

U3600-246 Elementary Statistics

Course Format: Online

Course Author: Wufeng Tian, Ph.D.

Course credits: 4

Prerequisites: Completion of an introductory-level Algebra course or U3600-110 College Algebra with a C or better or the equivalent.

Course Level: Intermediate

Course Description: The primary aim of the course is to help students develop a basic understanding and use of statistical concepts and methods to facilitate study and research in other disciplines.

Major topics that we will cover include:

- (1) Exploring data and relationships among data
- (2) Producing (collecting) data and understanding sampling distributions
- (3) Making statistically correct interpretations and inferences

Specific topics we will cover include: data collection, descriptive statistics, both graphical and numerical; general and sampling distributions; measures of central tendency; measures of variability; grouped data; the normal distribution; central limit theorem and the fundamentals of statistical inference, including confidence intervals and hypothesis testing and estimation; simple regression and correlation; the t-distribution; and the chi-square test.

Students who have successfully learned this material will be prepared to interpret data from their field of study.

Required Course Materials

- Diez, D., Barr, C., Cetinkaya-Rundel, M. (2015). OpenIntro Statistics (3rd edition). OpenIntro. The text is available as a free open educational resource (OER). The text is linked within the course.
- MathXL Access subscription - 6 Month Subscription. The Course ID for MathXL is available to you within the syllabus page of the course. If you have any questions about MathXL, please contact your course facilitator.

Optional/Recommended Course Materials

The following texts are optional materials. They are recommended if you are looking for supplemental material. Any edition of the following texts will work for this course.

- Statistics, 12th Edition, By James T. McClave, Terry T Sincich, Published by Pearson ISBN-13: 978-0321755933, ISBN-10: 0321755936
- Fundamentals of Statistics, 4th Edition, by Michael Sullivan ISBN: 9780321838704
- Introductory Statistics, by Illowsky, Barbara, Dean, Susan, Illowsky, Barbara. This is an open educational resource (OER) linked within the course
- Open Intro Statistics, Third Edition, David M Diez, Christopher D Barr, Mine C etinkaya-Rundel. ISBN-10: 1943450056. ISBN-13: 978-1943450053

- Open Statistics Education (linked within the course).

Hardware Requirements

You will need a webcam, speakers, and a microphone. You will complete your exams through an online proctor that requires all three components. You will also need a scanner (there are free apps, such as Cam Scanner)—at the end of proctored exams you will be scanning your handwritten work to a single file to be submitted to the file upload question.

Course Learning Objectives

- Develop and interpret descriptive statistical methods
- Use basic concepts of probability to calculate and explain outcomes associated with random experiments
- Explain and calculate probabilities from binomial and normal distributions
- Explain the reasoning behind sampling distribution including the central limit theorem
- Use and apply inferential statistics including one-sample (both small and large) confidence intervals and hypothesis testing for population mean and population proportion
- Use and apply inferential statistics for two-sample hypothesis testing of the population means
- Perform linear regression analysis and interpret the results
- Use and interpret one-way ANOVA
- Use the Chi-square goodness of fit to test if a sample of data came from a population with a specific distribution

Course Overview

Lesson #	Lesson Topic	EVALUATED ACTIVITIES
Unit 1: Introduction to Data		
1	Data Collection	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
2	Organizing & Summarizing Data	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
Unit 2: Probability		
3	Probability	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
4	Probability Distributions	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
	Units 1 & 2 Exam	<ul style="list-style-type: none"> • Exam 1
Unit 3: Distribution of Random Variables		
5	Foundations for inference	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz • Project 1
6	Binomial Distribution & Approximation	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
Unit 4: Foundations for Inference		
7	Sampling Distribution & Central Limit Theorem	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
8	t-Distribution & Estimating a Proportion	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
	Units 3 & 4 Exam	<ul style="list-style-type: none"> • Exam 2
Unit 5: Inference for Numerical & Categorical Data		

