straighterline

Syllabus

MAT150 | **Business Statistics**

Course Text

Lind, Douglas A., William G. Marchal, and Samuel A. Wathen. *Basic Statistics for Business & Economics.* 2024 Release, McGraw-Hill Education.

The text is provided digitally as part of the course enrollment. Students may find used, new, or rental print copies by searching for the ISBN.

Course Description

This course introduces students to fundamental concepts in business statistics, covering both the scope and limitations of statistical analysis. Students learn to analyze sample data, compute and interpret measures of central tendency and variability, and apply descriptive statistical methods. The course includes linear and multiple regression, as well as correlation analysis. Following an introduction to probability, students work with discrete and continuous probability distributions. Key inferential topics include confidence intervals, hypothesis testing for one and two samples, and analysis of variance (ANOVA) in both one-way and two-way designs. Nonparametric methods are briefly covered, focusing on chi-square tests for categorical data.

Learning Outcomes

After completing this course, students will be able to:

1. Define statistics and identify its scope and limitations.
2. Describe and apply the basic concepts in statistics.
3. Apply sampling methods and the Central Limit Theorem to perform statistical analyses of samples and predict population behavior.
4. Compute and interpret measures of location and dispersion.
5. Represent statistical data in different forms and interpret various representations.
6. Perform linear regression and correlation analysis.
7. Perform multiple regression and correlation analysis.
8. Describe the basic concepts of probability.
9. Describe and apply discrete and continuous probability distributions.
10. Conduct hypothesis tests based on one or two samples.
11. Perform one-way and two-way analyses of variance (ANOVA).
12. Apply nonparametric methods of statistical analysis.

Course Prerequisites

There are no prerequisites for this course.

Academic Integrity Statement

Academic integrity is the pursuit of scholarly activity in an honest, truthful and responsible manner. Violations of academic integrity include, but are not limited to, plagiarism, cheating, fabrication and academic misconduct. Failure to comply with the Academic Integrity Policy can result in a failure and/or zero on the attempted assignment/examination, a removal from the course, disqualification to enroll in future courses, and/or revocation of an academic transcript.

Course Completion Policy

In order for a course to be considered complete, **all required coursework must be attempted, submitted, and graded.** Required coursework consists of graded assignments. Any Academic Integrity Policy violations may prevent a course from being considered complete.

Assessment Types

StraighterLine courses may include any combination of the assessment types described below. Review the descriptions to learn about each type, then review the Course Evaluation Criteria to understand how your learning will be measured in this course.

Benchmarks

Benchmarks are timed, multiple-choice exams that test your mastery of course concepts. You have 3 attempts, and your highest score counts. **Note:** Cumulative Benchmarks (final exams) only allow 1 attempt.

Capstones

Capstones are project-based assessments that help you apply concepts to real-world scenarios. You have 2 attempts, and your highest score counts.

Checkpoints

Checkpoints are quick knowledge checks on important course concepts. They are untimed, open-book, with 1-3 attempts allowed, and your highest score counts.

AI Use-Case Policies

StraighterLine Capstone assessments operate under one of three AI Use-Case Policies. These designations are selected intentionally to support learners in developing digital literacy, ethical reasoning, and authentic communication skills. Each model requires students to engage meaningfully with the course outcomes while adhering to academic standards.

Independent Work Requirement: Capstones with this designation must be completed independently without using AI tools. The goal is for learners to showcase their own understanding and skills without AI assistance. Students are expected to generate and submit original work developed solely through their own reasoning and effort.

AI-Assisted Planning Option: Capstones with this designation may allow AI tools to support brainstorming and assessment planning. If allowed, students will be asked to document any AI assistance by noting how it informed their work. Documentation must be included within the assignment or in a designated reflection field. Examples include describing how an AI tool helped organize an outline, generate ideas, or surface sources for further exploration.

AI-Integration Requirement: Capstones with this designation require AI tools as part of the learning process. Students will be asked to reflect upon their AI interactions and AI contributions to the assessment. Reflections must include which tools were used, how they were used, and what insights students gained from the process. This promotes transparency, ethical use, and metacognitive skill-building.

Course Evaluation Criteria

Your score provides a percentage score and letter grade for each course. A passing percentage is 70% or higher.

