University of Massachusetts Global A private nonprofit affiliate

Course Number, Title and Credits

MATU 203 - Introduction to Statistics - 3 credits

Course Description

This course presents an introduction to statistics and its practical applications. Topics include methods of sampling, graphical representation of data, descriptive statistics, elementary probability principles, discrete and continuous random variables, probability distributions, Central Limit Theorem, confidence intervals, hypothesis testing, correlation and regression, goodness-of-fit, and contingency tables. Students will explore the use of data analysis and statistical methods in the disciplines of business, health sciences, education, and social sciences. Computer software for statistical analysis of application problems is required.

Prerequisite: MATU 099 Intermediate Algebra or higher

Course Learning Outcomes

1. Define and interpret basic statistical concepts.
2. Calculate and analyze descriptive statistics.
3. Create and understand graphs and charts.
4. Understand basic probability theory.
5. Compute and analyze confidence intervals.
6. Perform hypothesis tests (demonstrate understanding of null/alternative hypothesis, one/two tailed tests, significance levels, significance test, p-values).
7. Calculate and interpret inferential statistics.
8. Determine which statistical procedure to use and interpret statistical outcomes.
9. Apply knowledge of statistics to a cumulative final project.

Required Textbooks

Introduction to Statistics and Data Analysis, Peck, Olsen and Devore, 3ed, Brooks/Cole.

Letter Grade/Percentage Equivalents

Grades are determined on a straight-scale basis using the following scales.

A	94%-100%	A-	90%-93%	B+	87%-89%
B	84%-86%	B-	80%-83%	C+	77%-79%
C	74%-76%	C-	70%-73%	D+	67%-69%
D	64%-66%	D-	60% - 63%	F	59% and below

Methods of Evaluation for Determining Grades

Assignment Detail for Course:

Assignments	**Possible Points**
Homework	230
Quizzes	360
Midterm Exam	110
Final Exam	300
Total Points Possible in Course	**1000**

Course Outline (Tentative):

Module	**Topics&Assignments**
Module 1	**Introduction to Statistics** ● What is statistics? ● Populations, samples, variables ● Types of data ● Observational vs. experimental studies ● Sampling designs (simple random, stratified, cluster, systematic) ● Bias and survey pitfalls

	• **Homework 1** • **Quiz 1**
Module 2	**Collecting Data Sensibly** • Types of data and variables (categorical vs. quantitative) • Populations, samples, and parameters vs. statistics • Sampling methods and sources of bias • Observational studies versus experiments • Principles of good study design and data collection • **Homework 2** • **Quiz 2**
Module 3	**Graphical Methods for Describing Data** • Dotplots and stem-and-leaf displays • Histograms and frequency distributions • Bar charts, pie charts, and time series plots • Identifying shape, center, spread, and outliers from graphs • Recognizing misleading or poorly constructed graphs • **Homework 3** • **Quiz 3**
Module 4	**Numerical Methods for Describing Data** • Measures of center (mean, median, mode) • Measures of variability (range, variance, standard deviation, IQR) • Percentiles, quartiles, and the five-number summary • Identifying and interpreting outliers numerically • Choosing appropriate numerical summaries for different distributions • **Homework 4** • **Quiz 4**
Module 5	**Summarizing Bivariate Data** • Scatterplots and interpretation of association • Direction, strength, and form of relationships • Correlation and its properties • Cautions about interpretation, including association vs. causation • **Homework 5** • **Quiz 5** • **Midterm Exam**
Module 6	**Probability** • Basic probability concepts and sample spaces • Probability rules, including complements and unions • Disjoint and independent events • Conditional probability • Tree diagrams and probability for compound events • **Homework 6** • **Quiz 6**
Module 7	**Random Variables and Probability Distributions** • Definition of random variables

	• Discrete versus continuous random variables • Probability distributions and distribution properties • Expected value, variance, and standard deviation • Common discrete distributions and interpretation • **Homework 7** • **Quiz 7**
Module 8	**Confidence Intervals** • Confidence intervals for population means (z and t) • Confidence intervals for population proportions • Interpreting confidence level and confidence intervals • Choosing sample size • **Homework 8** • **Quiz 8**
Module 9	**Simple Linear Regression, Correlation and Inference for Two Groups** • Review of correlation and linear association • Simple linear regression models and interpretation • Least-squares regression line and residuals • Using regression for prediction and the risks of extrapolation • Interpreting regression results and correlation with caution • Comparing group means and proportions • **Homework 9** • **Quiz 9** • **Final Exam**

