

University of Portland
Donald P. Shiley School of Engineering
EGR361B
Analysis of Engineering Data
(3 credit hours)
Course Syllabus
Spring, 2017

<u>Prerequisite:</u>	MTH202
<u>Lecture Hours:</u>	MWF, 12:30pm-1:25pm, Shiley 101
<u>Course Description:</u>	Basic probability and statistical procedures used in the analysis of engineering data and an understanding in measurement. Methods for displaying data, commonly used probability distributions for discrete and continuous random variables, and statistical tools such as simple linear regression are presented. Students are introduced to concepts of statistical experimental design and error mitigation.
<u>Student Outcomes:</u>	<ol style="list-style-type: none">1) Ability to organize, summarize, present, and analyze data graphically (e.g., Box Plots, and Histograms), and calculate mean, variance, standard deviation, median, mode, and outliers. Ability to perform above using Excel.2) Ability to calculate likelihood of events using probability theory.3) Ability to analyze discrete probabilistic processes using discrete random variables, PMF's and cdf's including Binomial and Poisson distributions.4) Ability to analyze continuous probabilistic processes using continuous random variables, pdf's and cdf's including the Normal and Chi-Squared distributions.5) Ability to understand random samples and the Central Limit Theorem.6) Ability to understand measurement issues (e.g., systematic vs. random error), significant figures, and error propagation.7) Ability to present paired "x-y" data in Scatter Plots and perform Simple Linear Regression using Excel.8) Ability to perform statistical inference on the mean, proportion, and variance of one population using Hypothesis Testing and Confidence Intervals (including z-test, t-test, chi-square test, and P-value).9) Ability to perform statistical inference on the means and proportions of two populations using Hypothesis Testing and Confidence Intervals (including z-test and the "Paired t-test").
<u>Instructor:</u>	Dr. Aziz S. Inan, ainan@up.edu , https://faculty.up.edu/ainan , Shiley 215, 943-7429, office hours M 1:30pm-3:30pm; T 12:30pm-1:30pm; W 2:30pm-3:30pm; F 1:30pm-2:30pm
<u>Text:</u>	<u>Engineering Statistics</u> , 5th edition, Montgomery, Runger, and Hubele, John Wiley and Sons, 2011
<u>Assessment Tools:</u>	15% Homework, 50% Exams (2), 35% Final Exam
<u>Grading Scale:</u>	90% – 100% = A ⁻ – A 80% – 89% = B ⁻ – B ⁺ 70% – 79% = C ⁻ – C ⁺ 60% – 69% = D ⁻ – D ⁺ Below 60% = F

University of Portland's Code of Academic Integrity:

Academic integrity is openness and honesty in all scholarly endeavors. The University of Portland is a scholarly community dedicated to the discovery, investigation, and dissemination of truth, and to the development of the whole person. Membership in this community is a privilege, requiring each person to practice academic integrity at its highest level, while expecting and promoting the same in others. Breaches of academic integrity will not be tolerated and will be addressed by the community with all due gravity.

University of Portland's Assessment Disclosure Statement:

Student work products for this course may be used by the University for educational quality assurance purposes.

University of Portland's Accessible Education Services (AES):

Students who experience a disability and require an accommodation to fully participate in this class, contact the Accessible Education Services office located in Buckley Center, Rm. 163 or call 503-943-8985. If you have an AES accommodation plan that includes academic accommodations that apply to this course, make an appointment to meet with the professor to discuss how your accommodation will be implemented. You are responsible for giving

sufficient notice to your professor for timely implementation of your accommodation; therefore it is recommended you speak with your professor in the first week of the semester or as soon as your accommodation plan is activated. Also, meet with the professor if you have an AES Safety Plan and/or wish to discuss emergency medical information or special arrangements in case the building must be evacuated. Requests for an alternate location for exams and/or extended exam time should, when possible, be made two weeks in advance of an exam, and must be made at least one week in advance of an exam.

University of Portland's Shepard Academic Resource Center (SARC):

The Learning Resource Center, located on the first floor of Buckley Center within SARC (BC 163), provides peer assistance tutoring for writing, math, speech and presentations, languages, business and economics, sciences and nursing. For complete information about SARC, go to: <http://www.up.edu/sfrc/default.aspx?cid=13615&pid=8862>.

Course Outline

<u>Date</u>	<u>Topic</u>	<u>Reading</u>
?	Introduction	Ch.1
?	Descriptive statistics: Mean, Var, Stdev, Box Plot, Histogram, Excel example	2-1, 2-3, 2-4
?	Random variables and Probability	3-1-3-3,handout
?	Probability	3-1-3-3
?	Discrete random variables: PMF, cdf, Mean, Var, Binomial distribution	3-7, 3-8
?	Poisson distribution	3-9
?	Continuous random variables: pdf, cdf, Mean, Var, Normal distribution	3-4, 3-5.1
?	Random samples, statistics, Central Limit Theorem	3-13
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?	Exam 1 review	Ch. 1-3
?	Exam 1	Ch. 1-3
?	Measurement issues (systematic vs random error), Sig Figs, Error Propagation	3-12.3
?	Scatter plots and Simple Linear Regression: Excel example	6-2.1
?	Scatter plots and Simple Linear Regression: Excel example	6-2.1
?	<i>Spring Break (no class)</i>	
?	<i>Spring Break (no class)</i>	
?	<i>Spring Break (no class)</i>	
?	Stat inference: Hyp test and CI on mean, one pop, large sample (z-test, z)	4-1-4-4
?	Stat inference: Hyp test and CI on mean, one pop, large sample (z-test, z)	4-1-4-4
?	Stat inference: Hyp test and CI on mean, one pop, small sample (t-test,t)	4-5
?	Stat inference: Hyp test and CI on proportion, one pop (z-test, z)	4-7
?	Stat inference: Hyp test and CI on proportion, one pop (z-test, z)	4-7
?	Exam 2 review	Ch. 4
?	Exam 2	Ch. 4
?	Stat inference: Hyp test and CI on variance, one pop (chi-square-test)	4-6
?	Stat inference: Hyp test and CI on proportion, two pops (z-test, z)	5-6
?	<i>Holiday (no class)</i>	
?	Stat Inference: Hyp test on means, two pops "Paired t-test"	5-2
?	Stat Inference: Hyp test and CI on means, two pops "Paired t-test"	5-2
?	Final exam review	Ch. 1-5
?	Final exam review	Ch. 1-5
?	Final Exam (10:30am-12:30pm)	Ch. 1-5