STAT 251
Basic Statistics

General Description

Introduction

Statistical methods are needed in every walk of life—arts, humanities, communication, sciences, technology, education, psychology, economics, business, and so on. The study of statistics has, therefore, become a critical element in most undergraduate, professional, and graduate curricula. Data collection and its interpretation is an important function of businesses, corporations, government agencies, and all types of scientific establishments, including those concerned with public health, education, the environment, economic forecasting, and public policy.

Most research is supported by statistics. The development of computers and related technologies has further made statistics a critical element in any decision-making process. In short, basic knowledge of statistics is an essential component of preparation for any profession. For an introductory course in statistics like this one, you only need an understanding of high school algebra.

Course Objectives

In this course you will learn what statistics is, including

- basic terminology
- branches of statistics
- basic methods of descriptive statistics (displaying, describing, and summarizing data using numerical statistical measures of location, position, variability, asymmetry, and hump)
- analysis of data involving two variables (methods of correlation and regression)
- basic concepts of probability
- sampling methods
- the two methods of inferential statistics (estimation and hypothesis testing).

Textbook and Materials

The required textbook for the course is Bluman, *Elementary Statistics: A Step by Step Approach,* 8th edition (ISBN 9780077460396).

Optional: *Student Solutions Manual for Elementary Statistics: A Step By Step Approach*, 8th edition (ISBN 9780077438654). This supplemental book gives *detailed* solutions to all odd-numbered text problems and answers to all quiz questions. (Your textbook gives answers to many exercises, but not detailed solutions.)

A simple, nonprogrammable scientific calculator will be helpful for working the problems.

For ordering information, see http://fridaycenter.unc.edu/creditprograms/selfpacedcourses/textbooks.

Helpful resources   The following books are not required, but you might find them helpful:

- *Basic Statistics and Data Analysis* by Larry J. Kitchens
- *Introduction to the Practice of Statistics* by David Moore and George P. McCabe
- *Introductory Statistics* by Prem S. Mann
- *Statistics: The Exploration and Analysis of Data* by Jay Devore and Roxy Peck

Course Structure

Assignments   This course consists of twelve lessons, one of which is a midterm exam. You will submit exercises for each lesson taken from the text. Complete the assignments in order. For every assignment you submit:

- Attach the submission sheet to your assignment before you mail it to Self-paced Courses.
- Indicate the textbook page number as well as the problem number of every problem that you submit for grading.
- Be sure your graphs/charts/diagrams are clearly and accurately drawn, show your complete work and calculations, and have proper titles and the like.
- For "Data Analysis" assignments, always explain the random sampling method used to draw the samples, and include the data set selected and used for calculations.

Midterm exam Lesson V is a midterm exam that is to be taken on the honor system and turned in just like the other assignments. You may use the "Important Formulas Sheet" that is included in your textbook.

Research project The course includes a research project, which should be a research study involving at least fifty data points and at least two variables. Your project will produce better results if you use randomization techniques in choosing your sample. Please follow the format given in Appendix B-l, Writing the Research Report, in the back of your textbook. Your project should consist of:

- a set of hypotheses
- a data set and its analysis
- statistical techniques used in the analysis
- conclusions
- a summary or abstract of the study.

When you reach Lesson VI, you will submit a brief proposal of your topic to your instructor for approval. The project will be due with the written assignment for the last lesson, Lesson XII.

Final exam Finally, the course includes a final exam. **You must pass the final exam to receive credit for the course.**

- You may use an ordinary, nonprogrammable scientific calculator on the exam to do the algebra.
- You may use the "Important Formulas" sheet that came with your textbook, but you may *not* refer to your textbook or any other notes, books, or materials during the exam.
- The exam is to be taken in one sitting.
- The time limit is three hours.
- No computers, cell phones, beepers, backpacks, notebooks, or books are permitted in the exam room.

A Final Exam Review is offered at the end of this course manual. The answer key for the review is also provided. You do *not* need to turn in your answers for the Final Exam Review. These are just sample questions and do not, by themselves, constitute a complete review for the exam. If you have problems with any of the questions, please contact your instructor.

Grading Scheme   The following grading scheme will be used:

Assignments:	50 percent
Midterm exam	20 percent
Course research project	5 percent
Final exam	25 percent

Remember that although the final exam is 25 percent of your grade, you must pass the final exam to receive credit for the course.

Study Strategies   Your overall objective in this course should be to learn to think statistically and to look critically at whatever you read and whatever formulas and procedures the text recommends in problem-solving. A course in statistics, like any other mathematics course, demands both practice and sufficient time for study.

Each lesson has specific objectives that you should read before beginning the lesson work, and should read again after you have finished the lesson, to be sure you have mastered the material. After reading the objectives, do the assigned textbook reading, including the examples that are solved in the text.

Plan to keep a notebook for your own detailed notes and for solving the **Practice Exercises** (odd-numbered) that are suggested with each lesson. These exercises are **not** to be turned in for grading. Nothing can substitute for the quality of learning you can achieve by preparing your own study guide. If you purchase the student solutions manual, please use it very sparingly. Your learning process will be substantially hindered if you don't put in your own efforts to solve the assigned exercises.

Work the lesson assignments and submit them to Self-paced Courses for grading. It is **very important** that you follow the instructions for assignments given in the Course Structure section. Also note the following:

- **Use of a calculator:** Use a calculator for simplifying the mathematical expressions and doing the calculations. Do not use the built-in programs of the calculator because you are required to show the intermediate steps of your calculations

for the assigned problems. Therefore, you do not need a costly calculator—a simple one will do the job.

- **Use of software:** A number of statistical computer software packages are available commercially, such as SAS, MINITAB, SPSS, MS Excel, and so on, and you may use such software in doing data analysis assignments and your course research project, if you like. If you use any software to draw the graphs/diagrams/charts and so on, use it carefully and intelligently, but **do not forget to show the complete work and intermediate steps of the calculations**. The textbook's Web site at mhhe.com/math/stat/bluman also has tutorials available; however, use of a computer is not required for this course. Your objective should be to develop the self-confidence to solve simple problems without the use of a computer.

Please note that the suggested list of practice exercises is the minimum that you are expected to do. You need to do more. Do as many as you need in order to thoroughly learn the material. The more exercises you do, the better you will be at doing them!

Your textbook contains an index at the end that is helpful in finding definitions, rules, and formulas. For example, if a question asks you to determine the five-number summary of given data, the index at the back of the book tells you where you will find the five values that constitute a five-number summary of the data set. The index is also helpful in locating information quickly. The same purpose could also be achieved by looking at the Glossary in Appendix E.

Appendix A of the text is an Algebra Review. You will find it beneficial to refer to this appendix frequently to brush up on your algebra skills. Please review section A-2 (Summation Notation) before you begin working on Chapter 3, and master section A-1 (Factorials) before you begin working on Chapter 4 of this course. Review these sections again when you come across the concepts given in them.

Course Evaluation

Please complete a course evaluation form when you finish your course or otherwise end your enrollment. A course evaluation form can be found near the end of this manual; a copy of the form will also be provided when you take your final exam.