ENGR 115
Statistics for Engineers
Course Syllabus
Fall 2016

Instructor: Dr. Ghazan Khan

Section 01
Lecture: Tuesday & Thursday 8:00 – 8:50 am (Tahoe Hall 1007)

E-mail: ghazan.khan@csus.edu

Office Hours:
Monday/Wednesday 10:00 – 11:00 am, or by e-mail appointment
4015 Riverside Hall
ENGR 115 – Statistics for Engineers

COURSE DESCRIPTION
This course is designed to introduce students to the concepts and application of probability and statistics for analyzing engineering and physical systems.

PREREQUISITES
You must be a Civil, Mechanical, or Computer Science major and you must have at least a C- grade in MATH 031 to enroll in this class.

ACADEMIC HONESTY AND GRADING SYSTEM
All students should be familiar with and are subject to the policies described in the most recent CSUS Catalogue. Grades will be assigned in accordance with the grading policy of the University as outlined in the section entitled “Grading System” in the current copy of the university catalog. Any instance of academic dishonesty will result in a zero score on the assignment or exam and will be reported to the Department as well as the University Office of Student Judicial Affairs. Academic dishonesty includes, but is not limited to, copying another student’s work or using prohibited material on quizzes or exams. Grades will be assigned with the general guidelines shown below.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>Outstanding achievement</td>
<td>&gt; 90</td>
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<tr>
<td>B</td>
<td>Excellent performance; clearly exceeds course requirements</td>
<td>80 – 89</td>
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<tr>
<td>C</td>
<td>Average</td>
<td>70 – 79</td>
</tr>
<tr>
<td>D</td>
<td>Passed, but not at average achievement standards</td>
<td>60 – 69</td>
</tr>
<tr>
<td>F</td>
<td>Failure to meet course requirements</td>
<td>&lt; 60</td>
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For more details on these guidelines, please refer to the University Catalog Grading Policy.

GENERAL COURSE AND SPECIFIC LEARNING OBJECTIVES
This is not a math class. The objective of this course is to help students develop an intuition and interest in analyzing engineering problems through the application of statistical methods. The aim is to equip students with the basic concepts and methods involved in the analysis, interpretation, and decision making based on collected data. Specific topics include data collection, descriptive statistics, probability theory, random variables and distributions, confidence intervals, hypothesis tests, and regression analysis. Note that depending upon the pace of lectures and class performance, the instructor may include or exclude specific topics from the course. After completing this course, you will be able to:

1. Communicate using the language of probability and statistics.
2. Present and interpret graphical and numerical summaries of data.
3. Use basic probability concepts and tools to describe engineering problems.
4. Distinguish between discrete and continuous random variables.
5. Calculate the expected value (mean) and variance of a given probability distribution function.
6. Calculate the confidence interval for the mean and variance based on normal distribution.
7. Set up a hypothesis for the mean and variance of one sample, calculate the appropriate test statistic, and derive proper conclusions based on the results.

SUPPORTED ABET LEARNING OUTCOMES

1. Develop the ability to apply knowledge of mathematics, science, and engineering (1A)
2. Develop the ability to use techniques, skills and modern engineering tools (1B)
3. Develop the ability to conduct experiments and to analyze and interpret data (2A)
4. Develop the ability to identify, formulate, and solve engineering problems (2E)
5. Introduce the recognition of need for, and ability to engage in lifelong learning (2F)
6. Develop the ability to communicate effectively (3)
7. Develop an understanding impacts of engineering solutions in the global and societal context (4A)
8. Demonstrate at a higher level knowledge of contemporary issues (4B)
9. Develop an understanding of Civil Engineering practice (5A)

REQUIRED TEXTBOOK
ISBN: 9780538733526

The text is available at the campus bookstore and older editions are not permitted.

SUPPLEMENTARY SOFTWARE
StatCrunch: http://www.statcrunch.com/ Online beginners statistics software used to make graphs and do statistics beyond Excel’s capabilities for a nominal fee (~$13 per 6 months). This software is recommended but not required for the course.

COURSE ORGANIZATION
1. Lecture sessions will be held weekly. Each student is responsible for reading the assigned material prior to the lecture session.
2. The instructor will assign homework assignments and may provide solutions to the problems to help students practice concepts learned in class through practical problems.
3. There will be a number of graded and non-graded online Learning Modules throughout the course available on SacCT.
4. Four in-class quizzes will be conducted throughout the course (see calendar for dates, subject to change).
5. Three exams will be conducted throughout the course (see calendar for dates, subject to change).

