Spring 2023 Syllabus

ECO 611: Offshore Wind Energy: Environmental Impacts, Siting, Permitting, and Stakeholder Engagement

Spring 2023 Instructor: Max Dilthey (mdilthey@umass.edu)
Teaching Assistant: Joseph Mannion (josephmannio@umass.edu)
Synchronous Lecture:
Wednesdays 6:00-7:00PM EST
Office Hours:
Mondays 6:00PM-7:00PM EST or by appointment with Max
Zoom Link (same link for all Mondays and Wednesdays):
https://umass-amherst.zoom.us/my/maxzoomclassroom

Course Description:

Before construction begins on an offshore wind farm, there is a rigorous process of assessing ecological and human impacts, obtaining federal and state permits, designing the project, and engaging with stakeholders. This process is expensive, lengthy, and vital to the successful installation of an offshore wind farm. This course is designed to guide you through the project development process, from the time a potential offshore wind site has been identified, until construction is complete and the wind farm is operational. In this course, we'll look closely at many aspects of offshore wind project development, including marine spatial planning, environmental impacts, species interactions, state and federal laws, and various stakeholder perspectives. As we explore these topics, you'll also develop your vocabulary and comprehension across different sectors and roles within the offshore wind industry.

This on-line course will consist of synchronous lectures and asynchronous assignments. All assignments, course readings, and projects will be accessed through the course Moodle site. Students will engage with the instructor and fellow students through Zoom lectures, office hours, and asynchronous discussion boards. All synchronous lectures will be recorded and posted to the Moodle site. Monday's Office Hours are a supplement to Wednesday's lectures, and attendance is highly encouraged.

Accessing This Course:
This course uses the online learning platform Moodle for all assignments and course materials. Please log into https://umass.moonami.com using your UMass email address and password to access course materials.

Critical course announcements will be communicated to your UMass email. You can set your UMass email to forward to another email address using the instructions here: https://www.umass.edu/it/support/google-apps/google-mail-faq
Learning Objectives:

Upon successful completion of this course, students will understand:

- Ocean and benthic environments and ecology
- Threatened/endangered/commercial species of concern
- Pre-and post-construction monitoring and assessment practices
- Impacts of offshore wind construction and operation
- Impact mitigation strategies
- Federal and State ocean jurisdictions
- BOEM – leasing and auctioning for offshore wind development rights; environmental and other permits under NEPA and other laws
- Permitting of subsurface cables, landfall, and interconnection points
- Key stakeholder groups and perspectives
- Engagement, understanding, and finding common ground
- Surveying opinions of stakeholders and general public
- Rules and best practices on public hearings and transparency

Reading Materials:

Readings will be assigned from academic literature and applied professional and governmental reports on present-day offshore wind developments. There is no assigned textbook for the class. All readings will be listed and posted to Moodle. You should come to class having completed the assigned readings, so that we can apply the course material.

Course Outline:

