days allowing for face-to-face meetings in HEB 122 before class.

Course Website

As a registered student for this course you can access posted material on the OCEN 672 Google Drive folder. The folder is accessible via a button at the top of your HOWDY portal screen and also via a link emailed to every registered student. To access the folder, you must use your TAMU email and login credentials. It will not work if you try to use your personal Gmail account. Visit the folder frequently for updates and additional resources.
Furthermore, you will have access to the class online discussion board "Piazza" at http://www.piazza.com/tamu/spring2020/ocen672 for continued engagement in class discussions and exchange of ideas.

Prerequisites

OCEN 671.

Textbook and Resource Materials

D&D Coastal: Dean, Robert G. and Dalrymple, Robert A. (2002). *Coastal Processes with Engineering Applications*, Cambridge University Press, ISBN: 052160275
CEM: U.S. Army Corps of Engineers. (2002). Coastal Engineering Manual. Engineer Manual 1110-2-1100, U.S. Army Corps of Engineers, Washington, D.C. (in 6 volumes).
Free download available online at: USACE Engineer Manuals
RM: The Rock Manual. The Use of Rock in Hydraulic Engineering (2nd Ed.). (2007). CIRIA, CUR, CETMEF. Individual chapters are available for download online and will also be available on the course Google Drive.

Additional reading materials, notes, and relevant manuscripts will be made available digitally. While not mandatory, the following books are provided as a reference with helpful background information and can be used as an additional resource:

D&D Waves: Dean, Robert G. and Dalrymple, Robert A. (2000). *Water Wave Mechanics for Engineers and Scientists*, Advanced Series on Ocean Engineering – Vol. 2, World Scientific
PDK: Komar, Paul D. (1998). *Beach Processes and Sedimentation*, 2nd Ed., Prentice-Hall
SV: Svendsen, I.A. (2006). *Introduction to Nearshore Hydrodynamics*, World Scientific.
DN: Dean, R.G. (2002). *Beach Nourishment: Theory and Practice*, World Scientific.
GODA: Goda, Y. (2000). *Random Seas and Design of Maritime Structures*, World Scientific
KH: Kamphuis, J.W. (2000). *Introduction to Coastal Engineering and Management*, World Scientific.

Course Catalog Description

Coastal Engineering. (3-0). Credit 3. Effects of waves on coastal structures; design of seawalls breakwaters, jetties, harbors, ship channels and pipelines; intentional and accidental discharge of pollutants; diffusion and spreading; oil spill containment and collection.

Course Format

Non – Traditional Delivered Course: As the Ocean Engineering Department is co-located on the College Station and Galveston Campus, this course is delivered simultaneously in person to a portion of the students on one departmental site (Galveston Campus) and remotely to another portion of the students on the other departmental site (College Station Campus) via the state-of-the-art T1V equipment. OCEN faculty have determined and approved the equivalency of the non-traditional course to the traditional course.

Learning Outcomes

After successfully completing this course, you will be able to …

a) … understand the physical coastal engineering environment and explain current coastal engineering challenges and problems;
b) … apply knowledge of fluid mechanics, nearshore hydrodynamics, and wave mechanics to analyze coastal engineering problems;
c) … analyze coastal sediments and infer sediment engineering properties;
d) … analyze wave-shoreline interactions, coastal morphology, and beach profiles;
e) … evaluate and design suitable coastal engineering approaches to solve a variety of shoreline stabilization problems;
f) … evaluate and design appropriate coastal engineering structures for a variety of scenarios
g) … understand risk-based analysis concepts

Course Rationale

The objective of this course is to learn how to apply the principles of graduate-level ocean wave mechanics and fluid dynamics to the solution of coastal engineering problems. It is intended to give graduate students an insight into real-life coastal engineering problems, foster critical thinking and provide the necessary tools to design appropriate state-of-the art engineering solutions. The lessons learned will prove very useful in the students' aspired professional career in industry, the public sector, or academia. Discussions of coastal sediments and important aspects of coastal hydrodynamics are followed by detailed treatment of soft coastal engineering solutions, hard coastal structures, and other coastal infrastructure design elements and associated processes. This course provides a healthy balance between theory of important coastal processes and practical application for coastal engineering design.

Grading

Homework and Participation	20%	A (90 -100%)
Midterm Exam	25%	B (80 – 89%)
Research Project	25%	C (70 – 79%)
Final Exam	30%	D (60 – 69%)
		F (<60%)

Texas A&M University Student Rule 10 addresses course grading and can be accessed here: https://student-rules.tamu.edu/rule10/

Homework

Regular homework assignments are part of the course and will be handed out and collected at times indicated in the course outline below. Homework needs to be submitted to the instructor as a PDF file via email by COB on the due date. Some assignments will require the use of computer-aided solutions. Collaboration between students is acceptable but blind copying is prohibited. Unexcused late homework will not be accepted.

