

Effective Fall 2018, 2019/20

Required Syllabus Information – all must be included in the course syllabus

MAT 135

Credits: 3

Long Title: Introduction to Statistics: GT-MA1

Course Description: Introduces descriptive and inferential statistics, with an emphasis on critical thinking and statistical literacy. Topics include methods of data collection, presentation and summarization, introduction to probability concepts and distributions, and statistical inference of one and two populations. This course uses real world data to illustrate applications of a practical nature.

Guaranteed Transfer (GT) Pathways Course Statement:

The Colorado Commission on Higher Education has approved MAT 135 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-MA1 category. For transferring students, successful completion with a minimum C- grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to [CDHE GT Pathways Information](#).

MATHEMATICS CONTENT CRITERIA GT-MA1

- a) Demonstrate good problem-solving habits, including:
 - Estimating solutions and recognizing unreasonable results.
 - Considering a variety of approaches to a given problem, and selecting one that is appropriate.
 - Interpreting solutions correctly.
- b) Generate and interpret symbolic, graphical, numerical, and verbal (written or oral) representations of mathematical ideas.
- c) Communicate mathematical ideas in written and/or oral form using appropriate mathematical language, notation, and style.
- d) Apply mathematical concepts, procedures, and techniques appropriate to the course.
- e) Recognize and apply patterns or mathematical structure.
- f) Utilize and integrate appropriate technology.

COMPETENCIES & STUDENT LEARNING OUTCOMES FOR GT-MA1

Quantitative Literacy:

- 1. Interpret Information**
 - a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
- 2. Represent Information**
 - a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).
- 3. Perform Calculations**
 - a. Solve problems or equations at the appropriate course level.
 - b. Use appropriate mathematical notation.
 - c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.
- 4. Apply and Analyze Information**

- a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.
- b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.
- c. Make judgments based on mathematical analysis appropriate to the course level.

5. Communicate Using Mathematical Forms

- a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

SYSTEM REQUIREMENTS:

REQUIRED LEARNING OUTCOMES

- 1. Communicate the language of statistics using the appropriate terminology.
- 2. Analyze numerical summaries and graphical displays of sample data.
- 3. Analyze bivariate data by applying the concepts of correlation and regression.
- 4. Apply the basic rules of probability.
- 5. Utilize the appropriate probability distribution.
- 6. Make inferences about one or more populations using sample data.
- 7. Utilize technology to further statistical understanding and reasoning.

REQUIRED TOPICAL OUTLINE

The required topical outline information **MUST** be included in the syllabi. It may be incorporated using one of the following variations: copying the topical outline as written below, integrating the topics within the assignment schedule, or listing the topics to be covered.

- I. The language and appropriate terminology of statistics.
 - a) Introduction to experimental vs observational studies
 - b) Introduction to qualitative vs quantitative studies
 - c) Introduction to the research process
 - d) Introduction to sources of bias
 - e) Population vs samples
 - f) Parameters vs statistics
 - g) Types of data (discrete/continuous, quantitative/qualitative)
 - h) Types of variables (lurking/confounding/explanatory/response)
 - i) Sampling techniques (random/systematic/stratified/cluster/convenience)
 - j) Relevance of statistics to scientific and other real-world problems
- II. Numerical summaries and graphical displays of sample data
 - a) Frequency distribution tables including construction
 - b) Graphical displays of qualitative and quantitative data including construction
 - c) Distribution shapes (modality and skew)
 - d) Measures of central tendency including calculations with or without technology
 - e) Measures of variation including calculations with or without technology
 - f) Measures of relative position including calculations with or without technology
- III. Bivariate data by applying the concepts of correlation and regression
 - a) Scatter plots including construction
 - b) Correlation including calculations with or without technology

- c) Linear regression
- IV. Fundamentals of probability
 - a) Law of Large Numbers
 - b) Addition and multiplication rules
- V. Probability distribution
 - a) Introduction to discrete probability distributions
 - b) Binomial distributions
 - c) Normal distributions
- VI. Inferences about one or more populations using sample data
 - a) The Central Limit Theorem
 - b) Sample size for mean and proportion
 - c) Confidence intervals for one and two populations
 - d) Hypothesis tests for one and two populations
- VII. Technology to further statistical understanding and reasoning

RECOMMENDED TOPICAL OUTLINE

- I. Bivariate data by applying the concepts of correlation and regression
 - a) Analysis of residuals
- II. Fundamentals of probability
 - a) Introduction to permutations and combinations
 - b) Complementary events
 - c) Conditional probability
- III. Inferences about one or more populations using sample data
 - a) Chi-square and goodness of fit tests
 - b) Introduction to Analysis of variance (ANOVA)

Syllabi requirements, including legal compliance information must be included. Individual College syllabi guidelines may include additional information. Please contact your VPI/CAO for specific College requirements.