EVALUATION OF STUDENT PERFORMANCE*
Grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Attendance and Participation / Learning Modules</td>
<td>20%</td>
</tr>
<tr>
<td>Quizzes (4)</td>
<td>20%</td>
</tr>
<tr>
<td>Exams (3)</td>
<td>60%</td>
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<tr>
<td>TOTAL</td>
<td>100%</td>
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Attendance and Participation / Learning Modules – 20%
Class attendance is mandatory for this course. You will be permitted to miss three classes during the semester. This course is best enjoyed with active student participation and interaction. Students are expected to act in a professional manner, and persistent disruptions in class can also affect your participation grade. Graded Learning Modules will be assigned to learn new course content and reinforce concepts discussed in class followed by online quizzes to assess student learning. Non graded Learning Modules may also be offered.

Quizzes (4) – 20% (5% each)
There will be four scheduled quizzes throughout the semester in the 3rd, 7th, 9th, and 12th week of class (dates subject to change). These quizzes are designed to emphasize the material covered in lectures, homework assignments, and test on conceptual knowledge of statistics providing feedback between exams.*

Exams (3) – 60% (20% each)
There will be three exams around the fifth, eleventh, and last week of the semester designed to test your problem solving skills using statistical methods (dates subject to change).
COURSE POLICIES

Attendance and Etiquette: Classroom attendance and professional behavior are required of all class participants during all aspects of the course. Coming to the class late is a form of class disturbance. Chitchatting disturbs the class too. Please silence your mobile communication devices while in class. “Sorry, I forgot to turn it off” will not suffice. Use of a cell phone or texting is not allowed during the class. Non-adherence to these policies will affect your final grade.

Build Rapport: If you find you have any trouble keeping up with any aspects of this course, make sure you let me know as early as possible. As you will find, building rapport and effective relationships are key to becoming an effective professional. Make sure that you are proactive in informing me when difficulties arise during the semester so that I can help you find a solution. Remember, I am here to help you succeed.

Calculator Policy: Only current FE/EIT approved calculators will be allowed during in-class exams. Use of an unapproved calculator will be considered an act of academic dishonesty. Per Civil Engineering Department Calculator Policy, the only calculators allowed for quizzes and exams are:

- Casio: All fx-115 models; any Casio calculator with fx-115 in its model name is allowed.
- Hewlett Packard: The HP 33s and HP 35s models are allowed. No other Hewlett Packard models are allowed.
- Texas Instruments: All TI-30X and TI-36X models are allowed; any Texas Instruments calculator with TI-30X or TI-36X in its model name is allowed.

Mobile communication devices may not be substituted for calculators and are strictly prohibited from all quizzes and exams. See http://www.ecs.csus.edu/wcm/ce/policies.html.

Make-up exams and quizzes: Make-up exams or quizzes will not be given except in unusual cases beyond the student’s control (e.g. medical emergencies). Grades will be given at the end of the semester based only on the work completed during the semester.

Collaboration: You are encouraged to do homework assignments with a classmate. The goal of the homework is for you to learn the concepts of the course, and you will be asked to demonstrate your knowledge of these concepts on quizzes and exams. It will be in your best interest to understand all of the assigned problems, even if collaborating with other individuals.

Communication: Some features of this course, like homework solutions, will be available on SacCT (http://online.csus.edu). You must have a working SacLink account to access SacCT. If you do not have a SacLink account, you can apply for one on-line (http://www.csus.edu/saclink) or by visiting the second floor of the AIRC Building.

For more technical/conceptual questions requiring thorough explanation or discussion, please see me after class or during office hours. If you cannot attend office hours, you are encouraged to e-mail me directly (ghazan.khan@csus.edu) to schedule an appointment.1

Disability Access: If you have a disability and require accommodations, please provide disability documentation to SSWD, 1008 Lassen Hall, (916) 278-6955. Please discuss your accommodation needs with me during the first week of the semester.

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1 Please use professional e-mail etiquette and grammar when corresponding with University faculty and staff. We are here to help you develop both your engineering skills as well as your communication skills.