ENGR 3305 Data Collection and Analysis in Engineering

Course Syllabus

Lecture: Tuesday & Thursday, 3:30 pm – 4:45 pm

Instructor: Prof. Mahyar Amirgholy
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Office: M-162C

Prerequisite: Calculus II (MATH 2202)

Textbook

The primary course text will be the following book:

Montgomery, D.C. and Runger, G.C., 2014. *Applied Statistics and Probability for Engineers*. John Wiley & Sons.

Available Online: https://library.kennesaw.edu

Additional readings and references will be posted as necessary to D2L Brightspace.

Description and Objectives

[3 credits] The course objectives are for students to understand applied statistics and probability in engineering. Upon completing the course, students should be familiar with sampling distributions, conditional probability and Bayes' theorem, parameter estimation, statistical inference, and regression techniques. Students should be able to describe and interpret random variables and probability distributions, determine required sample size, generate and interpret descriptive statistics, conduct hypothesis tests, apply linear regression techniques, and use statistical software programs. The student will leave the class with computational and software skills that can be applied in different engineering fields.

Course Topics

- Introduction to engineering statistics and data analysis
- Probability applications in engineering
- Random variables and probability distributions
- Joint probability distributions
- Descriptive statistics
- Sampling distributions
- Point estimation and confidence intervals
- Sample size
- Hypothesis tests
- Linear regression

Course Learning Outcomes

1. Describe and interpret random events and variables, and probability distributions.

2. Apply Bayes' theorem to solve stochastic engineering problems.

3. Generate and interpret descriptive statistics for engineering applications.

4. Conduct hypothesis test as part of an engineering decision-making process.

5. Apply linear regression techniques to engineering problems.

6. Develop statistical models in engineering and evaluate the accuracy of results.

Course Requirements and Grades

Course grades will be based on four components:

1. **Homework** [20%] In order to practice concepts from the class, some shorter exercises will be assigned as homework. For these assignments, you may talk to other students in the class and share ideas. Unless I tell you otherwise, I expect individual submissions.

2. **Midterm Exam** [40%] The midterm exam evaluates your knowledge in the middle of the semester. The problems will be similar in size and scope to the assigned homework. Unless instructed otherwise, the midterm exam will be closed book.

3. **Final Exam** [40%] The final exam is a cumulative exam at the end of the semester, covering all lectures and assigned readings. Similar to the midterm exams, the final exam will be also closed book.

Course Communication

Course communications will be sent to the class using the D2L website. This site is where notes, readings, assignments, and other announcements will be posted. It is important that if you are registered for the course, you are also on the roster for the D2L site.

Contacting Me

The best way to contact me is by email. Include "ENGR 3305" in the subject line to ensure your message receives timely attention. In general, homework and project questions are difficult to answer by email, so I may request that you come in for office hours.

Academic Integrity Policy

Homework assignments are designed to be an individual effort, and you are expected to submit only your own work. Semester projects must consist of your original analysis and writings. Ideas from other authors must be properly cited, and plagiarism will not be tolerated. All students are expected to adhere to the Kennesaw State University Codes of Conduct.[*]

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[*] https://scai.kennesaw.edu/KSU_Codes_of_Conduct_2019-2020.pdf

Course Delivery

KSU may shift the method of course delivery at any time during the semester in compliance with University System of Georgia health and safety guidelines. In this case, alternate teaching modalities that may be adopted include hyflex, hybrid, synchronous online, or asynchronous online instruction.

COVID-19 Illness

If you are feeling ill, please stay home and contact your health professional. In addition, please email your instructor to say you are missing class due to illness. Signs of COVID-19 illness include, but are not limited to, the following:

- Cough
- Fever of 100.4 or higher
- Runny nose or new sinus congestion
- Shortness of breath or difficulty breathing
- Chills
- Sore Throat
- New loss of taste and/or smell

COVID-19 vaccines are a critical tool in "Protecting the Nest". If you have not already, you are strongly encouraged to get vaccinated immediately to advance the health and safety of our campus community. As an enrolled KSU student, you are eligible to receive the vaccine on campus. Please call (470) 578-6644 to schedule your vaccination appointment or you may walk into one of our student health clinics.

For more information regarding COVID-19 (including testing, vaccines, extended illness procedures and accommodations), see KSU's official Covid-19 website.

Face Coverings

Based on guidance from the University System of Georgia (USG), masks are encouraged based on individual preference and assessment of personal risk. Disposable face coverings can be picked up at the Office of Emergency Management at Chastain Pointe on the Kennesaw campus and Norton Hall Police Precinct on the Marietta campus. Please email oem@kennesaw.edu if you have questions.