Quinsigamond Community College
School of Math and Science

Instructor's Information:
Instructor: <Professor John Smith>
Office: <200A>
Email: <jsmith@qcc.mass.edu>
Telephone: 508-854-2400

Course Information:
Course: MAT 122 Statistics – Section ##
Meets on: <Mondays, Wednesdays, Fridays from 8:00am – 8:50am>
Credits: 3 credit hours

Course Description:
This course covers the essentials of statistics. Students learn descriptive and inferential statistics; charts (histograms, frequency polygons, ogives, and pie charts); measures of central tendency (mean, median, mode, and weighted mean); and measures of dispersion (range, variance, and standard deviation). Additional areas of study include discrete and continuous random variables; basic probability theory; the binomial distribution and its application in binomial experiments; standard and non-standard normal distributions; the Central Limit Theorem; confidence intervals for means, proportions, and variances; linear correlation and regression; and the one sample hypotheses test for mean (large and small sample), proportions, and variances.

Pre-requisite:
MAT 095 with a grade of “C” or higher; or appropriate placement score

Required Textbook/Materials/Website:
Materials: Graphing calculator
Website: Access to www.mystatlab.com

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
- Tchebychev’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
  - H₀, H₁ 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
  - H₀, H₁ and significance level
  - sigma unknown: critical t values. P-values (using technology)
  - conclusions
  - errors (if time permits)
• Testing hypothesis about the variance
• Correlation
  o calculation and meaning of the correlation coefficient
  o coefficient of determination
  o testing for correlation in the population using Pearson’s table
• Regression
  o the regression line
  o calculating the slope and intercept of the regression line
  o using the regression line for prediction when appropriate

**Teaching Procedures:**
Most classes will be a combination of lecture, group activities, and in-class assignments. You will be given homework assignments to be completed outside of class, with due dates/times. There will occasionally be a quiz or exam given in class.

**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

**Assignment & Test Schedule:**
<list all assignments, quizzes, & exam dates>

**Grading Breakdown:**
25%  Homework  
15%  Quizzes  
10%  Attendance  
20%  Exams  
30%  Final Exam

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**Attendance Policy:**
Students are expected to attend all classes, for the entire period. Attendance will be taken during every class, and counts towards your final course grade. If you are absent from class, a doctor's note will excuse your absence.

**Disability Statement:**
If you have a disability which may require an accommodation, please notify me as soon as possible. You are responsible for forwarding your Accommodation Letter to me and discussing arrangements for this course. Your accommodations for this course begin upon my receipt of your Accommodation Letter; accommodations are not retroactive. You may request accommodations at any time during the semester, but instructors must be provided with reasonable notice prior to exams or deadlines. Disability Services works to promote access to ensure an accessible college experience for students. If you have further questions, contact Disability Services. All discussions are confidential.

**Contact Information for Disability Services & Assistive Technology:**
Call:  508-854-4471  
Sorenson Video Phone: 508-502-7647  
Email: disabilityservices@qcc.mass.edu

**Services for Veterans:**
If you are a veteran of the armed forces, please visit the Veteran Affairs Office located in 258A (Administration Building) or contact them at veteranaffairs@qcc.mass.edu

**Academic Honesty and Plagiarism:**
Our purpose in the classroom is to seek the truth; this work requires trust and honesty between teacher and student. If we are not honest about what we know and don’t know, our learning will always be impaired. Because our teaching and learning depends on this honest communication, we expect all students to understand what plagiarism is and why it is unacceptable.

Plagiarism means taking someone else’s ideas or words and presenting them as one’s own. The offense can take many forms including cheating on a test, passing in a paper taken from the Internet or from another student, or failing to properly use and credit sources in an essay. Sometimes the issue is subtle, involving getting too much help on an assignment from someone else. In every instance, plagiarism means cheating both oneself and the owner of the source. Since the cheating sabotages a student’s learning experience, consequences range from no credit for the assignment to failure for the course and possible expulsion from the college.

For further information concerning plagiarism, refer to the QCC Student Handbook.