**Course Description:** This course covers solving real-life business applications in statistics. The course includes, but not limited to, using principles of probability, descriptive statistics, and an introduction to one and multi-sample inferential statistics such as the F-test and Analysis of Variance. Note: A specific graphing calculator is required for this course. Contact the EMPS Division office for details.

**Prerequisites:** MTH 108 (C or better)–OR–appropriate score on CLC Math Placement Test, Math ACT, or Math SAT

**IAI:** M1 902, BUS 901

**Text:** College of Lake County’s Open Education Resource text, *Introductory Statistics*. Adapted by Mark Beintema and Natalia Casper 3e


**Calculator:** A graphing calculator (TI-83 Plus or TI-84) is required for this course. The use of the calculator feature on a cell phone or PDA will never be permitted, nor will the sharing of calculators on exams or quizzes. Inappropriate uses of your calculator include storage of formulas, examples, procedures, tables, etc. Using your calculator in these ways is considered academic dishonesty and will be dealt with accordingly.

**Blackboard:** Many of the course resources and activities will be distributed or conducted using the Blackboard system. Students will be expected to make use of this system throughout the semester. Blackboard can be accessed by logging in to myCLC from the campus homepage (http://www.clcillinois.edu, look for the green button) or by navigating to http://clc.blackboard.com.
**Course Competencies/Objectives:**
Upon completion of this course, a student should be able to:

1. Evaluate measures of central tendency, measures of dispersion, measures of position, probability distributions, confidence intervals, hypothesis tests, and correlations with Excel spreadsheets and graphing calculators.
2. Assess sampling methods and graphs.
3. Differentiate between descriptive and inferential statistics.
4. Calculate and interpret the linear correlation coefficient.
5. Analyze and apply the basic concepts of probability.
6. Describe a probability distribution and calculate probability values using postulates, rules of probability and various probability distribution tables.
7. Explain Chebychev’s theorem, Empirical Rule, and the central limit theorem with respect to mean and proportions.
8. Assess one-sample and multi-sample hypotheses about population parameters by using appropriate distributions including the F-distribution.
9. Construct confidence intervals about the mean, standard deviation, and proportion.
10. Analyze distributions using ANOVA in a variety of techniques.

Upon completion of the course, a student should be able to use Microsoft Excel to:

1. Enter data into a spreadsheet.
2. Increase and decrease decimal places.
3. Enter formulas into a cell.
5. Create frequency distributions.
6. Create histograms, frequency polygons, and/or ogives.
7. Create pie charts.
8. Create scatter plots with a trendline.
10. Analyze means with single factor ANOVA.

Upon completion of this course, the student should be able to use his/her calculator to:

1. Create graphs (Scatter plots, Histograms, Box plots).
2. Use 1-Var Stats (Find Mean, Sample standard deviation, Population standard deviation, Quartiles, and Median).
3. Calculate probabilities for distributions (Normal, T, Binomial, Poisson (OPTIONAL), $\chi^2$).
4. Create confidence intervals (z-interval, t-interval, 2-Sample t-interval, 1-Proportion z-interval, 2-Proportion z-interval, Enter a matrix into the calculator for $\chi^2$ contingency tables).
5. Calculate critical values/p-values for hypothesis tests (z-test, t-test, 2-sample t-test, 1-proportion z-test, 2-proportion z-test, $\chi^2$-GOFtest, $\chi^2$-test, Linear regression t-test, ANOVA).

**Withdraw Dates**: If you plan to discontinue attending this class anytime during the semester, you must take responsibility for dropping the class. If you are still enrolled in the class after the midterm date you will receive a grade for this class that will impact your GPA unless you take action to withdraw yourself.

<table>
<thead>
<tr>
<th>Date</th>
<th>Last date to drop with a refund and no grade</th>
<th>Last day to withdraw and receive a grade of W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 4, 2019</td>
<td>Last date to drop with a refund and no grade</td>
<td></td>
</tr>
<tr>
<td>November 12, 2019</td>
<td>*Last day to withdraw and receive a grade of W.</td>
<td></td>
</tr>
</tbody>
</table>

*You may withdraw after this day only with the instructor’s consent. If you obtain the instructor’s consent and are passing prior to completion of the final class requirements, a grade of “W” will be reported. If you are not passing, a grade of “FW” will be reported. A grade of “FW” has the same impact on GPA as a grade of “F”.*
Attendance: Students are expected to attend every class period and to be on time for each session. Students who miss class should review Blackboard, read the relevant portions of the text, and work practice problems to prepare for returning to class. The student is responsible for all content and material missed due to an absence.

