Coastal Engineering & Nature-Based Solutions Short Course

Texas A&M University • Galveston, Texas • September 12-15, 2023

Description:
This course is administered by the Coastal & Dredging Laboratory, Department of Ocean Engineering, with organizational assistance from the Texas Engineering Experiment Station, and includes a mixture of lectures, laboratory exercises, and a field site visit. Electronic (PDF) versions of the USACE publications "Coastal Engineering Manual" and the "Natural and Nature-Based Features" are the primary course textbooks, and PDF copies of lecture slides are also provided. A certificate and continuing education units (~2.0 CEUs) are earned at the successful completion of the course.

Course Directors:

- Coastal Engineering (CE): Dr. Jens Figlus, Associate Professor, Texas A&M University, jfiglus@tamu.edu
- Nature-Based Solutions (NBS): Dr. Ram Mohan, Adjunct Professor, Texas A&M University, rmohan@tamu.edu

Registration Questions:
Ms. Kamola Owens Milton @ kmilton@tamu.edu or TEES Edge @ teesedge@tamu.edu

Course Fee: $1,400

Day 1: Tuesday, September 12, 2023

TIME	TOPIC	LECTURER
MODULE 1: COURSE INTRODUCTION AND BACKGROUND		
8:00	Welcome to TAMU Aggie Marine Campus and CE and NBS Course	Dr. Jens Figlus, TAMU
8:15	Introduction to Coastal Engineering	Dr. Jens Figlus, TAMU
9:15	*Coffee Break*	
MODULE 2: WAVES AND COASTAL HYDRODYNAMICS		
9:30	Wave Theory and Wave Mechanics	Dr. Vijay Panchang, TAMU
10:30	Wave Spectra, Wave Transformations, and Coastal Interactions	Dr. Vijay Panchang, TAMU
11:15	Inlet and Harbor Hydrodynamics	Dr. Jens Figlus, TAMU
12:15	*Lunch*	
MODULE 3: COASTAL SEDIMENT TRANSPORT		
1:15	Coastal Processes, Geomorphological Units and Morphodynamics	Dr. Orencio Duran Vinent, TAMU
2:15	Sediment Transport (Cross- and Long-Shore) and Sediment Budgets	Dr. Jens Figlus, TAMU
3:15	*Coffee Break*	
3:30	Erosion, Transport, and Deposition of Cohesive Sediments	Dr. Jens Figlus, TAMU
4:30	Essentials of Coastal and Hydrodynamic Modeling	Dr. Vijay Panchang, TAMU
5:30	*Adjourn*	
6:00	*Evening Ice Breaker at TAMU-Galveston*	

Coastal Engineering and Nature-Based Solutions Short Course

(Continued)

Day 2: Wednesday, September 13, 2023

TIME	TOPIC	LECTURER
MODULE 4: COASTAL PROJECTS AND STRUCTURES		
8:00	Coastal Project Types (Navigation and Inlet Management)	Coraggio Maglio, DCCM
9:00	Planning and Engineering Design Considerations	Rob Thomas, USACE Galveston
9:45	*Coffee Break*	
10:00	Coastal Protection: Structure Types and Considerations	Dr. Jens Figlus, TAMU
11:00	Coastal Storm Surge Barriers and Considerations	Dr. Himangshu Das, USACE Galveston
12:00	*Lunch*	
MODULE 5: NATURE-BASED SOLUTIONS: PLANNING CONSIDERATIONS		
1:00	Introduction to NBS and Planning Considerations	Dr. Ram Mohan, TAMU/Anchor QEA
1:45	NBS Principles and Framework	Dr. Jeff King, USACE ERDC
2:45	*Coffee Break*	
3:00	Measuring NBS Performance	Dr. Jeff King, USACE ERDC
3:45	NBS Benefits and Costs	Dr. Thomas Huff, USACE ERDC
4:45	Stakeholder and Outreach Considerations	Dr. Debalina Sengupta, Texas Sea Grant
5:30	*Adjourn*	

