Framingham State University

STAT 117 - Introduction to Statistics

Course Information

Semester	: Summer 2020 (29 June, 2020 – 31 July, 2020)
Credit	: 4
Teaching Hours	: 50 Hours
Time	: 2 hours/day, Mon-Fri
Professor Name	: Sheiba I. Mas-Oud
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Course Description

STAT 117 Introduction to Statistics (Gen. Ed. Domain II-A) An introduction to the discipline of statistics, emphasizing both statistical thinking and its application to analyzing data. Topics include sampling, design of experiments, organizing and exploring data, probability distributions such as the normal distribution, sampling distributions, hypothesis testing and confidence intervals, correlation and regression. Students are expected to express results of statistical procedures in ordinary non-technical language. Real world applications of statistical topics are emphasized throughout the course.
Prerequisite: Satisfactory score on the mathematics placement examination.

Course Goal

To provide the student with a basic understanding and working knowledge of elementary statistics as it applies to everyday life.

Required Text

Textbook: *Elementary Statistics*, by Triola, Pearson Publishing, 13th edition,© 2018
MML Access Code: Could be purchased directly from mymathlab.com.
Materials: Graphing calculator TI 83/84 is strongly recommended.
Website: Access to www.mymathlab.com

Teaching Procedures

Most classes will be a combination of lecture, group activities, and in-class assignments. You will be given homework assignments on MML to be completed outside of class, with due dates/times. Quizzes, tests and exams will be given at the beginning or at the end of class.

Student Learning Outcomes & Instructional Objectives

This course is designed to achieve the following student outcomes and objectives:

- Interpret and build Frequency distributions

- Interpret and build Frequency tables
  - histograms, frequency polygons, ogives and pie charts
- Calculate and interpret Measures of Center
  - mean, median, mode,
  - weighted mean
  - mean of a frequency table
- Calculate and interpret the Measures of variation
  - range
  - standard deviation and variance of samples and populations
  - the empirical rule
  - Chebyshev's theorem
- Calculate the measures of Relative Standing
  - z-scores
  - percentiles and quartiles
  - boxplots
- Introduction to Probability
  - the complement rule
  - addition rule of probability
  - multiplication rule
  - conditional probabilities
  - applications
- Discrete Probability Distributions
  - discrete random variables
  - mean, standard deviation and variance
  - mathematical expectation
- Binomial Distribution
  - binomial probability formula and its applications
  - computing the mean and the standard deviation of a binomial distribution
- Standard Normal Distribution
  - z-scores and normal distribution probabilities with applications
  - non-standard Normal Distributions: applications
  - Central Limit Theorem: applications (sample means)
  - normal approximation to binomial (if time permits)
- Estimating Population Proportions
  - estimators
  - critical values and confidence level
  - margin of error
  - confidence intervals
  - calculating sample size for a given margin of error and confidence level
- Estimating the mean
  - estimators
  - critical values: sigma known
  - critical value: sigma unknown. The t distribution

  - confidence intervals (SIGMA known and unknown)
- Estimating the variance
- Hypothesis testing: Proportions
  - H_0, H_1 and significance level
  - sample's test statistic
  - using P-value and critical value to test hypothesis.
  - conclusions
  - errors: alpha and beta (if time permits)
- Testing hypothesis about the mean
  - H_0, H_1 and significance level
  - sigma unknown: critical t values. P-values (using technology)
  - conclusions
  - errors (if time permits)
- Testing hypothesis about the variance
- Correlation
  - calculation and meaning of the correlation coefficient
  - coefficient of determination
  - testing for correlation in the population using Pearson's table
- Regression
  - the regression line
  - calculating the slope and intercept of the regression line
  - using the regression line for prediction when appropriate

Course Topics & Required Assignments/Readings

Exploring Data with Tables and Graphs

- Frequency Tables
- Histograms and Graphs

Describing, Exploring, and Comparing Data

- Measures of Center
- Measures of Variation
- Relative Standing

Probability

- Introduction to Probability
- Addition, Complement, and Multiplication Rules
- Conditional Probability

Discrete Probability Distributions

- Discrete Probability Distributions
- Binomial Probability Distributions

Normal Probability Distributions

- The Standard Normal Distribution
- Non-standard Normal Distributions
- Central Limit Theorem

