Math 1150: Introduction to Statistics

Course Syllabus

Instructor Information:

Name: Kelsey Dotson

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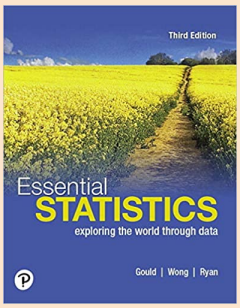
Room: 216 JH

Office Hours: By appointment. Please email Mrs. Dotson to set up a time as needed.

Course Information:



Textbook: *Essential STATISTICS* by Robert Gould, Colleen Ryan and Rebecca Wong; 3rd edition, 2021. Pearson Education Inc.

Required: Access to MyStatLab provided by AWLS. Help with registering: MyStatLab Help

All AWHS students will receive a hard copy of the textbook. There is an online version available through MyStatLab. All textbooks will be returned at the end of the semester.

Calculator: You will need a scientific calculator such as Casio FX Blue Scientific Calculator. Any graphing calculator (e.g., TI 84 or TI 86) will not be allowed to use for course work.

Statistics Software: The software StatCrunch is provided by Pearson in MyStatLab. It is sufficient for all computing jobs of the course and no other statistics software is needed.

Prerequisites: Two years of 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.

Homework:

Homework assignments will be posted in Canvas linking with MyStatLab, the Pearson online homework system that is also accessible through the link MyLab and Mastering in the left panel on the Canvas. Please pay close attention to the due date and time of each homework assignment (see the module Assignments in Canvas). Late homework is unacceptable.

Tests:

There will be two tests. The test time is to be announced later. online and proctored at AWHS during normal class time. The grading scores of the tests will be recorded and reported in the Grades folder in Canvas.

Final grade in the class will be calculated based on the performance on Homework (40%), Test 1 (30%) covering Chapters 1-4, and Test 2 (30%) covering Chapters 5-9.

Grading Scale:

A 90% - 100%
B 80% - 89.99%
C 70% - 79.99%
D 60% - 69.99%
F 0% - 59.99%

Teaching Methods:

This is a hybrid course. The instructor will highlight concepts for each section in class and there will be some online videos to supplement instruction as well. In addition to the textbook, PPT slides and videos on the topics covered will be posted in Canvas. All homework assignments and tests are available through Canvas.

Late Assignments:

Late assignments will not be acceptable.

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

- Using a word processor (changing font, spell check, etc.)
- Downloading files and appropriate plugins
- Taking pictures of your handwritten math work for uploading
- 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:

Dr. Kit Chan, 415 MSC, (419)-372-7468, kchan@bgsu.edu.

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

Intellectual Property:

All course materials posted in Canvas are protected by U.S. copyright law and by the University policy. You can make copies of the course materials for your own use, but you may not share with a tutor or a student currently enrolled in the same course that has a different instructor.

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:

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 send him a copy of the letter obtained through the Office of Accessibility Services (Links to an external site.), 38 College Park, 419-372-8495.

Course Contents:

Chapter 1 – Introduction to Data
1.1 – What Are Data?
1.2 – Classifying and Storing Data
1.3 – Investigating Data
1.4 – Organizing Categorical Data
1.5 – 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
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 NumbersThe 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:

- Select and produce appropriate graphical, tabular, and numerical summaries of the distributions of variables in a data set. Summarize such information into verbal descriptions.
- 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.
- Use the normal distribution to interpret z-scores and compute probabilities.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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:

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