Day 3: Thursday, September 14, 2023

TIME	TOPIC	LECTURER
MODULE 6: NBS IN COASTAL FLOOD RISK MANAGEMENT		
8:00	Beaches and Dunes	Dr. Orencio Duran Vinent, TAMU
9:00	Coastal Wetlands and Living Shorelines	Renee Robertson, Anchor QEA
10:00	*Coffee Break*	
10:15	Islands and Reefs	Dr. Ram Mohan, TAMU/Anchor QEA
11:15	Coastal and Hydrographic Surveying	Jim Naismith, T. Baker Smith; Conrad Blucher Institute; TAMU-CC
12:15	*Lunch*	
1:30	Field Visit to USACE Galveston Coastal Project Site (TBD)	
5:30	*Adjourn*	
6:00	*Dinner at TAMU-Galveston Pavilion*	

Day 4: Friday, September 15, 2023

TIME	TOPIC	LECTURER
MODULE 7: ALTERNATE CONSIDERATIONS FOR NBS		
8:00	NBS for Structural Enhancement & Fluvial Concepts	Dr. Burton Suedel, USACE ERDC
9:00	Adaptive Management of NBS	Dr. Ram Mohan, TAMU/Anchor QEA
10:00	*Coffee Break*	
10:15	Coastal Laboratory, Instrumentation, and Hands-On Measurements Experience	
12:00	*Adjourn*	

Lecturer Profiles

Dr. Jens Figlus is an Associate Professor in the Department Ocean Engineering at Texas A&M University. He heads the Coastal Engineering Laboratory on the TAMU Galveston Campus and is a faculty fellow with the Center for Texas Beaches and Shores (CTBS) and the Institute for a Disaster Resilient Texas (IDRT). Before joining TAMU, Dr. Figlus worked as a senior engineer and director of business development for the consulting firm Gauff Engineering Group. Since joining TAMU in 2012, Dr. Figlus has been conducting engineering research and teaching undergraduate and graduate students about coastal engineering and related subjects. Dr. Figlus' research focuses on improving our understanding of coastal system processes and engineering approaches to reduce the risk of coastal flooding and erosion through field measuring campaigns, laboratory experiments, and numerical modeling.

- Ph.D., University of Delaware
- M.Eng., University of Delaware
- Dipl.-Ing, University of Karlsruhe (TH)

Dr. Ram Mohan is an Adjunct Professor at Texas A&M University, Director of the GLDD Coastal and Dredging Laboratory, and a Senior Partner at Anchor QEA, LLC, where he leads the Engineering With Nature (EWN) and Coastal Practice areas. Dr. Mohan is a former member of the National Academy of Sciences Marine Board and Ocean Studies Board and former Chairman of the Western Dredging Association. Dr. Mohan is a Fellow of ASCE, and he currently serves as a consulting member to the U.S. Army Corps of Engineers (USACE) Environmental Advisory Board, which is a part of the Army Science Board.

- Ph.D., Texas A&M University
- M.S., University of Rhode Island
- B.S., Cochin University of Science & Technology
- Registered Professional Engineer (24 states)

Dr. Jeffrey King is the National Lead for the U.S. Army Engineer Research and Development Center (USACE ERDC) EWN program. Prior to this role, Dr. King served as Deputy National Lead and Program Manager for the EWN initiative from 2016 to 2023. In addition to managing a broad array of EWN activities and collaborative efforts, Dr. King is also advancing a multitude of strategic research and development projects within the EWN portfolio, including EWN Proving Grounds, Integrating EWN into Great Lakes Resiliency Study, Application of EWN and Nature-Based Solutions into Department of Defense projects, Engineering Standards for EWN, and others.

