Provisional – Subject to Revision

COURSE SYLLABUS ENPM660
Fall 2022

COURSE INFORMATION

WIND ENERGY ENGINEERING

ENPM660

Lecture Location: Remote/online Sections

Lecture Time: Asynchronous - Posted Weekly

Instructor: Dr. Kyosung Choo

Telephone(s): (301) 547-5345 [none at UMD]

Email: Primary: **kchoo1234@gmail.com**
Secondary:

Office: None on campus for this course.

Office hours: As arranged with student.

Canvas Site: Login to with your University of Maryland Directory ID/Username and password at: https://myelms.umd.edu/login

Deliverables: HW Assignments (30 %)
Midterm Exam (30 %)
Final Exam (40 %)

Required Learning Material:

1. Textbook: ***Wind Energy Explained***, **Second Edition**; J.F. Manwell, J.G. McGowan, and A.L. Rogers; John Wiley & Sons Inc. 2010. ISBN: 978-0-470-01500-1. http://www.wiley.com/WileyCDA/WileyTitle/productCd-0470015004.html
   Note: To reduce the cost of this textbook any format is acceptable: hardcover, paperback, used, or electronic versions, if available.

2. Lecture Notes: ***To be provided.*** These Lecture Notes will be posted on the University of Maryland Canvas web site and provided during class.

Additional Useful Material (not required):

1. ***20% Wind Energy by 2030 - Increasing Wind Energy's Contribution to U.S. Electricity Supply***. U.S. Department of Energy, July 2008. DOE/GO-102008-2567. http://www.nrel.gov/docs/fy08osti/41869.pdf

2. Wind Energy Center, University of Massachusetts, Amherst: http://www.umass.edu/windenergy/

Required Technology:

1. Since homework will be submitted as an electronic file, software and/or hardware to generate such files is needed (PDF files are preferred; MS Word, MS Excel, or Open Office equivalents are acceptable; JPG files are acceptable, but should be avoided unless there are no alternatives available, because they are difficult to work with). Photos of homework, e.g. from smart phones, should be avoided, because they often lack proper lighting and sufficient definition allowing the file to be read.

Method for Communication with Students Outside the Classroom:
In the event that a class is cancelled or other changes occur, email will be the communication mode; emails will originate from the instructor and/or DETS.

COURSE DESCRIPTION, GOALS, AND EXPECTATIONS

General Course Description:
The fundamental methodologies for the engineering analysis of wind energy systems and their components are described. The focus of the course is the principles of science, engineering, and mathematics and how those principles are used in wind energy engineering. The elements of the course are:

- Introduction: Modern Wind Energy and Its Origins (Chapter 1)
- Wind Characteristics and Resources (Chapter 2)
- Aerodynamics of Wind Energy (Chapter 3)
- Mechanics and Dynamics (Chapter 4)
- Electrical Aspects of Wind Turbines (Chapter 5)
- Wind Turbine Materials and Components (Chapter 6)
- Wind Turbine Design and Testing (Chapter 7)
- Wind Turbine Control (Chapter 8)
- Wind Turbine Siting, System Design, and Integration (Chapter 9)
- Wind Energy Applications (Chapter 10)
- Wind Energy System Economics (Chapter 11)
- Wind Energy Systems: Environmental Aspects and Impacts (Chapter 12)

The topics above will be covered to varying degrees, with the technical aspects of wind turbine design and operation stressed. Regulatory/economic aspects will be presented to a lesser degree.

For some aspects of wind energy engineering, advanced concepts and methods in statistics, fluid dynamics, mechanics, and electric power will be introduced and used to solve problems. The objective of the course is to provide students with sufficient basic skills and knowledge about wind energy systems, so they are able to manage, evaluate, and analyze wind energy systems and projects. This course is not: (1) training in the detailed design of wind turbines or (2) training in the use of computer codes used for wind turbine analysis and design.

Student Learning Outcomes:
Students are expected to learn relevant definitions, concepts, and methods and to be able to demonstrate their knowledge of Wind Energy Engineering by solving practical problems.

Prerequisites:
A student should have an undergraduate degree in engineering, the physical sciences, or equivalent training in the engineering core, including basic concepts of mechanics, electricity and magnetism, fluid mechanics, and other core topics. Mathematics through calculus and differential equations (ordinary and partial differential equations) is required; some knowledge of statistics is helpful.

Expectations for Students:

Homework is assigned as soon as the material is covered in the lectures; homework assigned during a lecture in week N is due at the beginning of class in week N+1. Students are expected to participate in the class by: (1) taking exams on the scheduled date (unless alternative arrangements are made in advance); (2) submitting homework on the scheduled date (unless an extension is granted); (3) submitting questions on lecture material, textbook material, and homework in class or by email. Online students are expected to participate by submitting questions by email regarding lectures, homework, and exams.

Grading Procedures:

The grade is based on a composite score made up of grades on homework and exams. The weights of these various components are:

Component	Contribution to Grade
Homework	**30%**
Midterm exam	**30%**
Final Exam	**40%**

The scale for assigning letter grades based on the composite score is:

Numerical Score	Grade
100.00-93.00	A
92.99-90.00	A-
89.99-87.00	B+
86.99-83.00	B
82.99-80.00	B-
79.99-77.00	C+
76.99-73.00	C
72.99-70.00	C-
69.99-67.00	D+
66.99-63.00	D
62.99-60.00	D-
less than 60	F

COURSE PROCEDURES AND POLICIES

Course Attendance Policy:
Interaction during the lecture is appreciated. However, this course is intended for adult students who may have full-time employment or other commitments; therefore, attendance at any particular class (except exam dates) is optional. A better course experience will be obtained by interacting with the instructor during the lectures.

Academic Integrity Expectations:
Students are expected to adhere to the University Honor Code.
Students may work together to prepare for an exam and to brainstorm approaches to solving homework problems; however, collaboration on homework and the Exams are limited to generalities. **In particular, (1) it is prohibited to provide to another person and (2) it is prohibited to receive from another person: an indication that a particular solution or approach to homework or the Exam is correct or incorrect.**

Code of Academic Integrity: "The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity of the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html."
The Student Honor Council proposed and the University Senate approved an Honor Pledge. The University of Maryland Honor Pledge reads:

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.

The Pledge statement should be handwritten and signed on the front cover of all papers, projects, or other academic assignments submitted for evaluation in this course. Students who fail to write and sign the Pledge will be asked to confer with the instructor. You may omit writing the Honor Pledge on homework assignments; **however, the Honor Code and Provisions of the Honor Pledge govern homework submittals in full force, just as for quizzes and exams.**