9	Hypothesis Testing Regarding a Population Parameter	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz • Project 2
10	Inference on Two Samples	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
11	ANOVA, Goodness-of-Fit Test	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz
Unit 6: Linear Regression		
12	Simple Linear Regression & Correlation	<ul style="list-style-type: none"> • Lesson Homework • Lesson Quiz • Project 3
	Units 5 & 6 Exam	<ul style="list-style-type: none"> • Exam 3
	Units 1 - 6 Exam	<ul style="list-style-type: none"> • Final Exam

Evaluation Methods

Your final grade will be based on your performance on the following:

- 1) Homework (15%)
- 2) Quizzes (15%)
- 3) Projects (15%)
- 4) Exams (55%)

Homework (15%)

There will be 12 homework assignments, one for each section, assigned online through MathXL during the semester. MathXL homework can be worked on until all questions are correct. You have unlimited tries on each MathXL homework. Always **save or submit** your work. Unsaved work will be lost. The instructor **will not** be collecting any written work used to obtain the solutions to the homework assignments and partial credit will not be applied to online homework. Your final grade for the homework will be recorded once you have completed the corresponding unit exam.

Quizzes (15%)

There will be 12 quizzes assigned online through MathXL. You only have three tries for each quiz. Only the highest quiz score will be used for grade calculation. You must hit the **"Submit"** button to score your quiz. The instructor will not be collecting any written work used to obtain the solutions to the quizzes and partial credit will not be applied to online quizzes. Your highest grade will be recorded once you complete the corresponding unit exam.

Projects (15%)

There will be three written project assignments that you will submit to the course assignment pages. These assignments will need to be scanned to digital format to show the work you did as part of the assignment. Alternatively, you may show your work using Microsoft Word Equation Editor or MathType. All work must be shown for all of your project conclusions and the solutions should be well-organized so that any reader can follow the process and logic you used. If your project work is handwritten, please give yourself plenty of space in which to write solutions. Be careful of the edges because scanners may crop the page. Your efforts to hand in neat and carefully done work will be greatly appreciated.

Exams (55%)

You will complete four exams for this course, worth a total of 55% of your overall grade. The first three exams will account for 60% of your course exam score (20% for each exam). The fourth exam, the final, will account for 40% of your course exam score. The final exam will be a cumulative exam, and will cover course material from units 1 -

6. You will complete all exams within D2L, and will use Examity proctoring system. You may bring five pages of blank 8½" x 11" paper. Remember to write your name at the top of each page and write your solutions clearly. The use of a calculator is permitted.

In compliance with the Examity proctoring system, no cell phones are allowed to be present during the taking of the exam. The formula card and statistics distribution tables will be provided to you along with the exams.

Though you don't need to do the problems in the order presented, you must clearly indicate to which problem your written work belongs. The number of the problem should be written large and circled at the start of the written work, and the work should be separated from other problems with a line. Show your work clearly and circle your final answer. **After you have finished and submitted the Exam in canvas, you will have to scan your sheets and upload your written work for each question into the canvas to receive credit for the exam.** Make sure to have suitable arrangements for this. If you've written on the back of any sheets, be sure you scan those as well. This will help you get partial credit when your answer is wrong but most of your work is correct; partial credit is given for providing part of a solution, so remember to show all appropriate work on to receive maximal credit. You will have a maximum of 120 minutes to complete the exam. Read each question carefully before responding. If you don't know how to start a problem or get stuck, skip it and return to it later.

Exam Method: Online with Proctoring

This course requires all students to complete exams online with a proctoring service. Students receive one attempt on each exam.

Grading Scale

The following grading scale is used to evaluate all course requirements and determine your final grade. Grades will always be rounded up to the nearest tenth.

Grade	Percentage
A	93–100
AB	88–92.9
B	83–87.9
BC	78–82.9
C	70–77.9
D	60–69.9
F	Below 60

Pass/Fail Option

Students who enroll in an Independent Learning course under the pass/fail option will receive a final grade of S in place of a final grade equivalent to an A, AB, B, BC, or C, and a final grade of U in place of a final grade equivalent to a D or F.