- Normal Approximation to Binomial (if time permits)

Estimating Parameters and Determining Sample Sizes

- Estimating a Population Proportion
- Estimating a Population Mean
- Estimating Population Variance (if time permits)

Hypothesis Testing

- Basics of Hypothesis Testing
- Testing a Claim About a Proportion
- Testing a Claim About a Mean where Sigma is Unknown

Correlation and Regression

- Correlation
- Regression

Assessment

Students will be assessed in various ways, including a project, in-class quizzes and exams, homework, and a cumulative final exam. Remember, your written work is a reflection of your effort in this course and therefore, all work is to be written legibly, with scratch work done on separate paper. Home works assigned each week on MML, Quizzes will be given at the beginning of each class, tests will be given at the end of each week and the final cumulative exam will be given at the end of the semester.

Grading Breakdown

The final grade will be determined as follows:
05% Attendance (Note: 0 – 1 absences = 5%; 2 absences = 3%; 3 absences = 0%)
25% Homework
20% Quizzes
30% Exams
20% Cumulative Final Exam

A	95 – 100	B –	80 – 82	D +	67 – 69
A –	90 – 94	C +	77 – 79	D	63 – 66
B +	87 – 89	C	73 – 76	D –	60 – 62
B	83 – 86	C –	70 – 72	F	0 – 59

Methods of Instruction

The classes will be a combination of lectures, discussions, cooperative learning, computer and writing activities.

Attendance Policy and Homework Requirements

- It is expected that the student will attend all scheduled classes for the full allotted time and arrive on time in order to be successful in this class. Attendance will be taken during every class, and counts towards your final course grade
- Homework will be assigned progressively. It is important that students keep on top of the course material. Please note that completion of all homework assignments in a timely manner is necessary to reinforce the skills learned in class that day.
- Missing an exam is a ***serious*** matter. In the event a student must miss an exam because of circumstances beyond his/her control, it is imperative that the student contacts the instructor before the scheduled exam, or before the next class following the exam. Once a graded exam has been returned to the class, it is not possible for a student to make it up.
- Most students find it difficult to learn Mathematics on their own and, since this is a rigorous course, it is expected that you will attend ***all*** classes for the full period in order to be successful in this course.
- Should a student happen to miss a class, he/she will be responsible for making up that day's work. A doctor's note may excuse your absence.
- Specific attendance and homework policies will be discussed in class on the first day.
- Students should NOT use cell phone calculators in any of the inclass quizzes or tests.
- Late attendance is a source of distraction to both the students and the instructor. Out of mutual courtesy and respect, please be in your seat and prepared to work at the start of our class time.

Class participation and attentiveness will be considered an integral part of this course.

Course Expectations

For our accreditation, it is essential that all Framingham State University credit courses follow the Federal Definition of credit hour: for every one hour of classroom or direct faculty instruction, a minimum of two hours of out-of-class student work is required. Since the summer courses meet for two contact hours daily (10 contact hours of classroom time weekly), the expectation is that students spend 20 hours per week doing out-of-class work. For the five week 4-credit course, this reflects 50 hours of classroom time and 100 hours of out-of-class time since the credit hour is defined as 50 minutes.

Academic Honesty Policy

Integrity is essential to academic life. Consequently, students who enroll at Framingham State University agree to maintain high standards of academic honesty and scholarly practice. They shall be responsible for familiarizing themselves with the published policies and procedures regarding academic honesty. Academic honesty requires but is not limited to the following practices: appropriately citing all published and unpublished sources, whether quoted, paraphrased, or otherwise expressed, in all of the student's oral and written, technical and artistic work.

FSU Notice of Non-Discrimination and Diversity

Framingham State University is committed to a policy of non-discrimination, equal opportunity, diversity, and affirmative action. The University is dedicated to providing educational, working, and living environments that value the diverse backgrounds of all people. Furthermore, the Massachusetts Civil Rights Act ("MCRA," M.G.L. c. 12, §§ 11H, 11I, 11J) protects the rights of all residents of and visitors to Massachusetts to be free from bias-motivated threats, intimidation, and coercion that interfere with their civil rights. The MCRA protects the right to attend school, live peacefully, and enjoy other basic rights.

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* This syllabus may be amended during the semester.