

**PRGR 605, Wind energy
2 Credits**

Syllabus

Prepared by

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Catalog Description:

Introduction to wind energy and fundamentals of converting wind energy to electrical energy. The module covers wind turbine types and components, turbine systems, power generation and control systems, connection to the electric grid, maintenance, wind site assessment, and wind farms mechanism on land and offshore.

Prerequisites:

Basic Calculus, basic physics

Course Objectives:

1. Understand the socio-economical aspects and the technical mechanism of renewable wind energy.
2. To utilize available technical and digital resources to evaluate potential sites and wind turbine systems.

Learning Outcomes:

At the end of the course, the students will be able to:

1. Recognize the renewable wind energy need and benefits.
2. Identify wind turbine components
3. Design wind energy systems as a grid-connected or off-grid system, with or without batteries.
4. Evaluate sites for potential wind energy generation and comprehend wind farms mechanism on land and offshore.
5. Assess the environmental, political, and economic issues for specific locations.

Textbook and Reference Material:

Wind Turbines by T. Al-Shemmeri 2010

Articles and other material to be posted during the course

30-50 Minute Modules:

1. Introduction to wind generated energy, historical review and basic mechanism
2. Wind Turbine, types, anatomy, mechanics, and components
3. Wind energy system and control system
4. Design process, and system monitoring
5. Electricity generation and electrical aspects
6. Wind farms, feasibility studies, economics and cost analysis
7. Wind turbine siting and energy measurements
8. Wind energy system design, *final project*

Grading and Evaluation

Short Assignments, solved in group discussion (3)	30%
Discussion Forum (2)	20%
Analysis/ case study project (2)	30%
Final project	20%

Technical Support

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Monday through Friday

08:00 till 17:00 (EET)

Technology Tools:

- Recorded Lectures
- Discussion Forums
- Assignments
- Quizzes

Spring 2017 Schedule

WEEK	DATE	MODULE	LECTURE TITLE	ACTIVITY	GRADE	DUE DATE
1	Feb 13-19	Orientation		Activity 1: Introductory Forum and Ice Breaker	10	Feb 21
2	Feb 20-26	Introduction	Introduction to wind generated energy	Activity 2: Discussion Forum	10	Feb 28
3	Feb 27-March 5	Technical	Wind Turbine, types, anatomy, mechanics, and components	Activity 3: Assignments, solved in group discussion (identification)	10	March 7
4	March 6-12	Systems	Wind energy system and control system			
5	March 13-19	Design	Design process	Activity 4: Assignments, solved in group discussion (identification)	10	March 21
6	March 20 - 26	Design	Electrical aspects	Activity 5: Assignment (design)	10	March 28
7	March 27 - April 2	Design	Wind farms, feasibility studies	Activity 6: Assignment (design)	10	April 4
8	April 3-9	Analysis	Siting and site assessment	Activity 7: Case study (analysis)	10	April 11
9	April 10-16	Analysis	Case Study	Activity 8: Case study (analysis)	10	April 18
10	April 17-23	Design	Case Study			
11	April 24-April 30	Design	Wind energy project design			
12	May 1-10			Activity 8: Final project (design)	20	May 10