Conduct: Behavior that disrupts the learning of other students or the learning environment in the classroom will not be tolerated. Please be on time and be attentive. Side conversations are both distracting and disrespectful. Students that disrupt the learning process will be asked to leave.

Cell phone use of any kind is prohibited during class.

Assignments: Students will be given recommended assignments that they are expected to complete and be prepared to discuss in class. Students will need to complete this daily work to be prepared for the quizzes and exams. Students will also need to complete online homework assignments through Blackboard on a weekly basis.

Quizzes: Short quizzes will be given on a weekly basis. These quizzes will be based on the lecture and homework from the previous week. Only the best ten quizzes will be counted for each student.

Late Work: As a general policy, late work will not be accepted. If an assignment is accepted late, the maximum grade that a late submission can earn will be equal to the minimum grade earned by students submitting the assignment on time.

Exams: Four unit exams will be given. The fourth unit exam will be on the scheduled final exam day.

Final Project: This course has a final project, which will be due the last week of classes. More details will be provided throughout the semester.

Make-up exams will only be given when there is an emergency situation that prevents you from taking the assessment. You must inform me in advance by email or voicemail that you will be missing the assessment.

Exam Dates:  
Exam 1: Wednesday, September 11th  
Exam 2: Wednesday, October 9th  
Exam 3: Monday, November 4th  
Exam 4: Monday, December 9th

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online HW</td>
<td>15%</td>
</tr>
<tr>
<td>Weekly Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>In-class activities, Excel Labs, and collected assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Exams 1-4</td>
<td>40%</td>
</tr>
<tr>
<td>Final Project</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
</tr>
</tbody>
</table>

Grading Scale:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90% to 100%</td>
<td>A</td>
</tr>
<tr>
<td>80% to 89%</td>
<td>B</td>
</tr>
<tr>
<td>70% to 79%</td>
<td>C</td>
</tr>
<tr>
<td>60% to 69%</td>
<td>D</td>
</tr>
<tr>
<td>59% and below</td>
<td>F</td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>1</td>
<td>8/19-8/21</td>
</tr>
<tr>
<td>2</td>
<td>8/26-8/28</td>
</tr>
<tr>
<td>3</td>
<td>9/2-9/4</td>
</tr>
<tr>
<td>4</td>
<td>9/9-9/11</td>
</tr>
<tr>
<td>5</td>
<td>9/16-9/28</td>
</tr>
<tr>
<td>6</td>
<td>9/23-9/25</td>
</tr>
<tr>
<td>7</td>
<td>9/30-10/2</td>
</tr>
<tr>
<td>8</td>
<td>10/7-10/9</td>
</tr>
</tbody>
</table>
| Week 9 | 10/14-10/16 | Chapter 7:  
• 7.2: *The Central Limit Theorem for Sums*  
• 7.3: Using the Central Limit Theorem  
Chapter 8:  
• 8.1: Introduction to Confidence Intervals  
• 8.2: Confidence Interval for Single Population Mean when $\sigma$ known  
| Online HW 8 (due 10/21) |
| --- | --- | --- |
| Week 10 | 10/21-10/23 | Chapter 8:  
• 8.3: Confidence Interval for Single Population Mean when $\sigma$ unknown  
• 8.4: Confidence Interval for Single Population Proportion  
Chapter 9:  
• 9.1: Elements of Hypothesis Test  
• 9.2: The Z-test for a Single Population Mean  
| Quiz 7  
| Online HW 9 (due 10/28) |
| Week 11 | 10/28-10/30 | Chapter 9:  
• 9.3: The T-test for a Single Population Mean  
• 9.4: Hypothesis Test for a Single Population Proportion  
Chapter 10:  
• 10.1: Two Population Means with Known Standard Deviations  
• 10.2: Two Population Means with Unknown Standard Deviations  
• 10.3: Comparing two Population Proportions  
| Quiz 8  
| Online HW 10 (due 11/4) |
| Week 12 | 11/4-11/6 | Review  
Exam 3 (Monday 11/4)  
Chapter 10:  
• 10.4: Matched Pair Test  
• 10.5: Confidence Intervals from Two Samples  
| Exam 3 (Ch. 7-9)  
Online HW 11 (due 11/11) |
| Week 13 | 11/11-11/13 | Chapter 11:  
• 11.1: Introduction to Chi-square Distribution  
• 11.2: Confidence Intervals for Variance/Standard Deviation  
• 11.3: Test of a Single Variance  
• 11.4: Goodness of Fit Test  
• 11.5: Test of Independence and Test for Homogeneity  
| Quiz 9  
| Online HW 12 (due 11/18)  
Online HW 13 (due 11/18) |
| Week 14 | 11/18-11/20 | Chapter 13:  
• 13.1: Test of Two Variances/Standard Deviations  
• 13.2: One-way ANOVA  
Chapter 12:  
• 12.1: Linear Equations  
| Quiz 10  
| Excel Lab 3  
Online HW 14 (due 11/25) |
| Week 15 | 11/25-11/27 | Chapter 12:  
• 12.2: Scatter Plots  
• 12.3: The Regression Equation  
• 12.4: Testing the Significance of the Correlation Coefficient  
Thanksgiving: No class Wednesday  
| Quiz 11  
| Online HW 15 (due 12/9) |
| Week 16 | 12/2-12/4 | Chapter 12:  
• 12.5: Prediction  
• 12.6: Outliers  
Review  
| Excel Lab 4  
Quiz 12  
Online HW 15 (due 12/9) |
| Finals Week | 12/9-12/13 | Exam 4 (Monday 12/9/19)  
| Exam 4 (Ch. 10-13) |
From the Mathematics Department: Student Success Behaviors to Avoid Repeating this Course

