MATH-1500: BUSINESS PROBABILITY AND STATISTICS II

Cuyahoga Community College

Viewing:MATH-1500 : Business Probability and Statistics II

Board of Trustees:
2009-05-28

Academic Term:
2009-08-22

Subject Code
MATH - Mathematics

Course Number:
1500

Title:
Business Probability and Statistics II

Catalog Description:
Second of two-semester introductory sequence in probability and statistics, intended for students majoring in business. Includes study of inferences on means and proportions, analysis of variance, correlation, simple and multiple linear regression models, business applications and decision making, and the use of statistical software.

Credit Hour(s):
3

Lecture Hour(s):
3

Requisites

Prerequisite and Corequisite
MATH-1490 Business Probability and Statistics I, or departmental approval: equivalent coursework.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.

For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online athttp://www.tri-c.edu/accessprograms (http://www.tri-c.edu/accessprograms/). Blackboard accessibility information is available athttp://access.blackboard.com.

Eastern (216) 987-2052 - Voice
Metropolitan (216) 987-4344 – Voice. (216) 987-4048 – TTY.
Western (216) 987-5079 – Voice. (216) 987-5117 – TTY.
III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students' accounts. Therefore, attendance is recorded in the following ways:

• For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

• For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

IV. LEARNING OUTCOMES ASSESSMENT

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called ‘artifacts,’ for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

V. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdfYou must also comply with the College's Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes
Course Outcome(s):
Perform hypothesis tests to make data driven decisions and evaluate claims about population means and proportions for one and two samples.

Objective(s):
1. Determine the appropriate hypothesis test based upon a data set and verify test assumptions.
2. Formulate an appropriate null and alternative hypothesis.
3. Calculate Type II error probabilities.
4. Perform hypothesis tests using small and large samples.
5. Perform hypothesis tests with known and unknown population standard deviations.
6. Identify independent and dependent samples for hypothesis tests.
7. Use the result of a hypothesis test to draw an appropriate business conclusion.

**Course Outcome(s):**
Use statistical control charts to monitor a business process.

**Objective(s):**
1. Understand the concept of statistical control.
2. Construct and interpret a control chart for process location (x-bar chart).
3. Construct and interpret a control chart for process variation (R chart and/or s chart).

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**Course Outcome(s):**
Apply a single factor Analysis of Variance (ANOVA) to make inferences about the means of several populations.

**Objective(s):**
1. Understand and verify the ANOVA model assumptions.
2. Perform the calculations to complete the ANOVA table.
3. Perform a multiple comparison procedure to determine the significant differences between the means.
4. Use statistical software to find the ANOVA table and interpret the results.
5. Identify an ANOVA model - Completely Randomized Design vs. Randomized Block Design.

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**Course Outcome(s):**
Build a Simple Linear Regression model to solve problems involving prediction in business and other applications.

**Objective(s):**
1. Construct scatter plots to graphically represent the relationship between two variables.
2. Find the simple correlation coefficient to assess the appropriateness of performing a simple linear regression.
3. Calculate by hand and use statistical software to find the least squares estimates of the model parameters (slope and intercept).
4. Use the least squares line to compute a point prediction.
5. Identify and verify model assumptions.
6. Assess the strength of the model and find and interpret the simple coefficient of determination.
7. Perform and interpret test of significance of the regression parameters.
8. Use statistical software to find and interpret confidence intervals and prediction intervals.

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**Course Outcome(s):**
Build a Multiple Linear Regression model to solve problems involving prediction in business and other applications.

**Objective(s):**
1. Understand the concept of a multiple linear regression model.
2. Interpret the model parameters and estimate them using statistical software.
3. Use statistical software to perform inferences about an individual model parameter.
4. Use statistical software to find the multiple coefficient of determination, R², and adjusted R².
5. Interpret R² and the adjusted R² and use them to assess model fit.
6. Use statistical software to find confidence intervals and prediction intervals and interpret these intervals.

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**Course Outcome(s):**
Additional topics may be covered from the list below as time permits.

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**Course Outcome(s):**
Apply Chi-square tests and F test to solve different types of decision-making problems.

**Objective(s):**
1. Use the Chi-square tests for population variance, goodness-of-fit, and independence.
2. Use the F test for testing two population variances.

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**Course Outcome(s):**
Use the ANOVA Two-Way Factorial Design model to make inferences about the means of the treatments.
Objective(s):
1. Perform the calculations to complete the ANOVA table.
2. Perform a multiple comparison procedure to determine the significant differences between the means.
3. Use statistical software to find the ANOVA table and interpret the results.

Methods of Evaluation:
1. Periodic exams.
2. Quizzes.
3. Homework.
4. In class collaborative work.
5. Comprehensive final exam.

Course Content Outline:
1. Hypothesis Test on the mean of a population
   a. Large and small samples
   b. P-value to report test results
   c. Type II error probabilities
2. Hypothesis Test to compare two means
   a. Independent samples - large and small
   b. Equal variances
   c. Paired t-test
3. Inferences on proportions
   a. Estimating a proportion
   b. Testing hypothesis on a proportion
   c. Comparing two proportions
4. Correlation and simple linear regression analysis
   a. Scatter plots and correlation coefficient
   b. The simple linear regression model
   c. Inferences on correlation and regression coefficients
5. Multiple linear regression model
   a. Notation, assumptions, development and assessment of the model
   b. Inferences on regression coefficients
   c. Estimation and prediction
6. Analysis of variance
   a. The assumptions, model and notation
   b. Treatment effects
   c. Statistical inferences
7. Use of technology
   a. Graphing calculators and software packages
   b. Interpretation of results
   c. Supplemental websites
8. Additional topics may be covered from the list below as time permits
9. Chi-square distribution and inferences on variances
   a. Chi-square table
   b. Interval estimation of population variance
   c. Hypothesis testing on population variance
   d. Multinomial distribution
   e. Goodness-of-fit test
   f. Test of Independence
10. The F distribution
    a. F table
    b. Comparing two variances
11. ANOVA two-way factorial design model
    a. Assumptions and notation
    b. ANOVA table
    c. Multiple comparison procedures
12. Statistical control charts
a. X-bar chart
b. R chart and s chart
c. Business applications

Resources


Resources Other
1. Various statistical software packages.
2. Publisher websites.

Instructional Services
OAN Number:
TMMSL and OBU009 (Course 2 of 2, both must be taken)

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