- Ph.D., Georgia Institute of Technology
- M.S., The Johns Hopkins University
- B.S., Florida State University

Dr. Himangshu Das is the Chief, Coastal Engineering Section and a subject matter expert at the U.S. Army Corps of Engineers, Galveston District. He was formerly an Associate Professor at Jackson State University. His professional and research interests include sediment transport, environmental hydraulics, computational fluid mechanics, storm surge modeling, geohazard analyses, and watershed and water quality modeling.

- Ph.D., University of South Carolina
- M.S., Asian Institute of Technology
- B.S., Bangladesh University of Engineering and Technology

Dr. Thomas Huff is a contracted Senior Environmental Data Scientist at the US Army Engineer Research and Development Center (USACE ERDC) and Adjunct Assistant Professor at Texas A&M University in the department of Ecology and Conservation Biology. After his Ph.D. studies, Dr. Huff completed a postdoc with Dr. Rusty Feagin and went on to manage the Coastal Ecology and Management lab in the Department of Ecology and Conservation Biology at TAMU. His past research focused on hydrologic restoration of coastal wetlands and understanding how anthropogenic disturbance influences coastal dynamics. Dr. Huff along with Dr. Feagin received the Texas Environmental Excellence award for their restoration work on the Magnolia Beach marsh. At ERDC Dr. Huff utilizes numerical and spatial data analysis techniques to produce insights relating to ecological and engineering with nature concepts (EWN).

- Ph.D., Texas A&M University
- B.S., Texas A&M University - Commerce

Lecturer Profiles

Dr. Vijay Panchang is the Regents Professor and Associate Head of the Ocean Engineering Department at Texas A&M University. Prior to TAMU, he served as Program Director for physical sciences and engineering at National Oceanic and Atmospheric Administration's (NOAA's) National Sea Grant College Program and as Professor in the Department of Civil and Environmental Engineering and in the School of Marine Sciences at the University of Maine. Dr. Panchang is a Fellow of ASCE and has served as Editor of ASCE's *Journal of Waterway, Port, Coastal, and Ocean Engineering*. He is the recipient of the ASCE's Torrens Award and the Moffat-Nichol Award. Currently, he also serves on Editorial Advisory Panel of the *Journal of Maritime Engineering*.

- Ph.D., University of Maine
- M.S., University of Maine
- M.Tech., Indian Institute of Technology
- BE, University of Poona, India

Coraggio Maglio is the Vice President of Water and Coastal Resources at DCCM. He was formerly Branch chief of hydraulics and hydrology at the USACE Galveston District, where he specialized in coastal processes, and freshwater and estuarine systems. Mr. Maglio's hobbies include surfing, gardening, and native landscaping, and he is a strong, sensible environmentalist and lover of nature, especially coastal areas. The diversity of his work experience ranges from storm damage reduction projects, beach and ecosystem restoration, navigation dredging, and flood protection.

- M.S., Florida Institute of Technology
- B.S., New College of Florida

James "Jim" Naismith is the CBI Chair for Excellence in Hydrographic and Coastal Surveying at the Conrad Blucher Institute of Texas A&M University, Corpus Christi, and the Senior Solutions Lead at T. Baker Smith. He specializes in software and solutions development for hydrographic, land, and geophysical surveying along the Gulf Coast. He was the former owner of Naismith Marine Services, a hydrographic and geophysical surveying and environmental company, which merged with T. Baker Smith in 2020.

- M.S., Texas A&M University
- B.S., Texas A&M University
- Registered Professional Land Surveyor
- USCG Licensed Captain

Renee Robertson is a Senior Managing Engineer at Anchor QEA with over 18 years of coastal and aquatic restoration experience. She is working on some of the nation's largest living shoreline programs including the Mississippi Department of Environmental Quality's Hancock County Marsh Living Shoreline (8 miles of Living Shorelines, 46 acres of marsh and 46 acres of subtidal reef), as well as the Nueces Delta and the Dagger Point shoreline protection projects for the Texas Coastal Bend Bays & Estuaries Program. A civil/coastal engineer grounded in engineering design and field construction experience Ms. Robertson brings decades of practical NBS experience to her lectures.

