

ECO 612: Offshore Wind Energy – Project Economics, Deployment, and Business Logistics

Summer 2022 Course Administrator: Max Dilthey (mdilthey@umass.edu)

Synchronous Lecture: Mondays and Wednesdays 6:00-7:00pm EST

Office Hours: Tuesdays 6:00-7:00pm EST or by appointment with Max

Construction of an offshore wind farm raises significant financing and insurance issues, and requires a well-established local workforce, supply chain, and infrastructure. Wind industry professionals must understand this complex process to make informed decisions on planning and construction of offshore wind development. This course will touch on the critical aspects of getting an offshore wind farm up and running, from the planning stages until construction is complete and the wind farm is operational.

The on-line course will consist of recorded lectures with slides, assigned readings, problem sets, and two exams. Students will engage with the instructor, teaching assistant, guest instructors and speakers, and fellow students through robust on-line discussion sessions and postings.

Learning Objectives:

Upon successful completion of this course, students will understand:

- Capital cost, levelized cost of energy, and revenue cash flows of OSW projects
- Financial structures for development, construction, operations
- Financial risks and mitigation: insurance, long term contracts, energy market hedges
- Federal and state policy incentives and ISO-NE market structures for offshore wind
- Offshore wind supply chain: current status and emerging needs;
- Workforce needs: number and description of jobs;
- Safety and training requirements and standards, and educational programs
- Supply chain coordination and build up
- The Jones Act
- Global perspectives and construction and operational experience
- Project and construction management
- Port-side fabrication of offshore wind subsystems
- Port deployment and construction procedures
- Cable-laying, substations, subfloor transmission, interconnection
- Project commissioning; and operations and maintenance

Course Outline:

Session Week	Topics	Guest Instructor
OSW Economics, Policy, Electric Markets, and Project Finance		
Week 1 (May 23, 25)	Offshore wind system costs, interconnection configurations, costs and implications; energy generation and prices, levelized cost of energy (LCOE) analysis; federal/state incentive programs State goals, procurement and long-term contract & OREC policies and processes. Competitive dynamics between states, lease areas	Bob Grace, Sustainable Energy Advantage LLC
Week 2 (May 30, Jun 1)	ISO New England (deregulated) electricity markets, interconnection process	John Keene, Sustainable Energy Advantage LLC
	BOEM leasing process and agreements Offshore wind financing structures Financial risks/mitigation Insurance	Jordan Shoesmith, Vineyard Offshore and Copenhagen Offshore Partners
<i>Project 1</i>		
OSW Trends, Port Logistics, and Deployment		
Week 3 (Jun 6, 8)	Project and construction management System assembly/staging at port Turbine, electric system, tower deployment Installation vessel and port requirements, overseas logistics, The Jones Act Commissioning/start-up process	Speakers TBD
Week 4 (Jun 13, 15)	Operations and maintenance Supply chain modeling Workforce needs, recruiting Labor Unions, training, and certifications	Andy Logan and Hannah Webb, Xodus Group
<i>Project 2</i>		
OSW Supply Chain, Global Experience and Project Management		
Week 5 (June 21, 22)	NOTE: No class on Monday, June 20th in observation of Juneteenth. Class held on Tuesday, June 21 6pm-7pm EST. OSW database of global construction and operational experience	Nick Zenkin, LAUTEC

	Research and Development	
Week 6 (June 27, 29)	Domestic Supply Chain Logistics Supply Chain Challenges and Opportunities Contracting Structures and Procurement	Ben Brown, Business Network for Offshore Wind
	Opportunities and Challenges in OSW Workforce Development Commitments and goals within the industry Democratization of OSW benefits	Xodus Group, other Speakers TBD
<i>Final Project</i>		

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. You will be able to complete all course materials on your own schedule if necessary and your grade will not be affected by absences.

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% Project 1

25% Project 2

25% Final Project

25% Other Homework Assignments and Forum Posts

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/>

We understand that life circumstances can present new or unexpected 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.