

GEOL 663 - GEOLOGICAL ASPECTS OF OFFSHORE WIND

COURSE SYLLABUS – 2014 Fall Semester

Course Meets – Wednesdays 6:30-9:30 PM

Description: Investigation of the geological and geotechnical aspects of offshore wind projects. Emphasis on influence of geology and properties of sediments and rocks on project planning and construction. Course utilizes problem-based learning pedagogy.

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Office Hours: Tuesdays 2:00-3:30; Thursdays 10:00-11:30 (or by appointment)

Course Web Site: Accessible from UD Sakai <https://sakai.udel.edu/portal>

Textbook: *Offshore geotechnical engineering: Principles and practice*, E.T.R. Dean, Published 2010 by Thomas Telford Limited, London, UK, www.thomastelford.com, ISBN: 978-0-7277-3641-3

Soil Mechanics, A. Verruijt, Delft University of Technology, 2001, 2012, <http://geo.verruijt.net/software/SoilMechBook2012.pdf>

Additional texts and publications will be available at the course web site.

Investigations: The pedagogical approach of this course will be primarily problem-based and inquiry-based learning. Much of the coursework will be done in groups. We will have three major investigations in this course. Each investigation will be designed around geological and geotechnical topics that are relevant to the development of offshore wind projects. The general focus of the investigations are: 1) *Properties of sediments and types of offshore wind turbine foundations*; 2) *A review of existing, or under construction, offshore wind projects*; and 3) *Geotechnical considerations applied to developing an offshore wind project*.

Grading: Grades will be based on:

2 - Content exams, one focusing on sediments, their geotechnical properties and offshore wind turbine foundations and one focusing on the coastal geologic history of a region and its relevance to offshore wind projects, each worth 40 points for undergraduates and 50 points for graduate students. These will account for 31% of your course grade.

6 – Individual problem sets, two within each investigation, worth 5 points each for undergraduates and 8 points each for graduate students. These will account for 12% and 15%, respectively of your course grade.

3 – Group projects, one for each investigation, worth 50 points each. These will account for 57% and 47%, respectively of your course grade.

For graduate students: 1 – Review paper on a topic of interest from the course worth 22 points. This will account for 7% of your course grade.

Course letter grades will be assigned as follows:

<u>Percentage Score (of 260 or 320 total points)</u>	<u>Final Grade</u>
94 and above	A
93.9 - 90	A-
89.9 - 87	B+
86.9 - 84	B
83.9 - 80	B-
79.9 - 77	C+
76.9 - 74	C
73.9 - 70	C-
69.9 - 67	D+
66.9 - 64	D
63.9 - 60	D-
59.9 and below	F

There will be no extra credit offered in this course, your final grade will be based on your scores from the content exams, individual problem sets, group projects, and, if a graduate student, your review paper.

Academic dishonesty will not be tolerated and those engaging in it will be prosecuted. For further information refer to: <http://www.udel.edu/stuguide/13-14/code.html>

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COURSE SCHEDULE

Aug. 27	Course Overview; Lecture Topic: Sediments and their Geotechnical Properties; Introduction of Investigation I: <i>Properties of sediments and types of offshore wind turbine foundations</i>
Sep. 3	Lecture Topic: Sediments and their Geotechnical Properties, continued...; Group Work on Investigation I: <i>Properties of sediments and types of offshore wind turbine foundations</i>
Sep. 10	Lecture Topic: Offshore Turbine Foundations; Group Work on Investigation I: <i>Properties of sediments and types of offshore wind turbine foundations</i>
Sep. 17	Lecture Topic: Offshore Turbine Foundations and Their Installation (Geotechnical Considerations); Group Work on Investigation I: <i>Properties of sediments and types of offshore wind turbine foundations</i>

- Sep. 24 Presentations and evaluations of Group Work for Investigation I: *Properties of sediments and types of offshore wind turbine foundations*; Group Reports on Investigation I: *Properties of sediments and types of offshore wind turbine foundations* are due; Review of Sediments, their Geotechnical Properties, and Offshore Wind Turbine Foundations
- Oct. 1 Content Exam on Sediments, their Geotechnical Properties, and Offshore Wind Turbine Foundations; Introduction of and Work on Investigation II: *A review of existing, or under construction, offshore wind projects*
- Oct. 8 Course will not meet – AWEA Offshore Windpower 2014 Conference & Exhibition Oct. 7-8 in Atlantic City, NJ
- Oct. 15 Lecture Topic: Coastal Geology and Geologic Evolution of Coastal Regions; Group Work on Investigation II: *A review of existing, or under construction, offshore wind projects*
- Oct. 22 Lecture Topic: Coastal Geology and Geologic Evolution of Coastal Regions, continued...; Group Work on Investigation II: *A review of existing, or under construction, offshore wind projects*
- Oct. 29 Poster Presentations and Evaluations of Group Work on Investigation II: *A review of existing, or under construction, offshore wind projects*; Group Reports on Investigation II: *A review of existing, or under construction, offshore wind projects* are due; Introduction of Investigation III: *Geotechnical considerations applied to developing an offshore wind project*
- Nov. 5 Lecture Topic: Geologic Evolution of the U.S. Atlantic Continental Margin and Implication for Offshore Wind Projects; Group Work on Investigation III: *Geotechnical considerations applied to developing an offshore wind project*;
- Nov. 12 Lecture Topic: Geologic Evolution of the U.S. Atlantic Continental Margin and Implication for Offshore Wind Projects; Group Work on Investigation III: *Geotechnical considerations applied to developing an offshore wind project*
Review on Coastal Geologic History and Relevance to Offshore Wind Projects
- Nov. 19 Content Exam on Coastal Geologic History and Relevance to Offshore Wind Projects; Group Work on Investigation III: *Geotechnical considerations applied to developing an offshore wind project*
- Nov. 26 Course will not meet – Thanksgiving Break
- Dec. 3 Presentations and evaluations of Group Work for Investigation III: *Geotechnical considerations applied to developing an offshore wind project*; Group Reports on Investigation III: *Geotechnical considerations applied to developing an offshore wind project* are due