Math 1150 Introduction to Statistics

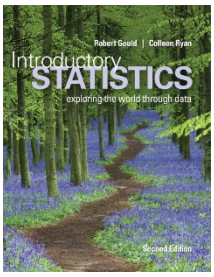
Instructor Information:

Name:

Office Phone: Office:

Email:

Office hours:



Required: Access Code to MyStatLab which includes the eText. Help with registering: MyStatLab Help

Optional: Printed copy of the textbook: Essential STATISTICS by Robert Gould and Colleen Ryan 2nd edition. A copy of the textbook is on reserve for library use only at the front of Jerome Library. If you prefer to purchase the printed copy of the book, you have to buy the book with the access code included. Some books on the market do NOT include the access code.

Calculator: You will need a scientific calculator.

Prerequisites: Two years high school algebra, one year of geometry and a satisfactory placement exam score.

General Description: The main objective of MATH 1150 is to give the non-mathematical student an elementary introduction to the practice of statistics. This course will give insight into how a statistician gathers, summarizes, and draws conclusions from data. We are surrounded everyday by numerical information and graphical material. At the end of the course, the student should be a critical consumer of this information.

Reading Quiz and Homework: Reading Quizzes and Chapter HW are found in MyStatLab. Book Homework will consist of assigned exercises from the text that will be submitted online. The more homework you can type (instead of handwriting and taking a picture) the easier it is for me to grade. **Your lowest 2 assignments among the reading quizzes and homework will be dropped**. All due dates and times are subject to change in accordance to the progress of the course.

Activity: There will be activities over the concepts covered throughout the semester. **One of the lowest activity scores will be dropped**.

Project: There will be projects over the concepts submitted throughout the semester. Some of these will be discussion posts and other will be submitted online in Canvas through the assignments. You should start the project at least a week before they are due so that you can receive help with them if needed. You MAY be given permission to resubmit projects; do not rely upon this. If you are given permission to resubmit you must complete it within 1 week of the date permission was given. **One of the lowest project scores will be dropped**.

Exam: Two exams, Exam 1 and 2, would be given throughout the semester.

Your final grade in the class will be calculated based on the performance on Reading Quiz and Homework (20%), Activity (10%), Project (20%), Exam 1 (25%), and Exam 2 (25%).

Grading Scale:

Grading Scale

- A 90% - 100%
- B 80% - 89.9%
- C 70% - 79.9%
- D 60% - 69.9%
- F 0% - 59.9%

Teaching Methods: The instructor will integrate teaching strategies including, but not limited to: video, activities, projects and homework. Throughout this course, students will be expected to work independently or in groups to learn about statistics.

Late Assignments: Late assignments will not be accepted

To be successful in Math 1150, students should be comfortable using a computer for the following functions:

- Using a word processor
- Using Inbox in Canvas (Links to an external site.)
- Downloading files and appropriate plugins
- Converting material to PDF documents
- Uploading documents to an assignment in Canvas (Links to an external site.)

Codes of Conduct and Academic Honesty Policy: The instructor and students in this course will adhere to the University's general Codes of Conduct defined in the BGSU Student Handbook. The Code of Academic Conduct (Academic Honesty Policy) requires that students do not engage in academic dishonesty. For details, refer to: Student Discipline Programs (Links to an external site.)

Department Mediator: (Links to an external site.) Dr. Kit Chan, 415 MSC, (419)-372-7468

If a student has a problem with this course, the student should first discuss the problem with the instructor. If the problem persists or is unresolved, the student should then contact the course coordinator (math1150@bgsu.edu, Xiaofen Zhang). If the problem is still unresolved, the student should finally contact the department mediator.

Dropping the Course (Links to an external site.): During the first 14 calendar days of the semester, students may drop this course with no record on their transcript. After the second week, students must follow the formal withdraw policy. It is the student's responsibility to obtain the Add/Drop form and submit it to the appropriate University office.

BGSU Learning Commons

Additional Resources: Tutoring at the Learning Commons website (Links to an external site.) is a free service for all BGSU students enrolled in any course at BGSU. The Learning Commons is located on the first floor of Jerome Library. In addition to tutoring, the center also offers resources such as textbooks, computers, calculators, a variety of handouts, and a lending library. For this semester's hours of operation, please visit their .

Technology Support Center (TSC): Provides a central point of contact for faculty, staff and students for questions, problem reports, service requests and inquiries for University computer systems and communications technologies at BGSU. Email: tsc@bgsu.edu Phone: (419) 372-0999.

Office of Accessibility Services (Links to an external site.): In accordance with the University policy, if the student has a documented disability and requires accommodations to obtain equal access in this course, he or she should contact the instructor at the beginning of the semester and make this need known. Students with disabilities must verify their eligibility through the Office of Accessibility Services (Links to an external site.), 38 College Park, 419-372-8495.

