

AG 400 - Statistics in the Life Sciences Fall 2009

Ag. 400 is a four-credit course dealing with data analysis in the life sciences, including both biological and social science applications. Emphasis is on the *use* of descriptive and analytical procedures in data analysis, rather than the theoretical derivation of tests. Students will be introduced to the use of computer processing of research data, using a comprehensive, flexible, pre-programmed software package, SPSS.

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Topics Covered:

Introduction: What is "Statistics"?

The Use of Statistical Methods in Research

Independent and Dependent Variables

Types of Measurement

Descriptive Statistics

Percentages, Proportions, Ratios

Measures of Central Tendency

Measures of Dispersion

Computers and Statistical Analysis

Data Files

Statistical Package Programs – SPSS

Normal Distributions

Probabilities Under the Normal Curve

Testing the Null Hypothesis /One Sample Z-Tests

T-Tests for the Difference Between Two Means

One-Sample T-Test

Two-Sample T-Test - Independent Samples

Paired T-Test

Confidence Intervals - Means

Chi Square

One-Sample Chi-Square

Chi Square for Contingency

Measures of Strength of Association

Correlation-Regression Analysis

Linear Regression/ / Correlation

Multiple and Partial Correlation/ Regression

Analysis of Variance

One-Way AOV

Post hoc Tests

Strength of relationship: Eta

Two-Factor AOV; Randomized Block; Factorial Designs

Class Attendance

Attendance at class meetings is optional, but students are responsible for all work covered and for meeting course deadlines.

Homework

There are required homework assignments involving both computer runs and hand calculations. Each can be resubmitted as often as desired until the due date. The final deadline for each assignment is 5:00 p.m. on the date listed below:

<u>Assignment</u>	<u>Due Date</u>
Percentages and Central Tendency Dispersion Computer - Data Files Computer - Frequencies 1 Computer - Frequencies 2	Friday, September 18

Normal Distributions t-tests and Z-tests Computer - t-Test	Friday, October 9

One sample and Contingency Chi Square Computer - CROSSTABS and CHISQ	Monday, October 26

Correlation-Regression Computer - CORRELATIONS/REGRESSION Computer - Multiple Regression	Monday, November 16

Analysis of Variance Computer - ONEWAY Two Factor Analysis of Variance	Friday, December 11

Quizzes and Examinations

There are five quizzes and a final exam. Each quiz covers computations, interpretations, and computer information. A make-up quiz is given for each in-class quiz. Students may elect to take either the in-class or the make-up or both. If both are taken the average of the two is used as the grade.

	<u>In-class</u>	<u>Make-up (7:00-10:00pm)</u>
Quiz I	Monday, September 14	Wednesday, September 16
Quiz II	Monday, October 5	Wednesday, October 7
Quiz III	Tuesday, October 20	Thursday, October 22
Quiz IV	Tuesday, November 10	Thursday, November 12
Quiz V	Monday, December 7	Wednesday, December 9

Sample quizzes are included in the Ag 400 On-Line Course Materials.

The final exam will be given during the final exam period. **There is no make-up final.**

Grading

Each student's grade for the course is derived from the following formula:

$$\text{Average Score} = (\text{Q1} + \text{Q2} + \text{Q3} + \text{Q4} + \text{Q5} + \text{Final} + \text{Homework}) / 7$$

Computer Course

R.Soc. 522, one-credit companion course on the use of the Penn State Computer facilities and the program SPSS (Statistical Package for the Social Sciences) is collated with Ag. 400 and offered Fall Semester. R.Soc. 522 takes the student beyond the basic introduction to computer processing offered in Ag. 400. If you are interested in research and further statistics you may want to take this additional credit.

Academic Integrity

Academic integrity includes a commitment to not engage in or tolerate acts of falsification, misrepresentation, or deception. Such acts of dishonesty include (but are not limited to) cheating, copying, plagiarizing, submitting another person's work as one's own, tampering with the academic work of another student, and facilitating other students' acts of dishonesty.

Students who engage in behavior that breaches academic integrity will face sanctions ranging from an F for the assignment, to an F for the course, to dismissal from the University.