Coastal Restoration

Course Dates: June 14 - July 2, 2020

Course Level: Undergraduate and Graduate (3-credit)

Course Location: Online

Cost: $750

Course Description: This course will examine how Mississippi River Delta evolves, from its geological beginnings nearly 7,000 years ago to its modern exists, and its prospects for the future. The course will focus on the physical and geological characteristics of the delta, while under also examining the ways that the people are affected by, and also impact, the movement of water and sediment across this landscape. Topics will include sediment transport, river dynamics, relative sea level rise, subsidence, climate change, flood risk and environmental equity in the coastal zone.

This class will provide students with opportunities to see Louisiana’s changing coast, the ways that human impact it, the potential for restoration and resilience in the modern era of climate change, and potential impacts of flood control policies on equity in the coastal zone. Though the course will be held virtually, digital products will be used to provide students with up-close and in-the-field opportunities to see Louisiana’s coast in a virtual manner. The course could be appealing broadly because lessons learned in Louisiana today will likely be applied in coastal systems worldwide in the years ahead.

Course Instructors: Dr. Alex Kolker, LUMCON, akolker@lumcon.edu

For more course details, course application, or scholarship application visit lumcon.edu/2021-summer-courses
Coastal Restoration

Course Instructors:
Alexander S. Kolker, Ph.D. Associate Professor of Coastal Geology, Louisiana Universities Marine Consortium, akolker@lumocn.edu

Course Synopsis:
How does the Mississippi River Delta change, and what do people do to adjust to these changes? This delta, which forms much of coastal Louisiana, is one of the largest and most dynamics coastal environments on earth, dynamics that are governed by natural processes and intense human over the past 100 - 200 years. This course will examine how Mississippi River Delta evolves, from its geological beginnings nearly 7,000 years ago to its modern exists, and its prospects for the future. The course will focus on the physical and geological characteristics of the delta, while under also examining the ways that the people are affected by, and also impact, the movement of water and sediment across this landscape. Topics will include sediment transport, river dynamics, relative sea level rise, subsidence, climate change, flood risk and environmental equity in the coastal zone.

Rationale:
Louisiana has a suite of landscape and seascapes that tie people closely to their environment. The region has highly productive fisheries, fertile soils, abundant freshwater, and vast mineral resources, which make the landscape highly desirable for many people and industries. The region is also challenging to live because it has some of the greatest rates of land loss, relative sea-level rise and flood risk in the country. The state of Louisiana also has one of the most active restoration and protection programs in the nation, making this region a laboratory for coastal environmental change. This class will provide students with opportunities to see Louisiana’s changing coast, the ways that human impact it, the potential for restoration and resilience in the modern era of climate change, and potential impacts of flood control policies on equity in the coastal zone. Though the course will be held virtually, digital products will be used to provide students with up-close and in-the-field opportunities to see Louisiana’s coast in a virtual manner. The course could be appealing broadly because lessons learned in Louisiana today will likely be applied in coastal systems worldwide in the years ahead.

Course Details:
- June 14- July 2, 2021
- Class will meet synchronously (virtually via Zoom or Go to Webinar) Monday - Friday, 9 am to 12 pm
- Asynchronous sessions will also be required.
- Weekends will not be required, though homework may be required during some weekends.
Course Grading System:

3 Credits, Solid Letter Grade (A,B,C,D,F)

- Undergraduate
  - Introduction To Coastal Data: 150 pts
  - Levee Tour Essay: 150 pts
  - Coastal Meteorology Assignment: 150 pts
  - Deltaic Geology and Land Building Assignment: 150 pts
  - Coastal Relocation Essay: 150 pts
  - Synthesis Presentation: How to change the course of Louisiana’s Coast? 400 pts
  - Total: 1000 pts

- Graduate:
  - Introduction To Coastal Data: 150 pts
  - Levee Tour Essay: 150 pts
  - Coastal Meteorology Assignment: 150 pts
  - Deltaic Geology and Land Building Assignment: 150 pts
  - Coastal Relocation Essay: 150 pts
  - Synthesis Project: How to change the course of Louisiana’s Coast? 400 pts
  - Written Analysis of Project: 400 pts
  - Total: 1400 pts

Course Activity Description:

Coastal Data Assignment: Students will be required to perform a series of analyses of coastal data. Data will come from open and readily available sources, such as the US Geological Survey, the National Oceanographic and Atmospheric Administration, Louisiana’s Coastwide Reference Monitoring Service, and Louisiana’s Strategic Online Natural Resources Information System. Students will be asked to download data, plot data, and conduct a series of calculations such as determining area of land change, rates of relative sea level rise, tidal range, and deposition rates in wetlands. Students will be evaluated on the precision and accuracy of their answers, the graphs and figures they generate, and the text they use answer questions.

Levee Tour Reflections. This project will follow the virtual class tour of the Morganza To The Gulf Levee and other flood protection systems in the Mississippi River Delta. Students will be asked to reflect on their experiences seeing the levee, be asked a series of questions on geotechnical, ecological and social impacts of the levee. These questions will cover the kinds of storms that the levee will and will not protect against, the ecological impacts of the levee, the impacts of the levee on reducing or accelerating flood risks, and a series of questions on equity in flood protection.

Deltaic Geology and Land Building Assignment: Students will answer a series of question regarding how river deltas develop, grow, accrete, subside and erode. Questions will be based both on assigned readings and a virtual field trip to the Wax Lake Delta, and answers will be required in the form text, drawings, interpretations of stratigraphic data, and calculations.
Additional questions will relate how an understanding of deltas can affect coastal restoration plans.