The CLC Math Department is interested in student success. Therefore we urge students to exhibit success behaviors including:

- Attend every class and be here on time
- Keep up with daily homework and assignments
- Do quality work on all assignments and hand them in on time
- Be an engaged and productive member of your class
- Spend a minimum of two hours per week studying outside of class for every hour spent in class
- Work to understand the concepts in mathematics beyond step-by-step procedures
- Seek help when needed by taking advantage of the many support services available at the college

Please note that repeating courses negatively impacts a student’s academic standing, financial aid, and ability to transfer. Repeating courses also impedes degree progress and may lengthen your completion timeline. Plan on succeeding in your mathematics class the first time you take it by exhibiting success behaviors and striving for an "A" level of understanding.

Preparing to Learn: These are things that you, as the student, need to be thinking about and planning for to make your college experience as successful as it can be.

- **Be realistic:** College takes time. The federal definition of one “credit hour” is one hour in class paired with two hours outside of class each week. Taking a course is a commitment both to be in class a certain number of hours a week, but also to budget significant time outside of class as well.
- **Sleep:** The average student needs 7.5-9 hours of sleep each night for optimal brain function. Getting less sleep than your body and brain require inhibits concentration and interferes with learning/the formation of memory. Sleep is the time when your brain is transferring memories from your (limited) short-term memory to the (nearly unlimited) long term memory and strengthening the connections between ideas.
- **Exercise:** Getting regular physical exercise has been shown to be one of the most significant things you can do to prime your brain to learn. Aerobic exercise particularly has been shown to increase concentration levels, ability to stay on task, and mood.
- **Hydrate:** When you are not properly hydrated, your brain cells operate less efficiently, in addition to the impacts on energy levels and overall health.
- **Eat:** It shouldn’t be surprising that your brain needs energy to function, and it gets that energy from the food you consume. Eat a healthy, balanced diet to provide consistent energy. Don’t come to class hungry!
- **Decide to succeed:** “Getting through” is not enough. You need to decide that you are going to learn and master this material. “Well enough” is not a sufficient goal.
- **Multitasking:** Your brain doesn’t multitask. Period. If you are trying to pay attention to more than one thing at a time, your brain is actually switching its attention back and forth continually, burning extra time and energy each cycle. Put away the distractions and focus. You will finish faster, learn better, and have more time to dedicate to other things!
Ways to get help:

**Ask me!** See the front page for my office hours (and my email!)
**Check your answers in the back of the book** - that's why I assign odd problems!
**Work with a classmate** - a study partner is a great resource!

**CLC Math Center** - The secret of success is knowing when to seek help. If you are enrolled in a math or math-related course and need assistance, the Math Center provides tutoring by trained professionals as well as by fellow students. Please visit the CLC Math Center(s) for support.
Come prepared for tutoring by having specific questions on problems that you have tried and on which you have had trouble. While Math Center tutors are happy to help you with homework, they cannot do it for you. The Math Center does not provide help on take home exams and assignments or extra credit assignments.

For locations and hours on all three campuses, visit:
https://www.clcillinois.edu/student-services/tutoring-and-academic-support/tutoring/math-center

**FERPA Statement:** Although students may forward emails from their CLC email accounts to another email account, in order to be in compliance with the Family Educational Rights and Privacy Act (FERPA) and to guarantee the student’s privacy, CLC personnel will not communicate with the student via email unless the official college email address is used.

