Spring 2016  
MTH 347 – Applied Statistics (3cr)  
Quinn  
Cleveland State University - Mathematics Department

Faculty: Linda M. Quinn, PhD
Office: RT 1512
Office Hours: TTh 9:00-10:00am; TTh 2:30-3:30pm; and by appointment
Office Phone: 216-687-4691
E-mail: l.quinn@csuohio.edu
Prerequisite: A grade of "C" or better in MTH 147, MTH 323, PSY 311, PSY217, COM 303, ECN 322, ESC 310, OSM 201, PSC 351, SOC 353, SWK 305, or UST 404
Drop Dates: January 29 (drop) and April 1 (withdrawal with a “W”)  

Section: MTH 347 section 3
InClass Meetings: TTh 10:00-11:15 am
Classroom: RT 1501
Final Exam Period: T, May 10 – 10:15am – 12:15pm

RECOMMENDED TEXT: Statistics: The Art and Science of Learning from Data, 2nd or 3rd edition – Agresti and Franklin

COURSE DESCRIPTION: The purpose of this course is for students to learn additional statistical concepts and methodology. Topics may include simple linear regression, analysis of variance, nonparametric statistics, multiple and logistic regression, statistical process control, and basic time series analysis. This course emphasizes the applied nature of statistical analysis and requires using Minitab software. It counts toward the statistics minor; either MTH323 or MTH347 can count toward the mathematics minor; but not both. MTH 347 does not count toward the mathematics major.

COURSE OBJECTIVES:

- Students will be able to read and understand research reports.
- Students will be able to create research reports.
- Students will be able to perform inferential statistical analyses involving: regression, analysis of means, chi-square analyses, and non-parametric analyses.
- Students will be able to manipulate and use Minitab datasets for use in a statistical analysis.
- Students will be able to choose between appropriate analyses by considering context and statistical assumptions.
- Students will use descriptive statistics: numeric, graph, and narrative.

TEACHING APPROACH: This course is taught with the expectation that statistics as a subject is best learned in the context of research problems. Software, in this case Minitab, will be a tool to understand data that is collected and to make informed decisions and conclusions based on the empirical evidence. In this regard, there is a strong writing component associated with successful completion of the course. It will not be sufficient to do the mathematical calculations because statistics without context can be subject to much misinterpretation.

The flipped classroom model encompasses any use of using Internet technology to leverage the learning in the classroom, so the instructor can spend more time interacting with students instead of lecturing. This is
most commonly being done using teacher created videos that students view outside of class time. It is called the flipped class because the whole classroom/homework paradigm is "flipped". What used to be classwork (the "lecture") is done at home via teacher-created videos and what used to be homework (assigned problems) is now done in class. Ours will be semi-flipped in that the videos will primarily be used to show you how to use the software and the process of a 4C template; however, there may be times when I will lecture in class on manual calculation or discuss questions that arise. Being prepared is essential to effectively working on homework assignments.

CLASS FORMAT:
Each week there will be Tegrity videos assigned that must be viewed prior to Thursday labs, several quizzes that must be completed based on the videos, and homework problems (not for grade).

On each Thursday, there will be a lab to be completed during class. Therefore, the student must be prepared and ready to work when they come to lab on Thursday. These graded assignments account for 40% of the course grade.

ASSESSMENT AND GRADING: Grades will be based on:

