Course Syllabus

ENV 120
Introduction to Wind Turbine Technology
2 Credits

Fall 2014

Faculty: Mr. Jay Bonk
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Office Hours: By advance arrangement with the instructor
Class Time: Lecture: Tue. 6:00-7:00 Lab 7:15-9:15 p.m. AAB 306

Course Description:

Introduction to Wind Turbine Technology examines the theoretical aspects of wind turbine technology. Students study the physical components, the mechanical and electrical systems of wind turbines related to location siting, construction and repair. Considerations of power distribution in moving large amounts of power over long distances are studied. Two credits. One hour lecture and two hours lab. Offered in the Fall of 2014 on Tuesday nights.


COURSE OBJECTIVES, ASSESSMENT GOALS AND ASSESSMENT STRATEGIES

Course Objective 1. List and explain the history and development of components for windmills.
-Describe how windmills were adopted historically to produce electricity
-Compare and contrast power availability from wind versus other sources such as coal, hydroelectric, solar or nuclear sources

Course Objective 2. List and define types and materials for wind turbine construction.
-Determine factors to guide selection of material of construction for various turbine types
-List and describe the factors that determine the height, diameter and length of turbine blade
Course Objective 3. Diagram, specify and document wind turbine mechanical systems.
- Enumerate and explain all the mechanical systems and their function on a wind turbine system.
- Calculate RPM and power requirements given input and output data

Course Objective 4. Define and diagram all of the control systems in a wind turbine.
- Enumerate and explain all the controls that define blade pitch, tower yaw and grid interface
- Explain compensations wind turbines controls must make to effectively produce electric power

Course Objective 5. Define and explain environmental factors as they relate to Wind Turbines.
- Explain and list the factors that control siting of a wind turbine system
- Analyze relative environmental impacts of siting a wind turbine

Course Objective 6*. Determine economic justification for wind turbine construction.
- Perform a cost energy analysis for wind turbine performance
- Measure and evaluate electrical readings from wind turbine components
- Perform an economic sensitivity analysis per kilowatt

Assessment Strategy: Exam questions, quizzes and assigned project. *

Course Requirements:

Grading will be determined on the basis of tests, quizzes, group project, laboratory assignments and final exam. This course will include a comprehensive final exam. Final grade will be weighted as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Two Exams</td>
<td>30%</td>
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<tr>
<td>Quizzes</td>
<td>15%</td>
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<tr>
<td>Lab Assignments</td>
<td>10%</td>
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<tr>
<td>Written assignment</td>
<td>20%</td>
</tr>
<tr>
<td>Group Project Presentation</td>
<td>5%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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Conversion of numeric average to Final (Letter) Grade
90 - 100% = A
80 - <90% = B
70 - <80% = C
60 - <70% = D
<60% = F

Attendance Policy
Absence / Lateness
ARRANGE TO GET NOTES FROM ANOTHER STUDENT.
You must take initiative to track down all the details of what was covered. If you were absent,
you must make effort to obtain missed work. Being in class and on time is critical to the
successful completion of this course. Blackboard software will be used at times for assignments.
The use of Wor-Wic email will also be utilized in this class.

*Written Project and Presentation (Course objective 6.)
An electronic research project is due in the form of a written paper. The paper will be due before
the final exam is administered. The body length should be between 2-3 pages on the assigned
overall topic. The paper/project must list an electronic citation. It is preferred but not required
that the paper be completed using Wor-Wic's database collection. A professional association or
other professional level citation would be an acceptable source. Every source used must be cited
with the URL or electronic tag required to check the validity of its use. Wikipedia is not an
acceptable source.
The assigned overall topic for this paper: Justify the funding and implementation of a wind
turbine power source for a commercial or residential application. Based on your findings a
justification for solving a power problem in a way other than wind may be submitted. In either
case, all of the research and application for justification will begin with power generated via
wind. A written justification, with supporting facts and clearly formed opinions will be required
for completion of this assignment. An oral presentation performed in groups will be presented to
the class.
(You are allowed to work on your paper in class with the assistance of the instructor at
appropriate times dictated by the instructor)

How to get the highest grade on your paper
Cover page 5%
Intro paragraph-main idea 10%
Body-length and content 50%
Summary 5%
Proof read what you wrote. 15%
Discuss and show your mastery of the material for this course 5%
Use a “summarize and explain” technique to address the assigned topic 5%
Demonstrate your ability to think beyond the limits of this course by writing information that ties
this course to your whole program or career goal. 5%
Papers are written in APA style which is defined on Wor-Wic's website.

Late Assignment Policy
All homework, laboratories and reading assignments must be submitted on time.

**Quizzes and Tests**
Make up tests are not allowed

**COLLEGE POLICY/ACADEMIC HONESTY POLICY**

*Students are required to maintain a high level of academic performance. Cheating and plagiarism are defined in Wor-Wic's Student Conduct Policy found in the College Catalog. Infractions of this policy will result in the student's failure for the assignment or test. Satisfies GEO 8*