

Course Outline

GEOG 2271, Quantitative Methods in Geography

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Office Hours: Monday 12:00-1:00, Tuesday 2:00-4:00, Wednesday 12:00-1:00, or by appointment.

Lectures and Lab: Lectures on Tuesday and Thursday 11:30-1:00 in OA 2008, Lab on Monday 8:30-10:00 in OA 1002.

Text: STAT 2, by Johnson and Kubby, Brooks/Cole.

Goals and Learning Outcomes: By the end of this course, successful students should be able to:

1. Understand the meaning of symbols, words and phrases related to statistics and probability.
2. Understand the uses and limitations of probability and statistics.
3. Critically read assertions and statements in Geography and Science in general, which use statistical arguments.
4. Identify questions, make hypotheses and design simple experiments to test hypotheses about means, variances and proportions.
5. Be familiar with linear regression and analysis of variance (ANOVA).
6. Use tables and graphs to represent the significance of data.

Course Outline:

- **Statistics (Chapter 1):** qualitative and quantitative variables, measurability and variability, data collection.
- **Descriptive Analysis and Presentation of Single-Variable Data (Chapter 2):** histograms, pie graphs, bar graphs, measures of central tendency, measures of variability, measures of position.
- **Probability (Chapter 4):** probability of events, conditional probability, rules of probability, mutually exclusive events, independent events.
- **Probability distribution (Chapter 5):** random variables, probability distributions of a discrete random variable, binomial distribution, Poisson distribution.
- **The normal probability distribution (Chapter 6):** normal probability distribution, applications of the normal distribution, exponential distribution.
- **Sample variability (Chapter 7):** sampling distribution, central limit theorem, sampling distribution of sample means applications.

- **Introduction to statistical inferences (Chapter 8):** confidence interval for the mean, hypothesis testing for the mean.
- **Inferences involving one population (Chapter 9):** inferences about the mean, inferences about a proportion.
- **Descriptive analysis and presentation of bivariate data (Chapter 3):** bivariate data, linear correlation, linear regression
- **Linear correlation and regression analysis (Chapter 13):** linear correlation analysis, inferences about the linear correlation coefficient, linear regression analysis, inferences about the slope of the regression line, confidence interval for regression
- **Inferences involving two population (Chapter 10):** inferences about the mean difference using two dependent samples, inferences about the mean difference using two independent samples, inferences about the difference between two proportions using two independent samples, inferences about the ratio of variances using two independent samples.
- **Analysis of variance (Chapter 12):** analysis of variance techniques, applications of Single-Factor Anova.
- **Application of Chi-Square (Chapter 11):** Inferences concerning multinomial, inference concerning contingency tables, test of independence, test of homogeneity.
- **Elements of nonparametric statistics (Chapter 14):** Mann-Whitney U Test.

Grading System: The final grade will be determined by two midterms, the homework and the final. The weight of each component is as it follows:

Homework Grade 30%
 Midterm 1 15%
 Midterm 2 15%
 Lab Exam 10%
 Final 30%

Exam Schedule: The first midterm will be on October 4, 2016, while the second midterm will be November 8, 2016.

Reading: You should read the material that will be covered in class before coming to class so that you know in advance which points are more obscure for you and you can ask questions in class.

Homework: I will give a list of homework problems to work as a practice. There will be nine homework assignments. A homework assignment will be due in class every Tuesday, except when you have midterms. No late homework will be accepted except with a well documented valid university excuse. IF YOU WORK ALL THE ASSIGNED HOMEWORK PROBLEMS, YOU WILL DO WELL IN THE COURSE. WITHOUT PRACTICING THE MATERIAL COVERED IN CLASS IT WILL BE VERY UNLIKELY THAT YOU

WILL RECEIVE A GOOD GRADE. Lastly, I will drop one homework grade (the lowest) when determining your homework grade for the semester.

Calculator: You will need a standard scientific calculator for the class. Calculators that can store formulas or any large amounts of data are not allowed on the test.

Make-up policy: A make-up midterm will be given only with well documented valid university excuses (sickness, etc). A make-up midterm must be written by the student within two weeks of the date of the original midterm.

Plagiarism and Academic Misconduct: Exams and homework assignments must be independent work. Highly similar assignments will be graded at zero, The head of the department and the dean will also be informed of the academic misconduct. Plagiarism is an extremely serious academic offense and carries penalties varying from failure in an assignment to expulsion from the university. Students are encouraged to review Section IX of the University Regulations regarding academic dishonesty.

This is a general outline. Any communication or change regarding this outline, the time and location of exams as well as other matters concerning the course will be posted on the website and announced in the lecture.