

**Math 150-20: Elementary Statistics (Online)**  
**Cape Cod Community College**  
**Spring 2013**

**Instructor:** Mary E. Sullivan

**Office:** Science 213

**In-Person Office Hours:**

- MWF: 9:00 – 10:00
- Tu: 1:30 – 2:30

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**Virtual Office Hours:** By appointment

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**Description:** This course is a non-calculus-based introduction to descriptive and inferential statistics which emphasizes statistical literacy and conceptual understanding. Topics include: techniques for organizing and presenting data, measures of central tendency and dispersion, probability, discrete and continuous probability distributions, sampling distributions, estimation, one-sample hypothesis tests, correlation and regression, and the chi-square distribution. This course satisfies the General Education Requirement: Mathematics/Quantitative Reasoning.

**Credits:** 3 credits

**Prerequisites:** MAT040 or MAT 110 and ENL020 or satisfactory basic skills assessment score.

**Access Statement:** Students with disabilities who believe they need accommodations in this course must contact the O'Neill Center (South 222) at (508) 362-2131 ext. 4337 or 4317 as soon as possible.

**Student Learning Outcomes:** See last page of syllabus.

**Teaching Procedures:** This is an online course, so you will be expected to work through the course by taking advantage of resources including the ebook, videos, and guided exercises. You may ask questions by posting to the discussion board or by sending an email to the instructor.

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**Required Materials:** MyMathLab/MyStatLab Standalone Student Access Kit, Pearson: ISBN: 0-321-19991-x This access kit is available at the college bookstore. The code that is included with this access kit will allow you to access the e-book and the assignments for the course. Alternatively, you may purchase the access code directly from the publisher at <http://pearsonmylabandmastering.com/>

After you obtain the access kit, go to [pearsonmylabandmastering.com](http://pearsonmylabandmastering.com) and use the Course ID: sullivan25661 to access the course.

Although the course officially starts on January 28, you can log in one week prior to the start of the semester in order to get a head start on the assignments.

**Textbook (Optional):** If you would prefer to have a hard copy of the textbook instead of reading the ebook online, you may purchase the textbook bundled with an access code: Fundamentals of Statistics with MyMathLab/MyStatLab Student Access Code Card, Michael Sullivan, 3rd edition, Pearson, 2011. ISBN: 978-0321744418.

**Calculator:** A TI-83 or TI-84 graphing calculator is required. If you do not own a TI-83 or TI-84 graphing calculator, there are several options.

1. You may be able to borrow a calculator from a friend or a family member.
2. You may rent a calculator from CCCC for a small fee. Call the CCCC library for more information: (508) 362-2131 x4480.
3. You may rent a TI-83+ for \$9 a month and have it shipped to you. Visit the website RentCalculators.org.

**Attendance:** Regular attendance is required. If a two-week period elapses during which you have not logged into MyMathLab, you will be dropped from the course.

**Homework:** Weekly homework assignments will be due on Sunday evenings at 11:59 p.m. You will get three attempts to answer a question before MyMathLab will mark it incorrect. You can attempt a similar exercise for full credit. Therefore it is possible to receive 100% on each homework assignment. There are a number of learning aids available to help you solve the homework problems.

Any homework problems attempted after the due date will be marked down 25% per day late. There is no partial credit available on homework.

**Online Chapter Tests:** There will be an online test corresponding to each chapter that is covered. Online tests are untimed and do not need to be completed in one sitting. The learning aids (e.g. Help Me Solve This and View an Example) that are available for the homework problems will not be available for each test. Online chapter tests may be taken up to three times and only the highest grade will count.

Tests for Chapters 1 - 3 and 5 - 7 are due on March 21 at 11:59 p.m. (the date of the midterm exam).  
Tests for Chapters 4, 8 - 10, and 12 are due on May 16 at 11:59 p.m. (the date of the final exam).

**Data Analysis Projects:** There will be two data analysis assignments that will be due when you take your midterm and final exams. You may use your TI-83/84 calculator, Excel, or StatCrunch (a web-based data analysis tool that is included with MyStatLab) to complete these projects.

