

American University of Beirut
Faculty of Engineering and Architecture
Engineering Management Program

ENMG 617: Engineering Management Statistics

Fall 2017: 5:30-8:00PM, Mon. Bechtel 109

Instructor:

Dr. Saif Al-Qaisi

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Office Hours: Tuesday: 11:00 am – 12:30 pm; Wednesday 1:30 pm – 3:00 pm; and/or by appointment.

Course Description:

This course introduces the fundamental ideas and techniques of statistical analysis and regression with reference to decision taking in engineering management. The course covers techniques for the collection, presentation, analysis and interpretation of experimental results and develops procedures to deal with the uncertainty present in making inferences and decisions based on sample data. Topics covered include descriptive statistics; sampling distributions, the Central Limit Theorem; hypothesis testing and confidence intervals for one- and two-sample problems; one-way analysis of variance and basic ideas in experimental design; linear regression, and multiple regression.

Pre-requisite: None.

Learning Outcomes:

1. To demonstrate a command of visual statistical tools (graphs, charts, tables, etc.)
2. To develop mastery of a statistical computing package such as Minitab
3. To understand and apply inferential statistics for hypothesis testing and confidence interval estimation.
4. To understand and apply linear and multiple regression analysis.
5. To understand the difference between observational studies and design experiments.
6. To understand how to model experimental data.

Text: Montgomery, D. C., & Runger, G.C. (2011). *Applied Statistics and Probability for Engineers* (5th ed.), John Wiley & Sons.

Examinations & Grading:

- **Midterm Exam** (30%).
- **Final Exam** (35%).
- **Term Project** (20%).
- **Homeworks, quizzes, participation** (15%).
- Dishonest conduct related to any examination or quiz will not be tolerated. Students who cheat will receive a failing grade. Cheating includes but is not limited to GIVING / RECEIVING unauthorized help and the use of unauthorized material during an examination.

Chapters to be covered:

Chapters 1-5: Review; Discrete and Continuous Probability Distributions; Normal Distribution.

Chapter 6: Descriptive Statistics

Chapter 7: Sampling Distributions and Point Estimation of Parameters

Chapter 8: Statistical Intervals for a Single Sample

Chapter 9: Tests of Hypotheses for a Single Sample

Chapter 10: Statistical Inference for Two Samples

Chapter 11: Simple Linear Regression and Correlation

Chapter 12: Multiple Linear Regression

Chapter 13: Design and Analysis of Single-Factor Experiments: The Analysis of Variance

Chapter 14: Design of Experiments with Several Factors

Statistical Software:

Minitab[®] version 16 will be our preferred statistical computing package for this course. Minitab is available in the Engineering Management (EM) lab. Student versions can be purchased, as well as downloading a license for personal use of the software during the semester. Students may also download a full, trial version of Minitab, which can be used for 30 day period.

Term Project:

Discuss the potential role of statistical models in a real world problem for which you can obtain data. You must clearly define a management situation that you think statistical analysis can be used to bring about significant improvement and understanding. The written project reports must be computer printed. The length of the written report is strictly limited to 15 pages, but exhibits up to 5 additional pages may be appended. Each report must include the following information in this order:

- Purpose of study – Motivation, project description, and problem statement or definition.
- Analysis: You must apply Minitab (or any other statistical software package) to the representative data set.
- Recommendations: make recommendations based on a thorough analysis of the data.
- Summary and Conclusion

Homework

Homework problems will be assigned and graded frequently. Students are encouraged to spend plenty of time working on the homework problems and to discuss their solution with each other and the instructor. However, each student should write and submit the homework individually. Doing the homework is the best way to excel in this course.

Late/Missed Work Policy

Assignments are due at the beginning of the class period. Assignments may be turned in late with the following penalties:

Turned in after beginning of class: -10%

Turned in 1 day late: -10%

Turned in 2 or more days late: Assignment not accepted, unless a university-approved excuse is provided.

No make-up exams will be given without a written, valid excuse. You must contact the instructor within 24 hours of an exam and provide a written, valid excuse (defined by the University) to reschedule an exam. Your exam will be rescheduled ideally within a week, but be aware that make-up exams will be different from the rest of the class.

Attendance Policy

Attendance in class will enhance your learning experience, therefore everyone is expected to attend all classes and to come prepared for discussion. There will be pop-quizzes on random days, especially days with low attendance. If you arrive late, please enter quietly (from the back of the room). During class, please turn off all cell phones and laptops. As an open learning environment, it is expected that students will have diverse opinions and comments during discussion. All contributions are valuable and are to be respected.

Accommodation for Disability

AUB strives to make learning experiences accessible for all. If you anticipate or experience academic barriers due to a disability (such as ADHD, learning difficulties, mental health conditions, chronic or temporary medical conditions), please do not hesitate to inform the Accessible Education Office. In order to ensure that you receive the support you need and to facilitate a smooth accommodations process, you must register with the Accessible Education Office (AEO) as soon as possible: accessibility@aub.edu.lb; +961-1-350000, x3246; West Hall, 314.