CES 102 Syllabus Specifics – Fall 2010

Course Meeting Times and Instructor Information

Section	Day	Time	Room	Instructor	USERID
021	MWF	11:15 am – 12:05 pm	Holtz B003	Dr. Beth Stephan	bethste
023		1:25 – 2:15 pm			

- Class will not meet on the following days:
  - Monday November 1 – Tuesday November 2 Fall Break
  - Wednesday November 24 – Friday November 26 Thanksgiving 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%) 30%
- Final Exam, Computer 5%
- Final Exam, Written 20%
- Homework (11, drop 1 @ 1%) 10%
- In Class Activities (22, drop 2 @ 0.5%) 10%
- Lecture Activities 7%
  - Departmental tours (3 @ 1%)
  - ePortfolio (2%)
  - Student Organizations Fair (0.5%)
  - Surveys (3 @ 0.5%)
- Umbrella Projects (2 @ 9%) 18%

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, September 21 7:00 – 8:30 pm
- Exam II: Tuesday, October 26 7:00 – 8:30 pm
- Final Exam: Thursday, December 9 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, 10:00 am – 12:00 pm

Thursdays, 1:00 – 3:00 pm

Topical Outline

CES 102 Engineering Disciplines and Skills: 2 credits (contact hours: 1 lecture, 2 lab)

Provides solid foundation of skills to solve engineering problems. Students demonstrate problem solving techniques with spreadsheets, dimensions and units; use modeling techniques and interpret validity of experimental results. Students design projects on multi-discipline teams. Introduces professional and societal issues appropriate to engineering. Various forms of technical communication are emphasized. Coreq: MTHSC 104 or 106.

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 – 6 hours - 13%**
  - Course Introduction
  - Exam Review
  - Final Exam, Computer Portion
  - Technology Introduction (BlackBoard, iClicker, GEO)

- **Introduction to Engineering Profession & Clemson University – 9 hours – 20%**
  - Academic Advising topics: Academic Redemption, Registration, W hours
  - General Education Requirements (LIB 100 workshop, ePortfolio)
  - Grand Challenges
  - Introduction to engineering disciplines at Clemson
  - Opportunities at Clemson (Study Abroad, Co-op, Internship)
  - Student Organizations Fair

- **Dimensions & Units – 12 hours – 27%**
  - Use of estimation and reasonableness in problem solving
  - Fundamental and derived dimensions; base and derived units
  - Conversion of units as single values and within equations
  - Understanding the relationship and importance of units in solving complex equations
  - Equations and problems related to density, energy, force, mass, moles, power, pressure, specific gravity, temperature and weight

- **Excel and Problem Solving Procedures – 10 hours – 22%**
  - Basic worksheet structure and organization, including data entry, sorting, formatting
  - Conditional statements
  - Graphical representation and interpretation of data
  - Interpolation
  - Functions, including mathematical, statistical, trigonometry

- **Trendlines and Data Analysis – 8 hours – 18%**
  - Interpretation of trendline in terms of physical phenomena
  - Introduction to three trend types (linear, power and exponential)
  - Reinforcement of concepts of units, graphing and Excel through data analysis
  - Trendline choice based upon physical phenomena

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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 career options***

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**
Identify basic and derived dimensions and units; Express observations in appropriate units and perform conversions when necessary; Apply basic principles from mathematical and physical sciences, such as trigonometry, Hooke's Law, and the ideal gas law, to solve engineering problems	**a** **e**
Use graphical techniques to create "proper" plots, sketch functions, and determine graphical solutions to problems	**e**
Use Microsoft Excel to enhance problem solution techniques, including entering, sorting and formatting data in a worksheet; applying functions, including mathematical, statistical, and trigonometric; create and format data into graphs	**k**
Use Microsoft Excel to fit experimental data with a trendline; Describe and interpret mathematical models in terms of physical phenomena.	**b** **e** **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