

1. EM447 Wind and Tidal Energy
2. 3 credit hours / 3 contact hours
3. Course director: Prof. Ethan Lust
4. Instructional Materials: As the pace of development of wind energy is so rapid, a single textbook would be quickly out of date. Instead, a variety of materials are used in this course from academic papers and government reports to websites and online videos.
5. Specific Course Information
  - a. This course will cover wind and water turbine technology including design of turbine blades, analysis of flow regimes and energy conversion. The economics and policies involved in implementing these renewable energy systems will also be studied.
  - b. Prerequisites: EM317 or EM319 and EM316, EM324, or EA301
  - c. Corequisites: None
  - d. This is an elective course
6. Educational objectives for the course
  - a. To understand the basics of airfoil design for wind and tidal turbines
  - b. To understand wind and tidal resource characteristics
  - c. To understand wind and tidal turbine power conversion
  - d. To understand the basics of land based and offshore wind farms
  - e. To gain an understanding of the economics of wind energy
  - f. To gain an understanding of the policy of wind energy
  - g. To understand the design characteristics of hydrokinetic turbines
7. Specific program outcomes address by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Introduced							
Reinforced			x				
Mastered	x			x		x	x

8. Brief list of topics to be covered:
  - a. Introduction to utility-scale wind turbines
  - b. Wind resource assessment
  - c. Wind turbine blade aerodynamics and marine current turbine hydrodynamics
  - d. Wind and tidal turbine performance modeling

- e. Wind turbine control systems
- f. Land-based wind farm development
- g. Offshore wind resource assessment
- h. Offshore wind farm development
- i. Wind energy economic and policy considerations
- j. Marine energy resource assessment
- k. Marine energy conversion technologies