MATH-1410: ELEMENTARY PROBABILITY AND STATISTICS I

Cuyahoga Community College

Viewing: MATH-1410: Elementary Probability and Statistics I

Board of Trustees:
March 2020

Academic Term:
Fall 2020

Subject Code
MATH - Mathematics

Course Number:
1410

Title:
Elementary Probability and Statistics I

Catalog Description:
First of two-semester introductory sequence in probability and statistics. Intended for students majoring in liberal arts, business, sciences, engineering, and education. Includes study of descriptive statistics, elementary probability, probability distributions, normal distribution, binomial distribution, sampling concepts, sampling distribution of sample mean, estimation, and hypothesis testing.

Credit Hour(s):
3

Lecture Hour(s):
3

Lab Hour(s):
0

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
MATH-0965 Intermediate Algebra or MATH-1240 Contemporary Mathematics, or sufficient score on Math Placement Test, or departmental approval: equivalent coursework.

Note: MATH-1200, 1250, or 1280 completed prior to Fall 2016 or MATH-1270 completed prior to Summer 2017 will also meet prerequisite requirements for this course.

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 at https://www.tri-c.edu/student-accessibility-services/. Blackboard accessibility information is available at http://access.blackboard.com.

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 at http://www.tri-c.edu/student-resources/documents/studenthandbook.pdf.

VI. CORONAVIRUS/COVID-19 STATEMENT

Students are responsible for adhering to all College health and safety guidance, including that which relates to the COVID-19 pandemic. Public health requirements and standards are changing rapidly, and the College is adapting its guidance accordingly. Please check your Tri-C email and visit tri-c.edu/coronavirus regularly for updates. All students must adhere to the following general guidelines, until further notice:

• Remain at home if you are ill or experiencing symptoms of illness. Do not attend any in-person class or gathering.
• Notify your instructor(s) if you are ill, have tested positive for COVID-19, or were exposed to an individual who has tested positive for COVID-19 and they will report the information to the Tri-C Compliance & Risk Management team and you may be contacted for follow-up information.
• Wear a mask or face covering at all times, including, but not limited to: upon entering and exiting any Tri-C facility, in class, and in all common areas.
• Maintain a distance of at least six feet between yourself and others at all times and if you must pass near an individual do it quickly and do not linger.
• Provide the College with relevant information about your current health status and participate in any required on-site checks (e.g., temperature checks, current contact information, symptom profile, etc.).
• Use only designated areas of Tri-C facilities, including entrances and exits. Sign in and out of Tri-C facilities as directed.

The general guidelines listed above do not encompass all coronavirus-related guidance. These guidelines are subject to change at the discretion of the College and under the direction of public health authorities. Students who fail to adhere to this guidance may be subject to disciplinary action under the College's Student Code of Conduct and the Student Judicial Code.

Outcomes

Course Outcome(s):
Identify the characteristics of a well-designed statistical study and be able to critically evaluate aspects of a study.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
1. Distinguish between an observational study and an experimental study and discuss the advantages and disadvantages of each.
2. Identify variables, the population of interest, and the sampling technique.
3. Compare the various sampling techniques and the advantages and disadvantages of each.
4. Identify possible sources of bias and confounding variables.
5. Give several reasons why the results of a study would be challenged.
6. Interpret correlation vs. causation.

Course Outcome(s):
Use graphs and numerical summaries to interpret data.

Essential Learning Outcome Mapping:
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):
1. Calculate and interpret measures of center, relative position, dispersion, and shape.
2. Create and interpret bar graphs, pie graphs, histograms, frequency polygons, and box plots.

Course Outcome(s):
Create and use simple linear regression to describe bivariate data.

Essential Learning Outcome Mapping:
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.
Objective(s):
1. Construct scatter plots to represent variable relationships.
2. Calculate correlation and regression coefficients to determine their strength.
3. Use simple linear regression to find the line of best fit.
4. Recognize and interpret the difference between correlation and causation.

Course Outcome(s):
Compute the probability of single and multiple trial events.

Objective(s):
1. Compute the probability of compound events, independent events, disjoint events, as well as conditional probability.

Course Outcome(s):
Apply concepts of discrete random variables and their distributions for decision-making.

Objective(s):
1. Understand discrete random variables and find their distributions.
2. Calculate expected values.
3. Use a binomial random variable to determine probabilities.

Course Outcome(s):
Apply concepts of continuous random variables and their distributions for decision making.

Objective(s):
1. Identify the properties of the normal random variable.
2. Find areas under the normal curve.
3. Find probabilities using z-scores.

Course Outcome(s):
Compute point estimates and interval estimates to make inferences about populations.

Objective(s):
1. Calculate point estimates of a single mean and single proportion.
2. Identify the properties of the Central Limit Theorem and its applications.
3. Compute and interpret interval estimates of a single mean and single proportion.
4. Determine required sample sizes to carry desired interval estimates.

Course Outcome(s):
Perform hypothesis tests to evaluate claims about a single population mean and single population proportion.

Essential Learning Outcome Mapping:
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):
1. Determine the appropriate hypothesis test based upon a data set.
2. Identify and verify test assumptions.
3. Perform hypothesis tests using small and large samples.
4. Draw conclusions from the results of these tests.

Course Outcome(s):
Use a variety of technology, software packages and supplemental websites to solve probability and statistics problems.
Objective(s):
1. Use graphing calculators, Excel, and Minitab to perform statistical analysis, construct charts and graphs to solve probability and statistics problems.
2. Use supplemental websites to solve a variety of probability and statistical problems.

Methods of Evaluation:
1. Periodic exams.
2. Quizzes.
3. Homework.
4. In class collaborative work.
5. Projects employing technology and statistical software.
6. Comprehensive final exam.

Course Content Outline:
1. Foundational statistical terms
   a. Sampling techniques
   b. Population characteristics
   c. Study attributes
   d. Statistical misuses
2. Descriptive statistics
   a. Frequency distribution
   b. Measure of location
   c. Measure of Center
   d. Measure of variation
   e. Graphical displays of data
3. Relation between two variables
   a. Scatter plots
   b. Linear correlation coefficient
   c. Correlation versus causation
   d. Least squares regression line
4. Elementary probability
   a. Sample space and events
   b. Rules of probability
   c. Conditional probability
   d. Multiplicative property of a sequence of events
5. Probability distributions
   a. Random variable and its distribution
   b. Expected value of a random variable
   c. Mean and variance of a probability distribution
   d. Binomial distribution and its applications
   e. Normal distribution and its applications
6. Statistical inferences on population means
   a. Sampling techniques
   b. Sampling distribution and sampling concepts
   c. The central limit theorem
   d. Point and interval estimation on the mean
   e. Testing a hypothesis on the mean
   f. The normal distribution and its applications
   g. The t distribution and its application
7. Use of technology, software packages and websites
   a. Use graphing calculators and software packages for analysis
   b. How to interpret results
c. Use of supplemental websites

Resources


Resources Other

Instructional Services
OAN Number:
TMM010

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