

GEORGIA PERIMETER COLLEGE  
MATHEMATICS ACADEMIC GROUP  
COMMON COURSE OUTLINE

COURSE ABBREVIATION    Math 1431

CREDIT HOURS            3

COURSE TITLE            Introduction to Statistics

PREREQUISITES            Successful completion of any collegiate level mathematics course.

CATALOG DESCRIPTION

This course is designed for students whose programs require a course in statistics as well as for those who wish to elect such a course. Topics to be covered include descriptive statistics, basic probability, discrete and continuous distributions, sample estimation of parameters, hypothesis testing, tests on means and proportions, chi-square tests, correlation, and linear regression.

EXPECTED EDUCATIONAL RESULTS

As a result of completing this course, the student will be able to:

1. Analyze statistical problems using critical thinking skills, such as deciding on appropriate statistics to measure and suitable tests to be performed;
2. Support statistical analyses using the course-required calculator whenever possible;
3. Define basic descriptive and inferential statistical terms;
4. Select a random sample;
5. Construct frequency and relative frequency tables and histograms, stem-and-leaf diagrams, boxplots, and scatter diagrams;
6. Determine the mean, median, mode, standard deviation, range, and quartiles for a set of data;
7. Interpret and apply z-scores;
8. Compute regular and conditional probabilities of events from a contingency table;
9. Using contingency tables, determine the probability of the compound event A and B, and the probability of the compound event A or B.
10. Determine the mean and standard deviation for a discrete probability distribution;
11. Make appropriate checks for normality of distributions and apply the properties of normal and standard normal distributions;
12. Use the standard normal distribution to determine probabilities.
13. Interpret the Central Limit Theorem and compute the standard error of the mean and its standard deviation;
14. Determine confidence intervals for the mean and proportion of one population for large samples or normally distributed populations;

15. Apply the basic model of hypothesis testing and select the appropriate distribution to make inferences about a population mean and proportion or the difference between two population means and proportions, including the use of z-, t-, statistics;
16. Test experimental results against known distributions (goodness-of-fit) and the statistical independence of two variables in experiments where results are organized in contingency tables;
17. Write a regression line equation which best represents data relating two variables and interpret and/or make predictions from the line;
18. Compute the linear correlation coefficient for a regression line and interpret its significance;
19. Identify components of Statistical Design.

### GENERAL EDUCATION OUTCOMES

- I. This course addresses the general education outcome relating to communication as follows:
  - A. Students improve their listening skills by taking part in general class discussions and in small group activities.
  - B. Students improve their reading comprehension by reading and discussing the text and other materials. Reading mathematics requires skills somewhat different from those used in reading materials for other courses and these are discussed in class
  - C. Unit tests, examinations, projects, and other assignments provide opportunities for students to practice and improve mathematical writing skills. Mathematics has a specialized vocabulary that students are expected to use correctly.
- II. This course addresses the general education outcome related to problem solving and critical thinking as follows:

Students are assessed in a variety of ways that allow them to demonstrate individual and group problem-solving skills. Opportunities are also provided on tests and other assignments for students to employ critical-thinking skills.
- III. This course addresses the general education outcome related to using mathematical skills with quantitative data as follows:

The instructional goals for this course are to provide a sound foundation for the comprehension and application of statistics. Students completing this course successfully will be able to interpret, understand, and communicate fundamental ideas about quantitative data.

### COURSE CONTENT

1. Descriptive Statistics (data analysis)
2. Probability and Probability Distributions
3. Inferential Statistics
4. Linear Regression and Correlation

## ENTRY LEVEL COMPETENCIES

Upon entering the course, the student should be able to:

1. Analyze mathematical problems using critical thinking skills, such as estimation, reasonableness of answer, and writing and interpretation of results;
2. Use algebraic symbols and notation to make meaningful statements;
3. Use a calculator to perform arithmetic operations;
4. Write the equation of a line, given the appropriate information, and solve applications for which linear equations are mathematical models;
5. Solve linear inequalities and relate solutions to intervals on a number line.

## ASSESSMENT OF EXPECTED EDUCATION RESULTS

### I. COURSE GRADE

The course grade will be determined by the individual instructor using a variety of evaluation methods such as tests, quizzes, projects, homework, and writing assignments. A comprehensive final examination is required which must count at least one-fourth and no more than one-third of the course grade. The final examination will include items that require the student to demonstrate ability in problem solving and critical thinking as evidenced by detailed, worked-out solutions.

### II. DEPARTMENTAL ASSESSMENT

This course will be assessed every five years. A committee appointed by the Academic Group will grade assessment material.

### III. USE OF ASSESSMENT FINDINGS

The Math 1431 Committee, or a special assessment committee appointed by the Academic Group, will analyze the results of the assessment and determine implications for curriculum changes. The committee will prepare a report for the Academic Group summarizing the finding.

EFFECTIVE DATE: August, 2006

APPROVED DATE: March 2006