Research Project

Each student will be required to work on a research project related to course content. Projects need to be completed in teams consisting of 2 students, each. Teams and topics need to be selected by March 23rd at the latest and require instructor approval. Each project team needs to submit a final report by April 27. More details will be discussed in class and via a separate handout.

Exams

One in-class mid-term examination and one final examination are scheduled (see Course Outline below). Exams are open-book and open-notes. Grades will be based on both the approach as well as final problem solutions. Some problems may be open-ended and require judgment to solve.

Tentative Course Outline*:

Week	*Lecture Dates*	*Lesson Topics*	*Graded Assignments*	*Reading Preparation*
1	Jan 13, 17	Introduction, overview and review of necessary material		Syllabus; D&D Ch.1
2[a)]	Jan 24	Sediment characteristics, engineering properties, and sorting processes	HW1 assigned	D&D Ch.2; CEM III-1
3	Jan 27, 31	Astronomical tides, inlet hydrodynamics, coastal meteorology	HW 1 due	D&D Ch.4 & Ch.13; RM 4.2; CEM V-6
4	Feb 3, 7	Storm surge, wind wave generation	HW2 assigned	CEM II-1-2(a,b,c); CEM II-3-1,2,3,5(c,d)
5	Feb 10, 14	Radiation stress, nearshore hydrodynamics	HW2 due	D&D Ch.5; CEM II-7-2
6	Feb 17, 21	Long waves, infragravity motions, tsunamis, harbor oscillations	HW3 assigned	D&D Ch.5
7	Feb 24, 28	Extreme value statistics and design wave specifications	HW3 due	CEM II-1-3
8	Mar 2, 6	Sediment transport concepts, littoral processes	Midterm Exam (3/2)	D&D Ch.8; CEM III-2-2&3; CEM III-3-3
9	Spring Break	No classes		
10	Mar 16, 20	Soft coastal engineering solutions (beach nourishment processes and design considerations)	HW4 assigned	D&D Ch.11
11	Mar 23, 27	Soft coastal engineering solutions (dredging and beneficial placement considerations)	HW4 due; Project topic selection	CEM V-4-1
12	Mar 30, Apr 3	Coastal structure design considerations (principles, loading & stability)	HW5 assigned	D&D Ch.12; RM 5.1; CEM V-3-1; RM 6.3
13[b)]	Apr 6	Coastal structure design considerations (runup, overtopping, sediment interaction & scour)	HW5 due	CEM V-3-2; RM 5.2.1; CEM V-3-3; RM 6.1
14	Apr 13, 17	Coastal structure design considerations (pilings and pipelines)	HW6 assigned	CEM VI-2; RM 5.2.2
15	Apr 20, 24	Port and harbor design elements	HW6 due	CEM V-5
16[c)]	Apr 27, 28	Risk-based analysis and design of coastal interventions	Project due	CEM V-1-3
Final Exam: Fr., May 1, 2020 (3:30 – 5:30 pm), ZACH 445 & PMEC 145			Final Exam (5/1)	

[a)] No class Mon., Jan. 20 (MLK holiday)

[b)] No class Fr., Apr. 10 (Reading day)

[c)] Class on Tue., Apr. 28 (Redefined day, Students attend their Friday classes)

* This schedule is subject to modification if necessary and will be updated throughout the semester.

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat, or steal or tolerate those who do."
Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.
For additional information, please visit: http://aggiehonor.tamu.edu.

Course Evaluations

The PICA (Personalized Instructor/Course Appraisal) is an online course evaluation for Texas A&M. We highly encourage you to complete an evaluation for each course on your schedule. Student input is a critical component used to improve curriculum and teaching. Each faculty member values your input to improve his/her methodology. Your comments can also significantly impact the mix and membership of faculty. The PICA website is available at http://pica.tamu.edu, your Howdy portal, or by scanning:

University Statements:

Attendance Policy

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07

ADA Policy Statement

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit http://disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.
If you are located on the Galveston Campus and you believe you have a disability requiring an accommodation, please contact the Counseling Office, Seibel Student Center, or call 409-740-4587. For additional information visit http://www.tamug.edu/counsel/Disabilities.html

Family Educational and Rights to Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. To obtain a listing of directory information or to place a hold on any or all of this information, please consult the Admissions & Records Office.
Items that can never be identified as public information are a student's social security number or institutional identification number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.