CEE6215 – Coastal Structures – Georgia Tech – Spring 2016

Instructors: Dr. Hermann Fritz
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Office Hours: MW 4-5pm, flexible upon demand
Class Meeting: MWF 10:05–10:55, building ES&T room L1125

TA: None

Prerequisites: CEE4200 Hydraulic Engineering OR CEE4225 Coastal Engineering OR consent of instructor.

Objectives:
- Understand various types and functions of coastal structures
- Analyze hydraulic loading and response of coastal structures
- Design breakwaters, seawalls and levees
- Plan navigation channel and harbor layouts
- Analyze failure modes of coastal structures under extreme events
- Design vertical tsunami evacuation buildings and hurricane shelters

Text: Reference materials for each topic provided separately by instructor.

Homework: Homework assignments will be made available via http://t-square.gatech.edu. Late homework will not be accepted without a valid excuse. Homework will encourage collaborative thinking across traditional civil engineering disciplines. You are encouraged to work in groups, but independent homework solutions must be turned it.

Exams: Final Exam: TBD

Grades: Your final grade will be based on
30% graded homework problems
30% group project presentations in class
40% final exam.
Grades will be made available via https://t-square.gatech.edu.

Honor Code: This course will be conducted under the guidelines of the Georgia Tech Academic Honor Code. www.honor.gatech.edu
Unauthorized use of any previous semester course materials, such as tests, quizzes, homework, projects, and any other coursework, other than provided by the instructor, is prohibited in this course. Using these materials will be considered a direct violation of academic policy and will be dealt with according to the GT Academic Honor Code.

Course Outline: Structures designed and constructed in coastal environments offer very unique challenges to engineers spanning across the traditional civil sub-disciplines. The objective of this course is to introduce the student to the most common coastal, marine and offshore structures and to provide an overview of their analysis, design and potential failure mechanisms during extreme events such as storms, hurricanes and tsunamis. The focus will be on the hydrodynamic loading and the resulting analysis and design criteria encompassing also structural and geotechnical requirements.

Weeks (15 total)	**lectures**	**Topic**	**Instr.**
1-3	9	• Overview on coastal structures • Part 1, Coastal Engineering Manual (CEM), USACE • Part 6, Chapter 2, CEM, USACE • Types of coastal structures • Typical cross-sections and layouts • Types of concrete armor units • Failure modes of typical structure types	HF
4-8	15	• Part 6, Chapter 5, CEM, USACE • Fundamentals of Design • Structure Hydraulic Response (Wave runup and rundown on structures, overtopping, reflection and transmission) • Rubble-mound structure loading and response • Vertical-front structure loading and response • Foundation loads • Scour and scour protection • Wave forces on slender cylindrical piles • Other forces and interactions	HF
9-10	6	• Part 5, CEM, USACE • Planning and Design Process • Site Characterization (Storm characteristics, probabilistic design sea state, seasonal variability, littoral drift patterns) • Shore Protection Projects • Navigation projects	HF
11-15	15	• Performance of coastal structures under extreme events such as hurricanes and tsunamis based on global examples and their local design codes (JSCE, European etc.) • FEMA-55 and FEMA-550 Coastal Construction • FEMA P-646 Design of Tsunami Evacuation Buildings • ASCE 7 Chapter 6 Tsunami Loads and Effects (first US-tsunami code introduced in 2015)	HF