*Approved: June 2025 Effective: Fall 2025*

|  |  |  |
| --- | --- | --- |
| **MATERIAL TO BE COVERED** | **SECTIONS**  **FROM TEXT** | **TIME LINE** |
| Introduction to statistics - descriptive statistics: summarizing data,  graphing, averages, dispersion statistics, and measures of relative position. (Optional: Data Exploration - skewness, kurtosis, boxplots) | Chapter 1 & 2.1,  2.3 – 2.6 | 5.5 Hours |
| Probability: fundamentals, addition rule, multiplication rule, complements. | 3.1 - 3.2 | 4 Hours |
| Discrete probability distributions: discrete random variables, mean,  variance and expected value. Properties of expected value and variance. Binomial random variable. (Optional: Moments, skewness, kurtosis for a discrete random variable, the Poisson random variable.) | 4.1 & 4.4  Optional: 4.2 & 4.3 | 4 Hours |
| Continuous Random variables: uniform, non-standard and standard normal probability distributions. Finding scores when given probabilities. | 5.1 - 5.3 | 4 Hours |
| Sampling distributions for sample proportions and sample means. The  normal approximation of the binomial distribution. Estimation of population mean and proportion through confidence intervals, sample size and error. | 6.1 - 6.6 | 4 Hours |
| Hypothesis testing (single parameter): means, proportions, and mean  difference (with matched-pair samples) using the p-value approach and the critical value approach with *z*- and *t*-distributions. | 7.1 - 7.5 | 5 Hours |
| Hypothesis testing (two parameters): comparing two means using  independent samples, comparing two proportions. (Optional: confidence intervals for differences between parameters.) | 8.1 - 8.3  Optional: 8.4 | 4 Hours |
| Correlation and regression: linear correlation, linear regression.  Correlation inferences. Testing for Normality. | 9.1, 9.3 & 9.4 | 3 Hours |
| Applications of Chi square: multinomial experiments, contingency tables. | 10.1 - 10.2 | 2.5 Hours |
| Analysis of variance: one-way with equal and unequal sample sizes. | 11.1 | 2.5 Hours |
| Optional: Nonparametric tests. | Optional Chapter 12 |  |

3-unit class: hours total 42.5 (15 x 2 hours 50 minutes) – hours for exams + 2.5 hour final

This outline allows for 4 hours of exams.

NOTE: The course will include an introduction to the use of computers in statistics. Instructors are encouraged, where practical, to incorporate computer demonstrations and computer assignments in their courses. Between 10% and 15% of the course grade should be based on the students' ability to appropriately use computer software, interpret the results and turn in homework. The software used in the class will be determined by the instructor. Approximately 5% of the course grade should be based on a project involving a deep exploration of an application of statistics, or a study using statistical analysis devised and conducted by the student. Since this is an Honors class, topics should be presented in more depth and should include many current real-world applications.

Submitted by: Case, Chan, Chavez, DeWilde, Guth, Kim, Kirchgraber, Lancaster, Pyle, Troxell, Wohlgezogen

Math Department Policy can be found at: <https://www.mtsac.edu/math/departmentpolicy.html>