Academic Integrity

The University of Massachusetts Global is an academic community based on the principles of honesty, trust, fairness, respect and responsibility. Academic integrity is a core University value, which ensures respect for the academic reputation of the University, its students, faculty and staff, and the degrees it confers. The University expects that students will conduct themselves in an honest and ethical manner and respect the intellectual work of others.

Submitting to faculty work completed by the use of any artificial intelligence tool without permission and/or when prohibited by class policy. When faculty require the use of technology, including artificial intelligence, as a part of an assignment for the course, there is no violation. Students are reminded to consult syllabi, assignment sheets/rubrics, program documents and their faculty. Use of artificial intelligence, when permitted, must be correctly cited in the assignment.

The UMass Global online library provides resources to support research, proper citation styles, and the safe and responsible use of generative artificial intelligence or Gen AI.

- The Academic Integrity and Plagiarism Avoidance page provides guidance to help students better understand academic integrity and includes tips on how to avoid plagiarism.
- The Citing Sources page offers guidance on how to properly cite using APA, MLA, and Chicago

styles.

- The Artificial Intelligence Resource Guide for Students provides advice for understanding and appropriately using generative artificial intelligence tools such as ChatGPT and Bard.

UMass Global's Office of Accessible Education

Students who require disability-related services or accommodations to access their educational experience can register with the Office of Accessible Education (OAE). The Office of Accessible Education (OAE) is committed to ensuring equal educational access and opportunity for all members of our academic community. Students will be provided equitable and reasonable accommodations and services that are in compliance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 (ADA)/Americans with Disabilities Act Amendments Act of 2008 (ADAA). Registration with OAE is on a voluntary, self-identifying basis. Please visit the Office of Accessible Education (OAE) website for more information about how to register for services, eligibility requirements, and information about potential academic accommodations and services.

Our university is committed to ensuring equal access for all students. Let us know about any accessibility barriers you encounter using any of our online systems or websites by submitting a Feedback or Accessibility Concern Submission Form. We'll do our best to improve things and get you the information you need.

UMass Global’s CARES Team

The CARES team is a campus-wide team of appointed staff and faculty responsible for identifying, assessing, and responding to concerns and/or disruptive behaviors by students, faculty/staff, and community members who struggle academically, emotionally, or psychologically, or who present a risk to the health or safety of the university or its members.

Individuals may refer themselves or other community members of concern by emailing cares@umassglobal.edu or by filling out a referral form here. The CARES Team provides short term assessment, intervention, support, and recommendations of resources to those referred and engaged in the process.

UMass Global's Title IX Statement

The University of Massachusetts Global strives to maintain and foster a climate that promotes respect and human dignity. Sexual misconduct and relationship violence in any form is antithetical to the university’s mission and core values, violates university policies, and may also violate federal and state law. The office of Title IX is primarily concerned for students' safety and well-being and is tasked with investigating all reports of sexual misconduct experienced by our community members. Title IX prohibits

sex-based and gender-based discrimination and harassment, which includes discrimination based on pregnancy and/or pregnancy-related complications, parental status, and marital status. Students expecting or experiencing pregnancy-related complications, that may require educational accommodations, should contact the University's Title IX Coordinator and/or the Office of Accessible Education.

The University and Title IX's prohibition of sex discrimination also covers sexual harassment, sexual violence, and any other form of sexual misconduct. We offer options and resources to all students affected by these issues and are committed to providing a fair, thorough, and prompt investigation and adjudication process. If you or someone you know has been impacted by sexual assault, dating, and domestic violence, stalking, or sexual exploitation, please visit the University's Title IX Resource Page to access additional resources and information.

UMass Global's staff and faculty are tasked with reporting any possible sex or gender-based discrimination or Title IX violations to the University's Title IX Coordinator at civilrightscomplaints@umassglobal.edu.

Click on this Link to our University Title IX Policy