

OAKLAND UNIVERSITY
School of Engineering and Computer Science
Department of Mechanical Engineering

ME 4530 / 5530 – Alternative Energy Systems (4 credits)
Winter 2018

Instructor:

Dr. Jonathan Maisonneuve
Assistant Professor
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248-370-2657
EC 408

Lecture Times:

Tuesday and Thursday, 7:30 – 9:17 pm, SFH 374

Office Hours:

Tuesday, 5:00 – 7:00 pm, EC 408
Please email to confirm appointment.

Description:

The analysis and design of alternative energy conversion systems. Primary topics include solar, wind and hydro power, evaluation of energy resources, system modeling and control. Other topics include biomass energy, and emerging energy harvesting technologies. Prerequisites: ME 3500

Grading:

- Homework 20 %
- Project 20%
- Tests 60 %

Policies:

Homework:

- Late homework will not be accepted.
- Homework assignments will be posted on Moodle.
- Completed homework should be submitted in PDF format via Moodle.
- Collaboration on homework should be limited to general discussion of the problems and approaches. Copying homework or a solution manual is not allowed. If copying is found, you will lose the full 10% given for homework in the final grade.
- Only randomly chosen homework will be graded.
- The lowest homework grade will be dropped.

Project:

- Project may be different for graduate and undergraduate students.
- Project for graduate students will include presentation.

Tests:

- All exams will be closed book. Formula sheets may be provided.
- A score of zero will be recorded for a missed exam or test.

Tentative Class Schedule:

(subject to change)

| Week of | Topics | Due Dates |
|----------------|---------------------------------|-----------------------|
| Jan 1 | Introduction | |
| Jan 8 | Solar geometry | |
| Jan 15 | Solar thermal | |
| Jan 22 | Solar thermal | |
| Jan 29 | Solar photovoltaic | |
| Feb 5 | Solar photovoltaic | Test 1 on Feb 6 |
| Feb 12 | Solar photovoltaic | |
| Feb 19 | Winter Recess (no class) | |
| Feb 26 | Wind energy resource | |
| Mar 5 | Wind power | |
| Mar 12 | Wind power | Test 2 on Mar 13 |
| Mar 19 | Hydro power | |
| Mar 26 | Hydro power | |
| Apr 2 | Bioenergy | |
| Apr 9 | Project presentations | Test 3 on Apr 10 |
| Apr 16 | Project presentations | Project due on Apr 17 |

Important Dates:

- Jan 3 Classes begin
- Jan 15 Martin Luther King Jr. Day
- Jan 17 Last day 100% tuition refund
- Feb 17-25 Winter recess
- Mar 14 Last day official withdrawal
- Apr 17 Last day classes
- Apr 19-25 Final exams
- Apr 30 Grades due

Web Site:

<http://moodle.oakland.edu>

Homework, notes, handouts, and announcements can be found on this site. Please visit regularly.

References:

There is no required textbook for the course. The following references are complimentary and do not need to be purchased.

- J. Twidell and T. Weir, "Renewable Energy Resources," 3rd ed, Routledge, 2015.
- R. Messenger and J. Ventre, "Photovoltaic Systems Engineering," 3rd ed., CRC Press, 2010.
- M. K. Patel, "Wind and Solar Power Systems," 2nd ed., CRC Press, 2005.
- B. Sorensen, "Renewable Energy," 4th ed., Elsevier, 2010.

Academic Conduct:

All students are expected to read, understand, and comply with the *Academic Conduct Policy* found in the *Oakland University Undergraduate Catalog*. It may also be found on the OU website at <http://www.oakland.edu/?id=24228&sid=482>. . The policy applies to testing, homework and laboratory work, and is taken very seriously by the instructor. Perceived violations of this policy will be taken before the OU Academic Conduct Committee. Engineering is a profession that serves the public and demands integrity within its membership.