<table>
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<tr>
<th>Week 1 (Feb 6, 8) Introduction to Wind Energy</th>
<th>First Class on Wednesday, Feb. 8 at 6PM EST via Zoom: <a href="https://umass-amherst.zoom.us/my/maxzoomclassroom">https://umass-amherst.zoom.us/my/maxzoomclassroom</a></th>
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<td>Course Introduction</td>
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<td>Offshore Wind Scale &amp; Resource Potential</td>
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<td>Wind Energy Basics</td>
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<td>Wind Turbines, Arrays, Cables: from Land to Sea</td>
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<td>Week 2 (Feb 13, 15) BOEM &amp; the Permitting Process</td>
<td>Timeline: Offshore Wind Leasing Process - Planning, Leasing, Permitting, Construction &amp; Operations, Decommissioning</td>
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<td>Regulation of Offshore Wind: Agencies, Authorities</td>
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<td>National Environmental Policy Act (NEPA); role of NEPA in environmental permitting for offshore wind</td>
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| Week 3 (Feb 20, 22) | Federal Process: Site Assessment Plans (SAP)  
Construction and Operations Plan (COP)  
30 CFR Section 585 regulations  
State Process: Coastal Zone Management Act |
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<tr>
<td>BOEM, Leasing, Site</td>
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<td>Assessment,</td>
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<td>Operations Plan</td>
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<td>(COP), Section</td>
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<td>585 Regulations</td>
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| Week 4 (Feb 27, Mar 1) | Siting a Wind Farm: Using mapping and data to identify optimal wind farm locations; Marine Spatial Planning  
In-Class Activity: Data Scavenger Hunt |
| Marine Spatial      |                                                                                   |
| Planning, Data Portals & Mapping |                                                                                   |
| Week 5 (Mar 6, 8)   | Defining major habitats – Regional management, ecosystem-based management (EBM)  
Data Collection – Desktop review, baseline data collection  
Mitigation Plans for Marine Mammals  
Midterm Group Project Assigned  
Guest Speaker: Dr. Alison Bates, Assistant Professor, Colby College |
| Marine Mammals and Sea Turtles |                                                                                   |
| Spring Recess - Mar 12-19 - No Class |
| Week 6 (Mar 20, 22) | Birds & Bats: Species distributions, conservation status, management. Major protections including MBTA, Bald & Golden Eagle Protection Act Impacts from offshore wind: Surveys, Construction, Operations & Maintenance  
Surveying, Monitoring, Mitigation |
| Birds & Bats; Species Distributions, Impacts from Wind, Mitigation Measures |                                                                                   |
| Week 7 (Mar 27, 29) | Coastal Zone Management Act (CZMA) and the Federal Consistency clause  
Cable landings on shore  
Transmission  
Examples of State and Local Permits  
Other Environmental Permits: Clean Water Act, National Marine Sanctuaries Act, Rivers & Harbors Act |
| Bringing Offshore Energy Home |                                                                                   |
| Week 8 (April 3, 5) | Benthic & Pelagic Fish, Essential Fish Habitat  
| Fish: Species Distributions, Impacts from Wind, Mitigation Measures |
|-------------------|-----------------------------------------------------------------------------------------------------------------|
|                   | Major protections including Magnuson Steven Act, Fish & Wildlife Coordination Act  
|                   | Impacts from offshore wind: Surveys, Construction, Operations & Maintenance  
|                   | Surveying, Monitoring, Mitigation  
|                   | Guest Speaker: Kevin Stokesbury, Commonwealth Professor, UMass Dartmouth / SMAST |
| Week 9 (April 10, 12) | Theory of Social Acceptance  
| Theory of Social Acceptance Stakeholder Engagement |
| Week 10 (April 17, 19) | Fisheries: Resolving Spatial Conflicts; Commercial and Recreational Fisheries, economic value  
| Stakeholders: Commercial & Recreational Fishers, Economic Value, Recreation & Tourism |
| Week 11 (April 24, 27) | Archaeological & Cultural Impacts, National Historic Preservation Act Tribal Consultations  
| Stakeholders: Tribes, National Historic Preservation Act, Tribal Consultations |
| Week 12 (May 1, 3) | Permits related to human uses of the ocean and airspace: FAA, Military Vessel Navigation Routes  
| Stakeholders: Navigation & Safety of Ocean and Airspace - Military, Army Corps of Engineers, FAA, Coast Guard |
| Week 13 (May 8, 10) | Final Project Due Sunday, May 21 at Midnight EST  
| Finals Week |
|                   | Course Evaluations  
|                   | End-of-Semester Networking Activity |
Course Policy and Requirements:
This course will be taught asynchronously. Attendance at the weekly lecture is highly encouraged to be successful in the course. All weekly lectures will be recorded for students with a time conflict during the synchronous time.

Grading Scale and Criteria:
Individual grades for the course will be based on the following scales:
Graduate Grading Scale (ECO 611):
A 93-100% B- 80-82%
A- 90-92% C+ 77-79%
B+ 87-89% C 73-76%
B 83-86%
F Per policy of the Graduate School, grades below a C will result in a failing grade

The weights of course assignments and activities are as follows:
25% Midterm Project
25% Final Project
50% Homework, Group Projects, Presentations

Academic Honesty Policy Statement:
The integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, and academic honesty is required of all students at the University of Massachusetts. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair.
For more information about what constitutes academic dishonesty, please see
https://www.umass.edu/honesty/
The procedures outlined at the website listed above are intended to provide an efficient and orderly process by which action may be taken if it appears that academic dishonesty has occurred and by which students may appeal such actions. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent.

Accommodations:
The University of Massachusetts is committed to making reasonable, effective and appropriate accommodations to meet the needs of students with disabilities and help create a barrier-free campus. If you are in need of accommodation for a documented disability, register with Disability Services to have an accommodation letter sent to your faculty. It is your responsibility to initiate these services and to communicate with faculty ahead of time to manage accommodations in a timely manner. For more information, consult the Disability Services website at http://www.umass.edu/disability/

**Illness Policy:**

We understand that the ongoing COVID-19 pandemic and other illnesses present new challenges to our work and educational lives. If you require any accommodations to assist with those circumstances, or if any unexpected situations arise during the semester which might affect your scholastic schedule or otherwise have an impact on your ability to complete the coursework, please don't hesitate to contact the instructor.