



CEE 514 Coastal Science & Engineering (Fall 2024, 3 Credits)

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Course website:

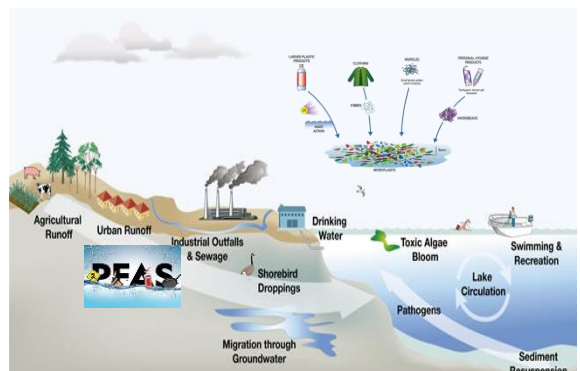
http://homepages.cae.wisc.edu/~chinwu/CEE514_Coastal_Engineering/CEE514_UW_Madison.html

Class: Tuesday and Thursday 9:30 ~ 10:45 AM at EH1213

Office Hour, Thursday 11 AM or appointment at 1261B Engineering Hall

Description

This course aims to introduce *analysis*, *application*, and *design* used in the field of coastal science and engineering. Topics include coastal water level fluctuations, water waves, coastal processes, coastal structures, and coastal development/management. In this class we will learn processes that are important for coastal environment and apply resilient and sustainable solutions to solve the coastal issues such as coastal flooding, shoreline erosion, navigation sedimentation, coastal pollution, and habitat evanescence.



Topics

Chapter 1: Introduction (Chapter 1)

Coastal Environment, Hazards & Issues, Coastal Science & Engineering, Resources & References

Chapter 2: Water Levels (Chapter 5)

Introduction, Tides, Storm Surges, Tsunamis, Seiches, Long-Term Water Levels,

Chapter 3: Water Waves (Chapter 2 & 3)

Introduction, Linear Wave Theory, Classification, Properties

Chapter 4: Wave Analysis (Chapter 6)

Statistics, Spectral/Periods, Design Conditions

Mid-term (In-class or Take-home) exam

Chapter 5: Wave Prediction (Chapter 6)

Generation, Hindcasting, Forecasting

Field Measurements (Chapter 9)

Chapter 6 Wave Transformations (Chapter 4)

Shoaling, Refraction, Reflection, Diffraction, Breaking, Runup, Overtopping

Chapter 7 Coastal Structures (Chapter 7)

Type, Function, Design

Field Trip - Coastal Area along Lake Michigan or Lake Superior

Chapter 8 Coastal Processes (Chapter 8)

Hydrodynamics, Sediment Transport, Geomorphological Response

Chapter 9 Coastal Management and Hazard Mitigation (Invited speaker)

Wisconsin Coastal Management Program

Project Presentations on December 10

Text & References

- Sorensen, RM (2006), Basic Coastal Engineering, 3rd Edition, Springer
- USACE Coastal Engineering Manual (2002)

Grade

- Homework: 45%, Midterm: 15%, Final Project: presentation 20%, and web page 20%

Topics of Final Project

Individually discuss your interests or ideas to form your project