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## DIVISION OF ENGINEERING

### COURSE SYLLABUS

**COURSE TITLE:** Data Collection and Analysis in Engineering      **TERM:** Fall  
**YEAR:** 2011

**COURSE:** ENGR 3305      **TIME:** MW 3:00-4:50 pm  
**SECTION NO.:** 001      **PLACE:** M 137

**INSTRUCTOR:** Dr. M. A. Karim, P.E.      **OFFICE LOCATION:** M 162D

**OFFICE HOURS:** MW 12:00-03:00 pm      **OFFICE PHONE:** (678) 915-3026  
Other hours by appointment      **E-MAILS:** [mkarim@spsu.edu](mailto:mkarim@spsu.edu)  
[makarim@juno.com](mailto:makarim@juno.com)

**DEPARTMENTAL PHONE:** (678) 915-4220

**NUMBER OF CREDIT HOURS:** 4-0-4 (Lecture-Lab-Total)

**PREREQUISITS:** MATH 2254 (Calculus II)      **COREQUISITS:** None

**COURSE DESCRIPTION:** This course combines the elements of proper engineering data collection and techniques unique to the field of civil engineering with the numerical analysis techniques needed to properly analyze the data. Using real world examples, students will collect various types of engineering data then analyze the data such that statistically valid conclusions can be achieved. Emphasis will be given to standard engineering practices.

**REQUIRED or ELECTIVE:** Required

**REQUIRED TEXT:** Probability & Statistics for Engineers and Scientists by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, and Keying Ye, Prentice Hall, Current Edition (2007: Eight Edition; ISBN: 0-13-187711-9).

**REFERENCES:** Basic Engineering Data Collection and Analysis by Stephen B. Vardeman and J. Marcus Jobe, Duxbury Thomson Learning, 2001 Edition, ISBN: 978-0534369576

**OTHER MATERIALS:** Handouts may be provided as needed. It is recommended that students take notes in a three ring binder since they may be receiving handouts throughout the semester. **SPSU email** and **BANNER** systems will be used for message and content delivery, respectively. Students should access these sites regularly.

**COURSE LEARNING OUTCOMES:** Upon successful completion of this course, students shall be able to:

- apply data collection procedures used in civil engineering practice;
- determine the sample size needed to obtain a meaningful statistical analysis;
- compute standard statistics associated with a sample and confidence limits of a mean, proportion, and other statistical parameters;
- conduct simple linear regression and a graphical analysis of data;
- apply a Goodness of Fit test;
- solve one- and two- sample tests of hypotheses;
- recognize the statistical limitations of a civil engineering design procedure;
- identify linkages between civil engineering data collection and statistical analysis; and
- present data collection and analysis results in a technical report.

**COURSE REQUIREMENTS:**

1. **Attendance:** Students are expected to attend class. Advance notice of an absence should be provided whenever possible. Makeup exams and acceptance of late assignments will be considered only for documented medical reasons, emergency circumstances, or other university sponsored activities.
2. **Homework:** All problem assignments must be submitted in the next class following the class in which the topic is discussed. Late homework WILL NOT be accepted. Exceptions may be considered in case of illness, serious emergencies, or other university sponsored activities. However, appropriate evidence must be presented in order to qualify for exceptions. All homework must be submitted on 8½"x11" white paper or on engineering design paper (preferable) with a cover page. Cover page should include student's name, course number and name, assignment number, assignment date, and due date. Show the detail work for full credit.
3. **Exams:** All exams are closed books and notes unless advised otherwise. NO make-up exams will be given. Exceptions may be considered in case of illness, serious emergencies, or other university sponsored activities. However, appropriate evidence must be presented in order to qualify for exceptions.
4. **Cheating:** Cheating on assignment and particularly on the examinations will not be tolerated. If you are caught cheating, you will get zero on the exam. You will be asked to move if you are caught looking at another student's work.
5. **Term Paper/Presentation:** No term paper/presentation for this course.
6. **ADA Provisions:** "Students with disabilities, as defined by the Americans with Disabilities Act (ADA) of 1990, should contact the instructor during the first week of the semester regarding the accommodations necessary to complete the requirements of this course. The instructor will make reasonable adjustments to take into consideration the specific handicap of each student covered under the ADA."

**GRADING POLICY:** All exams and assignments must be completed satisfactorily in order to pass the course. The evaluation process described below is subject to change by the instructor. Changes will be announced in the class.

<u>Class Work:</u>		<u>Total Grade:</u>			
1. Mid Term 1	- 15%	<b>Scale, Letter Grade, and GPA</b>			
2. Mid Term 2	- 20%	90% - 100%	A	4.0 (Excellent)	
3. Mid Term 3	- 20%	80% - 90%	B	3.0 (Good)	
4. Final Exam	- 30%	70% - 80%	C	2.0 (Satisfactory)	
5. Homework/Quiz	- 15%	60% - 70%	D	1.0 (Passing)	
		< 60%	F	0.0 (Failure)	
<b>TOTAL</b>	<b>- 100%</b>	--	WF	0.0 (Withdrawn after deadline)	

The following symbols are approved for use in the cases indicated, but will not be included in the determination of the grade point average.

"I" This symbol indicates that the student was doing satisfactory work but, for non-academic reasons beyond his control, was unable to meet the full requirements of the course. The requirements for removal of an "I" are left to the respective institutions; however, if an "I" is not satisfactorily removed after three quarters of residence, the symbol "I" will be changed to the grade "F" by the appropriate official. (See Southern Tech policy - Removal of an Incomplete "I", on page 2).

"W" This symbol indicates that a student was permitted to withdraw without penalty. Withdrawals without penalty will not be permitted after the mid-point of the total grading period (including final examinations) except in cases of hardship as determined by the appropriate official of the respective institution.

"V" This symbol indicates that a student was given permission to audit this course. Students may not transfer from audit to credit status or vice versa.

"K" This symbol indicates that a student was given credit for the course via a credit by examination program approved by the respective institution's faculty (CLEP, AP, Proficiency, etc.).

**SCHEDULE:** Two 75-minute classes or 3-50 minute classes or 1-150 minutes class per week.

**TENTATIVE LECTURE TOPIC/OUTLINE:** The following lecture topic/outline is subject to change by the instructor. Changes will be announced in the class.

Class/Week	Tentative Lecture Topic/Outline	Chapter
Week 1	Introduction to statistics and data analysis.	Chapter 1
Week 2-3	Probability. <i>Review for Mid Term Exam 1.</i>	Chapter 2
Week 3	Mid Term Exam 1	---
Week 4 -5	Random variables and probability distributions.	Chapter 3
Week 6	Mathematical expectation.	Chapter 4

Class/Week	Tentative Lecture Topic/Outline	Chapter
Week 7 - 8	Binomial & Poisson distributions. <i>Review for Mid Term Exam 2.</i>	Chapter 5
Week 8	Mid Term Exam 2	---
Week 9	Continuous probability distributions.	Chapter 6
Week 10 - 11	Fundamental sampling distributions. <i>Review for Mid Term Exam 3.</i>	Chapter 8
Week 11	Mid Term Exam 3	---
Week 12	One- and two-sample estimation.	Chapter 9
Week 13	One- and two-sample hypothesis.	Chapter 10
Week 14 - 15	Linear regression and correlation. <i>Review for the Final Exam.</i>	Chapter 11
Week 16	Final Exam - Comprehensive	---

**ABET CATEGORY:** Engineering science: 100%