There are a total of 1000 points in the course:

Assessment	Points	Learning Outcomes
Checkpoint 1: Statistics: An Introduction and Basic Concepts	5	1, 2
Checkpoint 2: Descriptive Statistics: Numerical Measures	5	4
Checkpoint 3: Descriptive Statistics: Graphical Representations	5	5
Benchmark 1: Checkpoints 1-3	125	1, 2, 4, 5
Checkpoint 4: Probability	5	8
Checkpoint 5: Discrete and Continuous Probability Distributions	5	9
Checkpoint 6: Sampling, Sampling Methods, and the Central Limit Theorem	5	3
Benchmark 2: Checkpoints 4-6	125	3, 8, 9
Benchmark 3: Checkpoints 1-6	180	1, 2, 3, 4, 5, 8, 9
Checkpoint 7: Confidence Intervals	5	3
Checkpoint 8: Tests of Hypothesis	5	10
Benchmark 4: Checkpoints 7-8	125	3, 10
Checkpoint 9: Analysis of Variance	5	11
Checkpoint 10: Correlation and Linear Regression	5	6
Checkpoint 11: Multiple Regression Analysis	5	7
Checkpoint 12: Nonparametric Methods: Nominal-Level Hypothesis Tests	5	12
Benchmark 5: Checkpoints 9-12	125	6, 7, 11, 12
Benchmark 6: Checkpoints 1-12	260	1-12
Total	**1000**	

Course Roadmap

This roadmap provides an overview of the checkpoints and lessons covered in this course.

Checkpoint 1: Statistics: An Introduction and Basic Concepts

- Why Study Statistics?

- What is Meant by Statistics?
- Types of Statistics
- Types of Variables
- Levels of Measurement

Checkpoint 2: Descriptive Statistics: Numerical Measures

- Measures of Location
- Why Study Dispersion?
- Interpretation and Uses of the Standard Deviation

Checkpoint 3: Descriptive Statistics: Graphical Representations

- Graphic Representation of Qualitative Data
- Graphic Presentation of a Distribution
- Dot Plots
- Measures of Position
- Box Plots
- Skewness
- Describing the Relationship between Two Variables
- Contingency Tables

Checkpoint 4: Probability

- What is a Probability
- Approaches to Assigning Probabilities
- Rules of Addition for Computing Probabilities
- Rules of Multiplication to Calculate Probabilities

Checkpoint 5: Discrete and Continuous Probability Distributions

- What is a Probability Distribution
- Random Variables
- Binomial Probability Distribution
- Poisson Probability Distribution
- The Family of Normal Probability Distributions
- The Standard Normal Probability Distribution

Checkpoint 6: Sampling, Sampling Methods, and Central Limit Theorem

- Research and Sampling
- Sampling Methods
- Sample Mean As a Random Variable
- Sampling Distribution of the Sample Mean
- The Central Limit Theorem
- Standard Error of the Mean
- Using the Sampling Distribution of the Sample Mean
- The Sampling Distribution of the Sample Proportion

Checkpoint 7: Confidence Intervals

- Point Estimate for a Population Mean
- Confidence Intervals for a Population Mean

- A Confidence Interval for a Population Proportion
- Choosing an Appropriate Sample Size

Checkpoint 8: Tests of Hypothesis

- What is Hypothesis Testing?
- Six-Step Procedure for Testing a Hypothesis
- One-Tailed and Two-Tailed Hypothesis Tests
- Hypothesis Testing for a Population Mean: Known Population Standard Deviation
- p-Value in Hypothesis Testing
- Hypothesis Testing for a Population Mean: Population Standard Deviation Unknown
- Test a Hypothesis of a Population Proportion
- Two-Sample Tests of Hypothesis: Independent Samples
- Comparing Population Means with Estimated Population Standard Deviations
- Two-Sample Tests of Hypothesis: Dependent Samples
- Comparing Dependent and Independent Samples
- Two-Sample Tests about Proportions

Checkpoint 9: Analysis of Variance

- ANOVA: Analysis of Variance
- Inferences about Pairs of Treatment Means
- Two-Way Analysis of Variance
- Two-Way ANOVA with Interaction

Checkpoint 10: Correlation and Linear Regression

- What is Correlation Analysis?
- The Correlation Coefficient
- Regression Analysis
- Testing the Significance of the Slope
- Evaluating a Regression Equation's Ability to Predict

Checkpoint 11: Multiple Regression Analysis

- Multiple Regression Analysis
- Evaluating a Multiple Regression Equation
- Inferences in Multiple Linear Regression
- Evaluating the Assumptions of Multiple Regression
- Qualitative Independent Variables

Checkpoint 12: Nonparametric Methods: Nominal-Level Hypothesis Tests

- Goodness-of-Fit Tests: Comparing Observed and Expected Frequency Distributions
- Limitation of Chi-Square
- Testing the Hypothesis That a Distribution is Normal
- Contingency Table Analysis

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