**Office for Students With Disabilities (OSD):** CLC prohibits discrimination against individuals with disabilities in its services, programs, activities, and employment. The Office of Students with Disabilities (OSD) provides academic accommodation, information and support to students with disabilities. Individuals with disabilities may be afforded the following classroom accommodations, including but not limited to extended time for exams, in-class note-takers, interpreters, and readers. OSD is located in Room B171. Additional information may be obtained by calling the OSD office at (847) 543-2055 or email: osd@clcillinois.edu. If you have already contacted the Office for Students with Disabilities and have completed the Instructor Notification Form, please set a time to meet with me to discuss your needs.

**From the Counseling, Advising, and Transfer Center:** The College of Lake County provides services to assist students in making the transition to college life, get oriented to the college environment, and reach their academic and career goals. Student Development Counselors and Advisors are available via the Counseling, Advising and Transfer Center (CATC) at all three campuses: Grayslake, Room A124, (847) 543-2060; Lakeshore, Room N211, (847) 543-2186; and Southlake, room V130, (847) 543-6502.

**From Counseling and Psychological Services:** Personal/mental health counseling is available at Counseling and Psychological Services (CAPS) in A151 at the Grayslake Campus or call (847) 543-2032. For a crisis or emergency outside of regular business hours, please call (847) 543-2032 and press #1 for "Crisis" and follow the prompts. When you reach the operator, ask for an after-hours "CYN" crisis worker to be paged.
**College of Lake County’s Policy on Academic Integrity:** The very nature of higher education requires that students adhere to accepted standards of academic integrity. Therefore, the College of Lake County has adopted the Student Rights and Responsibilities Policy (#403) and a Statement of Student Academic Integrity. These may be found in the Student Handbook. Among the violations of academic integrity listed and defined are: cheating, plagiarism, falsification and fabrication, unauthorized complicity, abuse of academic materials, complicity in academic dishonesty, falsification of records and official documents, personal misrepresentation and proxy, and bribes, favors, and threats. It is the student's responsibility to be aware of behaviors that constitute academic dishonesty. Pursuant to the due process guarantees contained in the Student Rights and Responsibilities Policy and Procedures on Student Academic Integrity, the minimum punishment for the first offense for a student found in violation of the standards of academic integrity is failure in the assignment. In addition, a disciplinary record will be established and kept on file in the office of the Vice President for Student Development.

**Tape Recording Guidelines:** The use of tape recording or other devices by a College of Lake County student is dependent upon the particular course, program and the permission of the instructor. CLC students acknowledge that their classroom discussions and participation may be recorded. CLC students further acknowledge that any authorized recording of a class or program is for their use only and may not be accessed or utilized by any other individual. Use of any course or program recordings shall be used for educational purposes only and no replication or reproduction of the recording shall be made without the express written consent of the instructor and College of Lake County. Any student determined to have violated this procedure/rule shall be subject to discipline under the College’s Student Rights and Responsibilities Policy and Procedures. Students requesting to record a class pursuant to the Americans with Disabilities Act shall contact the Office for Students with Disabilities at (847) 543-2055.

**Emergency Procedures:** The College of Lake County works to ensure that the students, staff, and faculty are provided a safe environment for learning. To ensure this, emergency procedures have been developed. Emergency instructions are posted in each classroom. Please acquaint yourself with them. In the event of an emergency, please stay with the instructor or your fellow classmates. For the events listed below, the following procedures will be used:

- **Fire Alarm or Fire Event:** Upon activation of the fire alarm, exit the room and remain together once outside the building. Remain outside, at least 100 feet from the building, until officially advised to re-enter.

- **Tornado:** The College of Lake County designates safe zones in the event of a tornado. You will either be asked to remain in place or move to the designated safety zone by specific personnel assigned to guide you to safety at the college location.

- **Life Threatening Emergency:** Based on the most current information, the college will advise all campus stakeholders of the identified threat. Options to address the threat may include, exiting the building or sheltering in place. Please follow the instructions provided and move quickly. Should the decision be made to shelter in the classroom, members of the classroom will immediately secure the classroom door and move to an area not visible from the windows or door. You will silence all cell phones and remain quiet through this time.

- **Earthquake:** Should an earthquake occur, the procedure will be to shelter in the room seeking cover under tables or desks until the tremors stop. You will then exit the building and remain at least 100 feet from the building.