Student veteran-friendly campus: BGSU educators recognize student veterans' rights when entering and exiting the university system. If you are a student veteran, please communicate with your instructor so reasonable accommodations can be made for absence when drilling or being called to active duty
(See http://www.bgsu.edu/nontraditional-and-military-students/veterans.html (Links to an external site.) for more information)
Religious Holidays: It is the policy of the University to make every reasonable effort to allow students to observe their religious holidays without academic penalty. In such cases, it is the obligation of the student to provide the instructor with reasonable notice of the dates of religious holidays on which he or she will be absent. Absence from classes or examinations for religious reasons does not relieve the student of responsibility for completing required work missed. Following the necessary notification, the student should consult with the instructor to determine what appropriate alternative opportunity will be provided, allowing the student to fully complete his or her academic responsibilities. (As stated in The Academic Charter, B-II.G-4.b
at: https://www.bgsu.edu/faculty-senate/academic-charter.html (Links to an external site.).)

- **Chapter 1 – Introduction to Data**
  - 1.1 – What Are Data?
  - 1.2 – Classifying and Storing Data
  - 1.3 – Organizing Categorical Data
  - 1.4 – Collecting Data to Understand Causality
- **Chapter 2 – Picturing Variation with Graphs**
  - 2.1 – Visualizing Variation in Numerical Data
  - 2.2 – Summarizing Important Features of a Numerical Distribution
  - 2.3 – Visualizing Variation in Categorical Variables
  - 2.4 – Summarizing Categorical Distributions
  - 2.5 – Interpreting Graphs
- **Chapter 3 – Numerical Summaries of Center and Variation**
  - 3.1 – Summaries for Symmetric Distributions
  - 3.2 – What's Unusual? The Empirical Rule and *z*-Scores
  - 3.3 – Summaries for Skewed Distributions

    - 3.4 – Comparing Measures of Center
- **Chapter 4 – Regressions Analysis: Exploring Associations between Variables**
    - 4.1 – Visualizing Variability with a Scatterplot
    - 4.2 – Measuring Strength of Association with Correlation
    - 4.3 – Modeling Linear Trends
    - 4.4 – Evaluating the Linear Model
- **Chapter 5 – Modeling Variation with Probability**
    - 5.1 – What is Randomness?
    - 5.2 – Finding Theoretical Probabilities
    - 5.3 – Associations in Categorical Variables
    - 5.4 – Finding Empirical Probabilities
- **Chapter 6**

  The Law of Large Numbers

  The Law of Large Numbers

  – Modeling Random Events: The Normal Model

    - 6.1 – Probability Distributions Are Models of Random Experiments
    - 6.2 – The Normal Model
- **Chapter 7 – Survey Sampling and Inference**
    - 7.1 – Learning about the World through Surveys
    - 7.2 – Measuring the Quality of a Survey
    - 7.3 – The Central Limit Theorem for Sample Proportions
    - 7.4 – Estimating the Population Proportion with Confidence Intervals
- **Chapter 8 – Hypothesis Testing for Population Proportions**
    - 8.1 – The Essential Ingredients of Hypothesis Testing
    - 8.2 – Hypothesis Testing in Four Steps
    - 8.3 – Hypothesis Tests in Detail
- **Chapter 9 – Inferring Population Means**
    - 9.4 – Hypothesis Testing for Means

Course Learning Outcomes:

1. Select and produce appropriate graphical, tabular, and numerical summaries of the distributions of variables in a data set. Summarize such information into verbal descriptions.
2. Summarize relationships in bivariate data using graphical, tabular, and numerical methods including scatter plots, two-way tables, correlation coefficients, and least squares regression lines. Investigate and describe the relationships or associations between two variables using caution in interpreting correlation and association.
3. Use the normal distribution to interpret *z*-scores and compute probabilities.
4. Understand the principles of observational and experimental studies including sampling methods, randomization, replication and control. Understand how the type of data collection can affect the types of conclusions that can be drawn.

5. Construct a model for a random phenomenon using outcomes, events, and the assignment of probabilities. Use the addition rule for disjoint events and the multiplication rule for independent events. Compute conditional probabilities in the context of two-way tables.
6. Introduce the concept of a sampling distribution. Discuss the distribution of the sample proportion under repeated sampling (Central Limit Theorem). Students should be expected to simulate or generate sampling distributions to observe, empirically, the Central Limit Theorem.
7. Estimate a population proportion using a point estimate and confidence intervals, and interpret the confidence level and margin of error. Understand the dependence of margin of error on sample size and confidence level.
8. Given a research question involving a single population, formulate null and alternative hypotheses. Describe the logic and framework of the inference of hypothesis testing. Make a decision using a *p*-value and draw an appropriate conclusion. Interpret statistical significance.
9. Carry out a hypothesis test for both a proportion and a mean. Interpret statistical and practical significance in this setting and two types of mistakes.

BGP Quantitative Literacy Learning Outcomes (Links to an external site.):

1. Interpret mathematical and statistical models such as formulas, graphs, tables, and schematics, and draw inferences from them
2. Represent mathematical and statistical information symbolically, visually, numerically, and verbally
3. Use arithmetical, algebraic, geometric and statistical methods to solve problems
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results
5. Recognize that mathematical and statistical methods are based on assumptions and have limits