- M.S., University of Alabama
- B.S., University of Alabama

Dr. Debalina Sengupta is the Coastal Resilience Program Director at Texas Sea Grant. An experienced academic professional working in sustainability and resilience, Dr. Sengupta currently directs coastal resilience portfolio for the NOAA and state-sponsored Sea Grant program at Texas A&M University. She works with researchers across Texas and beyond; regional, state, and local decision makers; and stakeholders in the 23 coastal counties of Texas. Her programs focus on preparing communities and economies for coastal hazards and water issues using STEM-based research, extension, and education.

- Ph.D., Louisiana State University
- B. Tech., Jadavpur University

Lecturer Profiles

Dr. Burton Suedel is a Research Biologist with the USACE ERDC Environmental Laboratory. Since 2005, Dr. Suedel has served as the Team Leader of the Risk Integration Team, where he focuses on risk assessment and management of dredged material and invasive species, incorporating uncertainty into ecosystem restoration projects and investigating ways in which sustainable engineering, environmental, social, and economic benefits can be incorporated into waterborne transport infrastructure planning. He has received international awards and recognition for applying EWN principles in practice at multiple USACE freshwater and marine coastal projects. Dr. Suedel also manages the USACE Dredging Operations Technical Support program that facilitates transfer of existing and new navigation and dredging technology to stakeholders in the USACE's navigation mission. Dr. Suedel also serves as the Principal U.S. Representative to the PIANC Environmental Commission.

- Ph.D., University of Mississippi
- M.S., University of North Texas
- B.S., University of North Texas

Rob Thomas is Chief of Engineering & Construction at USACE Galveston District. Mr. Thomas' fascination with the coast began at 17 years of age when he earned his Professional Association of Diving Instructors open-water scuba diving certification. Eventually, his love of the water led him to pursue a career in coastal protection and restoration with the U.S. Army Corps of Engineers Galveston District. In his current position, he oversees projects ranging from new placement areas and beaches to planning the world's largest coastal storm risk management projects and is currently focused on ensuring the quality of Corps projects.

- M.S., Texas A&M University
- B.S., Texas A&M University

Dr. Orencio Durant Vinent is an Assistant Professor at the Department of Ocean Engineering at Texas A&M University. His research interests include eco geomorphology, morphodynamics, coastal processes, ecological engineering, and sediment transport. Dr. Vinent leads the Eco-Morphodynamics Modeling Laboratory at Texas A&M University, where he investigates the formation and stability of accretional sedimentary landforms and landscapes.

- Ph.D., University of Stuttgart
- M.S., University of Havana
- B.S., University of Havana

Supplemental Information

Short Course Location:

This short course will be held on the Second Floor of the Aggie Special Events Center (ASEC) on the Texas A&M University Campus in Galveston (Mitchell Campus).

Getting Around Campus:

For directions to TAMU Galveston (Mitchell Campus), building location, and visitor parking go to: https://www.tamug.edu/directions.html

Note, you will need a rental car or personal vehicle to commute to the TAMU Galveston campus. Visitor parking is available on campus for a fee.

Airports:

The closest airports are Houston Hobby (HOU; 45min) and Bush Intercontinental (IAH; 1hr 10min).

Hotel/Lodging:

For hotels, Galveston is stacked with options for all price points. There are also many hotel options on Galveston Island. Harbor House and Tremont are good choices for proximity to campus, but there are plenty of other options as well.

Reserve early to ensure you get a room for the duration of the course: Details on lodging and hotels can be found here: https://www.visitgalveston.com/where-to-stay/hotels/

Local Activities:

There are many activities to explore while in Galveston, including leisurely walks along the beach.
Check them out at: https://www.visitgalveston.com/