**Midterm and Final Exams:** There will be two in-person exams. The midterm exam will include topics from chapters 1 – 3 and 5 - 7 and the final exam will include topics from chapters 4, 8 – 10, and 12. You may use your TI-83/84 calculator and one 8.5 x 11 page of notes, both sides. I will ask you to turn in your notes with your exam.

The midterm exam will be given on Thursday, March 21, and the final exam will be given on Thursday, May 16. On each test day there will be two test sessions: 1:00 – 3:00 p.m. and 6:30 – 8:30 p.m. Please note that you will be required to show a photo ID upon taking the midterm and final exams.

If you are unable to come to campus, arrangements for proctored examinations at other distance learning centers can be made. The National Consortium of Testing Centers maintains a list of distance learning testing centers throughout the country: <http://www.ncta-testing.org/cctc/>. Bridgewater State University and UMass-Boston are good local alternatives.

**Grading:** Your course grade will be based on the following:

Online Homework: 20%  
Online Tests: 20%  
Data Analysis Projects (2): 10%  
Midterm Exam: 25%  
Final Exam: 25%

above 92	A	80-82	B-	67-69	D+
90-92	A-	77-79	C+	63-66	D
87-89	B+	73-76	C	60-62	D-
83-86	B	70-72	C-	below 60	F

For course grades, I follow standard rounding procedures. Any percentage that ends in 0.5 or higher will be rounded up to the next percentage point. For example, if a student has a 79.5%, then that percentage will round up to an 80% or a "B-." That also means, however, if the number is 0.4 or less, then that percentage will be rounded down to the lower percentage point. For example, if a student earns a 79.4%, then that would round down to 79% or a "C+." As with any grading system, the cutoff points for the letter grades are arbitrary. That means that someone will always be close to getting the next letter grade.

The grade you earn is the grade you will receive in this course. Grades are not negotiable. You will not be allowed to make up work, substitute alternative assignments, or submit extra assignments in order to improve your grade during the semester or after the semester ends.

**Extra Credit:** There is no extra credit available in this class.

**Incompletes:** Grades of incomplete are given only in situations when extenuating circumstances such as an illness or a family emergency prevent a student from taking the final exam or fulfilling a specific requirement in the course. The grade of "I" cannot be used to give students additional time to complete course assignments in order to raise their grade.

**Getting Help:** There are several ways to get help during the semester.

1. You can contact me by email. I will answer all email within 24 hours.
2. You can post a question to the discussion board.
3. You can obtain face-to-face and online math tutoring by appointment or on a drop-in-basis.
  - The Math Learning Center (<http://www.capecod.edu/web/tutoring/math-learning-center>)
  - The Tutoring Center (<http://www.capecod.edu/web/tutoring/tutoring-center>)
  - E-tutoring (<http://www.capecod.edu/web/tutoring/etutoring>)

## Course Outline

### **Chapter 1: Data Collection**

- 1.1 Introduction to the Practice of Statistics
- 1.2 Observational Studies versus Designed Experiments
- 1.3 Simple Random Sampling (no MyMathLab homework)

### **Chapter 2: Organizing and Summarizing Data**

- 2.1 Organizing Qualitative Data
- 2.2 Organizing Quantitative Data: The Popular Displays

### **Chapter 3: Numerically Summarizing Data**

- 3.1 Measures of Central Tendency
- 3.2 Measures of Dispersion
- 3.4 Measures of Position and Outliers
- 3.5 The Five-Number Summary and Boxplots

### **Chapter 5: Probability**

- 5.1 Probability Rules
- 5.2 The Addition Rule and Complements
- 5.3 Independence and the Multiplication Rule
- 5.5 Counting Techniques (*Combinations Only*)

### **Chapter 6: Discrete Probability Distributions**

- 6.1 Discrete Random Variables
- 6.2 The Binomial Probability Distribution

### **Chapter 7: The Normal Probability Distribution**

- 7.1 Properties of the Normal Distribution
- 7.2 The Standard Normal Distribution
- 7.3 Applications of the Normal Distribution

