Math 225 - Introductory Statistics

Course Description: An introduction to statistics; data collection, description, visualization and analysis; basic probability; statistical reasoning and inference including hypothesis tests and confidence intervals: t-tests, chi-squared tests, ANOVA, correlation and regression. (3-0-3) (C)

Enrollment: Required for Statistics Major and Minor. Elective for other majors.

Textbooks: Statistics: Unlocking the power of data 2nd edition with WileyPLUS access, Lock et al.

Other Required Materials: JMP or other statistical software.

Prerequisites: None

Objective:
1. Students will become critical consumers of statistically-based results in the media and be able to recognize whether reported results follow from the studies and analysis reported.
2. Students will understand and be able to employ the key concepts of statistical inference: estimation with intervals and testing for significance.
3. Students will able to use statistical software for data analysis, and be able to interpret and draw conclusions from the output.
4. Students will understand basic ideas of formal probability theory and be able to compute probabilities of events for simple examples.
5. Students will be able to demonstrate awareness in ethical issues associated with sound statistical practice.

Lecture Schedule: Two 75-min sessions per week.

Course Outline	Hours
1. Data Collection: structure, sampling, experiments and observational studies.	3
2. Data Summary: categorical variables, measures of variability, visualization, z-scores.	3
3. Basics of Theory of Probability: probability laws, random variables, Bayes Rule.	3
4. Confidence intervals: sampling distributions, interval estimates, bootstrapping.	6
5. Hypothesis tests: statistical significance, randomization distributions, confidence intervals	7
6. Normal Distributions	4
7. Inference for means and proportions: tests and confidence intervals for proportions, t-tests.	5
8. Inference for multiple parameters: Chi Square Tests	3
9. Inference for multiple parameters: ANOVA	3
10. Inference for multiple parameters: Correlation and Regression	3

Assessment

Homework/Projects/Labs	30 - 40%
Mid-Exam(s)	30 - 40%
Final Exam	30 - 40%

Syllabus Prepared By: Despina Stasi and Arthur Lubin, 02/02/2018