

## ENGR 315 – Engineering Design and Practice Winter 2013

COURSE: ENGR 315– Engineering Design and Practice, 9:30-11:05 TR, Rm 680 BH

INSTRUCTOR: Laurie Williams, Ph.D., P.E.

CONTACT: Room 632 BH, Phone 247-7160, email: williams\_l@fortlewis.edu

OFFICE HOURS: 10:10-11:05MWF, 2:30-3:25 MW, 11:15-12:10 R or by appointment

PURPOSE: Students study the engineering design process and complete one or more design projects. The course is intended to model how engineers integrate technical knowledge with design concepts, teamwork, economics, project management, oral and written communications. Ethics and professionalism in engineering are explored.

EXPECTATIONS: This course requires student to work independently and in teams to complete tasks similar to those seen in the engineering profession. In practice engineers must not only be technically competent but must be good employees i.e. (dependable, responsible, prompt, organized, etc.). Students are expected to exhibit these characteristics in all aspects of this course.

COURSE STRUCTURE: Based on the course schedule all students will attend common lectures or discussion sessions dealing with engineering design topics of general interest. Class periods with non-scheduled lectures is to be spent working with your respective design team under the direction of the design team leader. **Design teams are expected to meet bi-weekly (beginning in week 4) with Dr. Williams to assess progress, discuss potential problems, and plan future activities.**

MATERIALS: Lab notebook (brand new, used only for this class). There is no required text. In lieu of a book students are required to purchase material for design projects. There is no preset list of materials but it is expected that they will generally cost between \$80 and \$120 per students.

ASSIGNMENTS: Assignments are due on a regular basis as stated in the schedule (at the beginning of class) or by the instructor. No late work will be accepted. This is a design course that requires a minimum of 5 hours per week outside of class time.

JOURNALS: You will be required to keep a design journal for the duration of this course (handout provided on journal format and documentation). Each student will submit a design journal along with the team submittal of the final design report.

GRADING: Tentatively grades will be based on:

Design exercises, assignments, attendance, participation, professional conduct, well prepared – 40% (**Individual component**)

Design Journal – 10% (**Individual component**)

Design project(s), – 40% (**Group component**)

Peer 10% (**Individual component**)

- a) Quality of work
- b) Quantity of participation (share of responsibility, wiliness, preparation)
- c) Timeliness
- d) Level of work (work was professional and ready to use)

WITHDRAWALS: The last day to drop the course without record in January 24. After this date and up to the midterm withdrawals will result in a W or F at the discretion of the instructor.

ATTENDANCE: Part of professional conduct is attending all classes and being on time.

ACADEMIC DISHONESTY is generally defined as presenting another persons work as your own or knowingly assisting someone to do the same. This would include traditional plagiarism and copying or sharing work on exams, quizzes, restricted homework, or other assignments where sharing work is not commonly or explicitly allowed. If you are not sure whether this description pertain to your case please ask your instructor. Academic dishonesty may result in reporting to the college administration, failure of the course, failure of the exam, paper or assignment, adjustment of the final grade or other sanctions imposed at the discretion of the instructor.

SPECIAL NEEDS: Fort Lewis College policy requires that students with documented special needs receive appropriate academic accommodations. This may include extended time on exams. Please contact the office of Disability Services at 247-7459 for more information.

**Engr 315 - Engineering Design and Practice**  
**Winter 2013**  
**Design Project: Passive/Self-Powered Solar Tracker**

Wk	Dates	Topic	Activity/Assignment
1	Jan 8, 10	Course introduction and review of the design process. Design project introduction – concept and scope <i>Background information and fundamentals</i> <i>The Design Process</i>	<b>Assignment 1:</b> Individual. Submit resumes and cover letter highlighting applicable experience/expertise (1/10)
2	Jan 15, 17	<i>Learning Styles and Teamwork</i> <i>Define the Problem</i> Design, problem formulation – problem statement	<b>Activity:</b> Complete HBDI questions – discuss <b>Assignment 2:</b> Individual –Solar path algorithm (1/17)
3	Jan 22, 24	Form design teams and discuss team charter <i>Explore the Problem</i> Objectives, constraints and metrics	<b>Assignment 3:</b> Individual. Problem Statement (1/22) <b>Assignment 4:</b> Team. Team Charter (1/24) <b>Activity:</b> Objective Tree Outlines
4	Jan 29, Jan 31	<i>Explore the Problem</i> Objectives, constraints and metrics	<b>Assignment 5:</b> Team. Project Concept Statement (1/29) <b>Assignment 6:</b> Team – Project Objectives, metrics, and constraints (1/31)
5	Feb 5, 7	<i>Conceptual Design</i> Functions and Requirements <i>Project Management</i> – time management, communications reporting, scheduling, work breakdown structure.	<b>Assignment 7:</b> Team – Design Problem Analysis document (2/7) <b>Assignment 8:</b> Team. Project Management Plan (WBS and Ghant). (2/7)
6	Feb 12, 14	<i>Conceptual Design</i> Developing Design Alternatives and Evaluating Design Models	<b>Assignment 9:</b> Team. Functions and Requirements (2/12) <b>Assignment 10:</b> Team. Design Alternatives and Model Development (2/14)
7	Feb 19, 21	Professional Ethics – Case studies	<b>Assignment 11:</b> Conceptual Project Proposal: Team. (2/21) <b>Assignment 12:</b> Individual. Ethics
8	Feb 26, Feb 28	Engineering Economics	<b>Assignment 13:</b> Individual. Eng Economics
<b>Spring Break, Mar 4-8</b>			
9	Mar 12, 14	Engineering Economics	<b>Assignment 14:</b> Individual. Eng Economics
10	Mar 19, 21	Model, Test, and Evaluate Chosen Design	<b>Assignment 15:</b> Team. Progress Report. (3/14)
11	Mar 26, 28	Model, Test, and Evaluate Chosen Design	<b>Working Model, 3/21</b>
12	Apr 2, 4	Refine and Optimize	<i>Project work</i>
13	Apr 9, 11	Project Work	<b>Final Paper DRAFT due 4/9</b> <b>Submit course journals, 4/11</b>
14	Apr 16, 18	Project Work	<b>Final Paper due 4/18</b>
<b>Design Teams make Final Presentations, April 23, 2:15-4:15 pm</b>			

Note: this schedule, topics and dates, may vary depending on the scope of the class design project.