***Midterm Exam (Chapters 1-3, 5-7): Thursday, March 21 from 1:00 – 3:00 p.m. or 6:30 – 8:30 p.m., CCCC campus, room to be announced***

***Data Analysis Project 1 Due***

### **Chapter 8: Sampling Distributions**

- 8.1 Distribution of the Sample Mean
- 8.2 Distribution of the Sample Proportion

## **Chapter 9: Estimating the Value of a Parameter Using Confidence Intervals**

- 9.1 Constructing Confidence Intervals for a Population Mean When the Population Standard Deviation is Known
- 9.2 Constructing Confidence Intervals for a Population Mean When the Population Standard Deviation is Unknown
- 9.3 Confidence Intervals for a Population Proportion
- 9.4 Putting It All Together: Which Procedure Do I Use?

## **Chapter 10: Hypothesis Tests Regarding a Parameter**

- 10.1 The Language of Hypothesis Testing
- 10.2 Hypothesis Tests for a Population Mean—Population Standard Deviation Known
- 10.3 Hypothesis Tests for a Population Mean—Population Standard Deviation Unknown
- 10.4 Hypothesis Tests for a Population Proportion
- 10.5 Putting it All Together: Which Method do I Use?

## **Chapter 4: Describing the Relation between Two Variables**

- 4.1 Scatter Diagrams and Correlation
- 4.2 Least-Squares Regression
- 4.3 The Coefficient of Determination

## **Chapter 12: Additional Inferential Procedures**

- 12.1: Goodness-of-Fit Test
- 12.2: Tests for Independence and the Homogeneity of Proportions

***Final Exam (Chapters 4, 8-10, and 12): Thursday, May 16 from 1:00 – 3:00 or 6:30 – 8:30 p.m., CCCC campus, room to be announced***

***Data Analysis Project 2 Due***

## Student Learning Outcomes

Upon successful completion of this course, students are able to do the following:

- Define common statistical terms.
- Identify level of measurement, unusual values, and rare events.
- Distinguish between good statistical practices and improper uses of statistics.
- Organize and display data by constructing frequency distributions, histograms, stem and leaf plots, boxplots, and scatterplots.
- Calculate measures of central tendency and dispersion.
- Compare individual values by using z-scores, quartiles, and percentiles.
- Apply Chebyshev's Theorem and Empirical Rule.
- Calculate probabilities using relative frequency method and classical method.
- Find the probability of compound events using probability rules, counting rules including permutations and combinations, and simulations.
- Identify and calculate means, standard deviation, percents, probabilities, and scores using tables, formulas, and technologies for discrete and continuous random variables including binomial, Poisson, normal distribution, and the sampling distributions of sample means and proportions.
- Calculate and interpret expected values, point estimates, and confidence intervals.
- Conduct and interpret hypotheses tests including test for a single mean or proportion, test for two means or proportions,  $\chi^2$  test of independence and goodness of fit test, and regression.
- Find and interpret the least squares regression line and the coefficient of determination.
- Analyze errors and required sample sizes for testing.
- Solve application problems
- Identify sources of bias in surveys and experiments.
- Determine the population to which the results of statistical inference can be extended, if any, based on how the data were collected.
- Determine when a cause and effect inference can be drawn from an association, based on how the data were collected (e.g., the design of the study)
- Obtain or generate data.
- Graph the data as a first step in analyzing data, and know when that's enough to answer the question of interest.
- Interpret numerical summaries and graphical displays of data - both to answer questions and to check conditions (in order to use statistical procedures correctly).
- Make appropriate use of statistical inference.
- Communicate the results of a statistical analysis through written explanations.
- Use a sampling distribution and apply it to making statistical inferences based on samples of data, including the idea of standard error
- Determine statistical significance using significance levels and p-values.
- Determine confidence intervals, including the interpretation of confidence level and margin of error.
- Interpret statistical results in context.
- Critique news stories and journal articles that include statistical information, including identifying what's missing in the presentation and the flaws in the studies or methods used to generate the information.
- Use a graphing calculator to complete statistics problems.
- Use appropriate technology such as tutoring web sites online and MyStatLab
- Present appropriate statistical analyses in class.