ENGR 130 Syllabus Specifics - Spring 2011

Course Meeting Times and Instructor Information

Section	Day	Time	Room	Instructor	USERID
032	MWF	9:05 – 9:55 am	Holtz 200	Dr. Beth Stephan	bethste

- Class will not meet on the following days:
  - Monday January 17 — MLK Jr. Day
  - Monday March 21 – Friday March 25 — Spring Break

Required Course Textbooks and Materials

- Thinking like an Engineer: An Active Learning Approach by E. A. Stephan, D. R. Bowman, W. J. Park, B. L. Sill, and M. W. Ohland (Prentice Hall, 2011 / ISBN-13: 978-0-13-606442-8)
- iClicker
- FE calculator

  ***What is an FE calculator?** On exams, only a calculator that meets the requirements used for the Fundamentals of Engineering (FE) exam many of you will take as seniors may be used. A list of acceptable calculators can be found here: www.ncees.org/exams/calculators/#example Calculators that are acceptable include: Casio: all fx-115 model /HP: 33 or 35 models /TI: 30X or 36X models. If you have a calculator that you think may be acceptable, please ask for clarification. DO NOT ASSUME we will have a calculator available for you to use - you are required to bring one with you! No, you will not be allowed to use your cell phone as a substitute.*

Grade Distribution

- Exams (2 @ 15% each) — 30%
- Final Exam — 25%
- Homework (6, drop 1 @ 2%) — 10%
- In Class Activities (21, drop 1 @ 0.5%) — 10%
- Lecture Activities — 5%
  - ePortfolio (3.5%)
  - Surveys (3 @ 0.5%)
- Umbrella Projects (6%, 9%, 5%) — 20%

Exam Schedule

Exam dates and times are listed below. The location of the exam will be posted on BlackBoard. You will be divided alphabetically to take the exam. Make sure you know where the exam will be given, since it is unlikely that it will be in your usual lecture room.

- Exam I: Tuesday, February 22 — 7:00 – 8:30 pm
- Exam II: Tuesday, April 5 — 7:00 – 8:30 pm
- Final Exam: Thursday, May 5 — 7:00 – 9:30 pm

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Office Hours

During the following days / times, I will be available in Holtzendorff 105 for drop-in office hours. If these times do not work with your schedule, please email me for a one-on-one appointment.

Tuesdays, 1:00 – 3:00 pm

Thursdays, 10:00 am – 12:00 pm

Topical Outline

ENGR 130 Engineering Fundamentals: 2 credits (contact hours: 1 lecture, 2 lab)

Students formulate and solve engineering problems using advanced spreadsheet applications, dimensional analysis, graphical representation of various physical phenomena, mathematical models and statistics. Various forms of technical communication are emphasized. Credit toward a degree will be given for only one of ENGR 130 or 141. Preq: C E S 102; Coreq: MTHSC 106 or 107.

The approximate number of class hours and percentage of semester spent on each topic is included. Please note topics are not presented here in chronological order.

- **Course Mechanics – 9 hours – 21 %**
  - Course Introduction
  - ePortfolio
  - Exam Review
  - Guest Speakers
  - Registration Advising

- **Advanced Excel – 6 hours – 14 %**
  - Conditional Formatting
  - Data Validation
  - Iteration
  - Use of built-in Excel functions (such as LOOKUP)

- **Dimensions – 10 hours – 23%**
  - Dimensionless Numbers
  - Fundamental and Derived Dimensions and Units
  - Rayleigh's Method
  - Sustainability
  - Using dimensions to dissect large problems (Umbrella Project: Fluid Flow)

- **Mathematical models and Graphing – 10 hours – 23 %**
  - Choice of trendlines based on physical properties, R^2, and logarithmic plots
  - Introduction to semi-log and log-log plots
  - Development and testing of a mathematical model (Umbrella Project: cantilever beam)

- **Statistics – 8 hours – 19%**
  - Creating and interpreting histograms and cumulative distribution functions by hand, in Excel
  - Determining how a change in a parameter will cause a shift in a statistical distribution
  - Statistical and built-in EXCEL functions (average, median, min, max, var, stdev)
  - Use of Statistical Process Control charts (Nelson Rules)
  - Using statistics to make design choices (Umbrella Project: Statistics)

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Course Objectives

The main goals of this course are:

- *to **prepare** students for the **rigor of future engineering classes**,*
- *to **provide** students with a **solid foundation of basic engineering skills**, and*
- *to **introduce** students to the **different engineering majors and careers***

Upon completion of this course, you will be able to:

Course Objectives	ABET
Communicate technical information effectively by correctly applying graphing conventions and composing clear and concise descriptions of experiments and projects;	**g**
Formulate and justify a solution to an engineering problem within a team structure	**d** **e**
Determine an appropriate mathematical model to describe experimental data using logarithmic plots and physical knowledge. Create logarithmic plots in Microsoft Excel. Use logarithmic plots determine graphical solutions to problems.	**b** **k**
Identify basic and derived dimensions and units; express observations and parameters in appropriate units and perform unit conversions when necessary; Use dimensions and units to aid in the solution of complex problems	**a** **e**
Read, write, and predict conditional statements, LOOKUP functions, and data validation statements in Microsoft Excel; Use iteration and conditional formatting to aid in problem solutions	**b** **k**
Interpret and justify experimental results using basic concepts of statistics; Use Microsoft Excel to enhance problem solution techniques, including statistical functions and graphs	**b** **k**

ABET Competencies

This course is designed to satisfy the following ABET Competencies. For more information, please refer to http://www.abet.org.

Engineering programs must demonstrate that their graduates have:

(a) an ability to apply knowledge of mathematics, science, and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs

(d) an ability to function on multi-disciplinary teams

(e) an ability to identify, formulate, and solve engineering problems

(f) an understanding of professional and ethical responsibility

(g) an ability to communicate effectively

(h) the broad education necessary to understand impact of engineering solutions in global and societal context

(i) a recognition of the need for, and an ability to engage in life-long learning

(j) a knowledge of contemporary issues

(k) an ability to use techniques, skills, and modern engineering tools necessary for engineering practice