Coastal Relocation Essay. Students will write a 1,500 to 2,000 essay on coastal relocation, the physical, ecological, and social factors governing people’s decisions on whether or not to relocate, and the role of government policies to either encourage or discourage people from relocating in the coastal zone.

Synthesis Project: In this project students will work in teams to develop their own original plan to restore and protect Louisiana’s coast. Students will be asked to develop a plan that incorporates the material that has been covered in class, including rates of relative sea level rise, deltaic geology, sediment budgets, coastal lifestyles, coastal heritage, and the coastal economy. Undergraduate students will be graded on a presentation that covers one element of this presentation that is part of the team efforts. Graduate students will be graded on both the presentation and 2000 word essay that addresses a series of question surrounding how people live within a rapidly changing coastal landscape.

Prerequisites:
There are no prerequisites for this class. Students of all personal and educational backgrounds are encouraged to enroll in this class.

Required Text and Other Materials:
All of the following materials will be distributed by the professor.
State of Louisiana’s Comprehensive Master Plan for A Sustainable Coast.
John McPhee, “Control of Nature”
R. Davies and D. Fitzgerald, “Beaches and Coast.”
Targeted Scholarly Papers
Documentary: Last Call For The Bayou

Student Outcome Objectives:
Overall goal of this course is to expose students to the physical and human challenges related to living in coastal Louisiana, and to use coastal Louisiana to as a window to understand future coasts globally. After completing this course, students will be able to:

* Obtain, process, view and analyze digital coastal data.
* Describe the major physical forces sculpting deltaic coastal systems.
* Understand patterns of demographic change in coastal Louisiana.
* Describe patterns of flood risk, resilience and equity in coastal Louisiana
* Write about changing human and physical systems in changing coastal systems.
* Explain the complexities of developing coastal plans.

Course Requirements:
Each student is required to:
1. Attend all course lectures. Three unexcused absences from lecture will result in the student receiving an FEA (failed due to excessive absences).
2. Attend all virtual field trips. More than one unexcused absence from a field trip will result in the student receiving an FEA (failed due to excessive absences).

3. Read and become familiar with material in all assigned readings prior to attending class.

4. Participate in all assignments, discussions, and presentations.

5. Conduct themselves in a manner respectful, harmless, and non-disruptive to the instructor and fellow students in lecture room, field activities and the laboratory.

6. Accept and abide by all other parts and provisions of this syllabus.

**Draft Course Syllabus** – Course schedule and order of topics subject to change.

<table>
<thead>
<tr>
<th>Day</th>
<th>Lectures and Virtual Field Trips</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Introduction To Coastal Louisiana 1</td>
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<tr>
<td></td>
<td>Northern Terrebonne Field Trip</td>
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<tr>
<td>Tuesday</td>
<td>Deltaic Geology 1</td>
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<td></td>
<td>Sediment Transport</td>
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<tr>
<td>Wednesday</td>
<td>Coastal Hydrology</td>
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<td>Morganza To The Gulf Field Trip</td>
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<tr>
<td>Thursday</td>
<td>Last Call For The Bayou, Watch and Discussion</td>
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<td></td>
<td>Louisiana Barrier Island Field Trip</td>
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<tr>
<td>Friday</td>
<td>Coastal Data I</td>
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<td></td>
<td>Group discussion – office hours</td>
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<tr>
<td>Monday</td>
<td>The Mississippi River</td>
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<td>Mississippi River Model Field Trip</td>
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<tr>
<td>Tuesday</td>
<td>New Orleans Geology Field Trip</td>
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<td>Physics of Flood Protection</td>
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<tr>
<td>Wednesday</td>
<td>Oil and Gas In The Coastal Zone</td>
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<td>Remote Sensing Virtual Field Trip 1: Deltas of the world</td>
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<tr>
<td>Thursday</td>
<td>Wax Lake Delta Field Trip</td>
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<td>People In The Coastal Zone Field Trip</td>
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<tr>
<td>Friday</td>
<td>Group Discussion: Control Of Nature</td>
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<td></td>
<td>Group discussion- office hours</td>
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<tr>
<td>Monday</td>
<td>Coastal Meteorology</td>
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|           | Group Discussion: Equity In The
Make-up Procedure:
The instructors will make extraordinary efforts to ensure that students facing unforeseen and urgent problems have an opportunity to succeed in the course. As you can imagine, however, this privilege is too often abused, and abuse causes the establishment of stipulations for all students. Understanding that personal problems can arise on dates and occasions important in this course, the instructors have developed the following policy for remediation (make-up work):

(1) Discretion. Make-up work is allowable only at the discretion of the lecturer responsible for the material.

(2) Request for Remediation. The student must request any and all make-up work. Within 24-hours of missing an exam the student must contact the lecturer either by phone, email, or in person during office hours to request remediation. In all cases, acceptable reasons for requesting remediation are (i) personal illness, (ii) illness of dependent, (iii) death of immediate family member. In all cases, requests for remediation must be accompanied by documentation substantiating the reason for missed work.

(3) Exam Remediation. Participation in each lecture exam is an absolute requirement of the course (see Course Requirements above). If you miss an exam you must contact the instructor within 24 hours of the examination to request a make-up exam otherwise you will be assigned a grade of “0” for that exam. The instructor will allow a make-up if your reasons for missing the exam are deemed acceptable.

Academic Honesty Policy:
Dishonesty cannot and will not be tolerated. Cheating during examinations and submission of non-original work are each grounds for dismissal from the course. Plagiarism or any other form of dishonesty detected in reports or exams will result in a course grade of F.

In the Case of Extreme Emergency: Students will be notified about their responsibilities in the case of an extreme emergency such as hurricanes.