

# WIND ENERGY COURSE DESCRIPTIONS

## 1000 Level Courses

**1110. Analytical Methods Lab (1).** Corequisite: WE 1310. Laboratory sessions will be devoted to hands-on exercises including the development of practical MatLab skills associated with mathematical modeling and data manipulation in wind energy.

**1300. Introduction to Wind Energy (3).** Provides a basic understanding of the wind energy industry and discusses the basic meteorology of wind, extraction of energy from wind, wind plant development, and the environmental and ecological impact of wind energy plants.

**1310. Analytical Methods in Wind Energy (3).** Covers fundamentals of physical wind modeling needed for a complete understanding of wind energy topics.

**1311. Principles of Wind Power Conversion (3).** Prerequisite: WE 1310. Covers fundamentals of physical wind modeling needed for a complete understanding of wind energy topics.

## 2000 Level Courses

**2300. Social Impacts of Wind Energy (3).** Provides an in-depth look at environmental, economic, national security, health benefits, and issues of wind energy vs. traditional fuels. Fulfills CoreTechnology and Applied Science requirement.

**2310. Methods for Wind Resource Characterization (3).** Prerequisite: WE 1310. In-depth study of the methods used in applying wind resource characterizations to contextual wind power problems.

## 3000 Level Courses

**3100. Wind Energy Lab (1).** Prerequisite: WE 3300. In-depth information on physical principles of wind resources modeling, site assessment, GIS and wind data processing.

**3300. Wind Energy Science and Technology I (3).** Prerequisite: WE 1300. An introduction to wind power meteorology, wind turbine aerodynamics and design, and wind farm grid integration and application.

**3301. Wind Energy Science and Technology II (3).** Prerequisite: WE 3300. Provides an understanding of wind turbine aerodynamics; wind turbine performance and investment; wind energy grid integration; institutional, legal, and environmental issues; and wind energy development and construction.

**3310. Wind Energy Economics and Finances (3).** Prerequisite: WE 2310. In-depth understanding of the economic and financial concepts involved in both large- and small-scale developments of wind energy.

**3315. Renewable Energy and the Environment (3).** Provides an overview of society's needs and future energy demands. Examines conventional energy sources and systems. Provides in-depth analysis of renewable energy sources.

#### **4000 Level Courses**

**4000. Internship in Wind Energy (V1-6).** Prerequisite: Junior or senior standing, consent of instructor. May be repeated for up to 8 credit hours. Supervised internship in an approved wind energy industry or professional establishment. May be repeated for up to 8 credits.

**4300. Wind Energy Grid Integration (3).** Prerequisite: WE 3301 .In-depth instruction in wind turbine generator technology, grid integration techniques, and market and grid regulations.

**4310. Wind Modeling and Design (3).** Prerequisites: ENGL 1302; WE 2300, 3300, 3301, 3100, and 3310. Instruction in the process and development of wind energy projects emphasizing technical, environmental, and financial aspects of project development. (Writing Intensive)

**4311. Wind Energy Law and Regulatory Issues (3).** Prerequisite: WE 3315, ENGL 1302, or declared minor in legal studies. Provides an in-depth understanding of the law as it relates to the development of wind projects. (Writing Intensive)

**4312. Wind Energy and the Environment (3).** Prerequisite: WE 3315. Covers issues and possible solutions regarding wind energy development, technology, and the environment.

**4313. Wind Energy Geographic Information Systems and Mapping (3).** Prerequisites: WE 2310 and 3100. Focuses on the tools, methods, technology, data, and related issues of GIS and mapping systems in wind energy.

**4320. Independent Study in Wind Energy (3).** Prerequisite: 9 hours of WE courses and consent of instructor. Individual research in the wind energy area of student's choice under faculty guidance. May be repeated once for credit.

**4321. Wind Dynamics for Wind Energy (3).** Prerequisite: WE 4323. Provides a background on the physical and mathematical bases of wind prediction.

**4322. Wind Turbine Aerodynamics (3).** Prerequisite: WE 3301. Provides an in-depth understanding of wind turbine aerodynamic principles and applications.

**4323. Meteorology for Wind Energy (3).** Prerequisite: WE 1311 and 2310. Covers topics related to wind power meteorology.

**4390. Advanced Wind Farm Project and Design (3).** Prerequisite: WE 3100 and 4313. Focuses on the design of wind farm projects, optimized layouts and data analysis using real world data, problems and considerations.

#### **5000 LEVEL COURSES**

**5300. Advanced Technical Wind Energy I (3).** A multidisciplinary course for students with a physical science/engineering background wishing to pursue a technical approach to wind energy.

**5301. Advanced Technical Wind Energy II (3).** Prerequisite: WE 5300. An in-depth multidisciplinary course for students with a physical science/engineering background wishing to pursue a technical approach to wind energy.

**5310. Advanced Managerial Wind Energy I (3).** Non-technical version studying wind turbine and wind farm architecture, wind energy conservation, aerodynamics, electrical systems, economics, regulatory issues with environmental and utility industries.

**5311. Advanced Managerial Wind Energy II (3).** Prerequisite: WE 5310. An in-depth multidisciplinary course for students with a business/managerial/natural science background wishing to pursue a non-technical approach to wind energy.

**5320. Renewable Energy Policy (3).** Provides overview of basic economic concepts and examines the progress made in renewable energy policy in the U.S. and the world.

### **7000 LEVEL COURSES**

**7000. Research (V1-12).** Prerequisite: Consent of instructor. May be repeated for credit.