Evanston Township High School

Data Analysis and Statistics

Course Information

Instructor	Jiangtao Gou Doctoral candidate in Statistics at Northwestern University Department of Statistics, Northwestern University 2006 Sheridan Road Evanston, IL 60208 jgou@u.northwestern.edu

Class Information	Wednesday and Friday 10:11-10:53 am February 13, 15, 20, 22, 27 and March 1, 6, 15
Prerequisites	High school math courses: Algebra, Geometry, Pre-Calculus. AP Statistics is good but not necessary.
Text	Lecture notes and necessary reading materials.
Course Description	Statistics is a very useful tool of science. On the other hand, statistics is often misused in the media to manipulate public opinion. This course is designed to introduce students to basic statistics as a preparation to college statistics course, motivate students to use statistics in daily life, and help develop critical thinking skills in statistics. It covers data collection and summary, correlation, simple regression, probability, frequency distribution, sampling, experimental design, estimation, confidence intervals, tests of significance, and two-sample comparisons. This introductory course does not require calculus and makes minimal use of formal mathematics. Students will do weekly homework assignments and final projects that address how to work as an applied statistician. There will be no final exam, instead the final projects will be the summative assessment.
Objective	Students will be able to describe statistical procedures, explain how to use statistical methods and their limitation, prepare a survey or a data collection plan, diagram and analyze data, persuade and conclude statistically.
Calculators	Students may need to have access to a calculator for use on homework.
Software	Students may consult with me about any statistical software (e.g. Excel, SPSS, JMP, R) if they need to use them in their course projects.
Homework	Students will do weekly homework assignments, typically 5-6 questions per week, where 3-4 questions will be based on the lectures in current week, and 1-2 questions will be based on the reading materials for the following week.

	You are encouraged to discuss these problems with me or with other students.
Exam	There will be no quiz or exam. Final projects will be assigned as the summative assessment.
Course Project	I will provide a list of topics for students to choose, and I also encourage students to find their own topics. Basically students will work as an applied statistician on some data and try to draw conclusion or gave suggestion based on these data. Students are encouraged to discuss with anyone for their course project. Every student need to hand in a 1 to 3-page project report. If you would like to collect data from public database, possible topics include (but are not limited to) the following ✓ Statistical Analysis on Mendel's Pea Experiments ✓ Blood Type and Ethnicity: A Statistical Correlation Analysis ✓ The Prediction of Presidential Election in 1936: Why Statistical Methods Failed ✓ How Could We Avoid an Accident like Space Shuttle Challenger Disaster in 1986 by using Statistical Methods? ✓ Football/Baseball/Basketball/Olympic Games Statistics ✓ Is it True that Babies Born at High Altitudes Weigh Less? If you would like to use your own experience, a possible course project could be ✓ Lori worked as a waitress and wondered whether suggesting a specific appetizer upon greeting her customers would lead to an increase in the sales of appetizers. Her data, though not statistically significant, ran counter to her belief—mentioning a specific appetizer decreased the sales of all appetizers!
Grading	Homework assignment 50% Final project 50% (Report 35% Presentation 15%)

Class Schedule

Week 1	February 13	Introduction
	February 15	Design of Experiment and Survey (Homework 1 will be assigned)
Week 2	February 20	Data Exploration (Homework 1 due)
	February 22	Normal Distribution (Homework 2 will be assigned)
Week 3	February 27	Correlation and Regression (Homework 2 due)
	March 1	Sample mean, confidence intervals (Homework 3 will be assigned)
Week 4	March 6	Inference for the population mean (Homework 3 due) Comparing two population means (Course project will be assigned)
Week 5	March 13	No class (Course project due)
	March 15	2013 ETHS-SRC (Final presentation)