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<tr>
<th>Component</th>
<th>Percentage</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>D</th>
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<tbody>
<tr>
<td>Minitab Labs</td>
<td>40%</td>
<td>93-100</td>
<td>90-92.9</td>
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<td>Exams</td>
<td>30%</td>
<td>87-89.9</td>
<td>83-86.9</td>
<td>80-82.9</td>
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<td>Weekly On-line Quizzes</td>
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<td>77-79.9</td>
<td>70-76.9</td>
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<td>Best category</td>
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<td>60-69.9</td>
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- Blackboard will record quiz grades automatically, but the total points column in Blackboard is meaningless. Blackboard will be updated with manually entered grades periodically and you will be notified to check for accuracy and bring any discrepancies to the instructor’s attention.
- Using the assessment values above, you should be able to manually calculate your current grade at any time.
- Please note well: There may be multiple assignments due in close proximity to each other. Please budget and plan accordingly.
- Students are strongly encouraged to retain all graded work from the course until the end of the semester and final grades are posted. This way if a discrepancy arises between a recorded grade and the actual grade, the actual document can be examined in order to rectify the situation. Additionally, graded works make for excellent study materials for upcoming exams.
- All work must be turned in, in paper format. No assignments (labs or exams) will be accepted by e-mail except with the prior approval of the instructor.
- In fairness to the majority of students that turn their work in on time, work turned in on time has first priority in grading
- Assignments received after the assignment has been returned to the class will receive no credit (but I will grade for student understanding).
- Minitab Labs: During the course there will be weekly lab assignments requiring Minitab. You may work alone or with at most two other persons (for a maximum total of 3 group members) – but all will receive the same grade. Each team will turn in one project report with sufficient work and/or computer output to support solutions. The
homework will require computer analyses. Labs not turned in on time may be penalized per class day late. All labs are due on Tuesday. All lab assignments carry equal weight – even though they might have different point values. Each lab will have a report portion and a MC portion for a total lab score.

- **Three Exams** (each equal weight):
  - There will be two exams during the semester (one at the end of one group inference, another at the end of two group inference). Each exam will require a take-home component and an in-class portion that will be multiple choice. The take-home portion of the exam will require you to use Minitab – so plan for appropriate lab time on campus or install Minitab on an accessible computer. Take-home portions of the exams are to be done as individual work products. They will follow the structure of the HW assignments.
  - The exam during finals week will cover the last part of the material, however material builds upon previous information and so therefore is cumulative in nature.
  - The exams may cover material discussed in lecture videos and in labs that may not be covered in the text. In addition, some techniques or procedures may be taught differently than what appears in the text.
  - **You are responsible for all material covered in class and labs.** Knowledge of the textbook alone is not sufficient.
  - Final exams times are determined by the official CSU calendar and do not conflict with other classes.
  - **Students who know they will miss an exam are required to let the instructor know prior to the scheduled exam time.** If notice is not given, the exam score is automatically zero for that exam. For a missed midterm, the final exam grade will be used.

- **Quizzes:** We shall have several weekly online quizzes throughout the semester, typically multiple choice, but not always. I have the option for in class pop quizzes that may or may not be multiple choice. Your highest 15 quizzes will be counted. There will be NO make-ups for quizzes. A missed quiz score may be one of the dropped quiz scores. Quizzes may be printed from the internet by the student and will always be reviewed. Quizzes will be available on Blackboard. The quiz is not timed and you will not be able to edit your responses after you submit it. Any quiz not completed by the due date receives a grade of zero. If you have technical difficulties, e-mail me immediately (although my response may not be immediate over the weekend). Pay close attention to Blackboard scheduled downtime notices and plan accordingly.

- **Attendance:** Attendance will be taken at every lab. Patterns of absences will be reported via the Starfish system. Attendance will be taken into consideration for borderline (1%) final grade assignments.

- **Best category:** An additional 10% will be used in the calculation of your grade for your best category (Labs, Quizzes, Exams)

- **Ungraded Homework Assignments:** There may be ungraded assigned homework from the textbook. It is important for students to do all the assigned problems. They are essential for learning the material in the course as well as doing well in the exams. They can also be used as an important study guide for the exams. Students are not required to turn in their homework. However, we will solve some of the problems in class when time permits and as questions arise.

- **Flipped Lectures:** Homework will also include a “flipped” lecture prior to your computer lab experiences. It is important you watch the lectures when assigned PRIOR to the lab. Otherwise you may not be able to effectively use time in the computer lab.
TECHNOLOGY: A variety of technology tools will be used in this course.

- **Lab/Software (MINITAB):** Our class is scheduled every day in a computer lab. We will be using Minitab in these lab sessions. The course will include the extensive use of the statistical software Minitab. Minitab 17 is available in campus labs and you will need your campus id and password to access. Alternatively, from the lab fees paid for this course, Minitab can be downloaded and installed on home computers from the Blackboard website. A release form will need to be signed prior to downloading. Minitab will not install on Mac computers without a windows emulator. Minitab cannot be installed on Chromebooks. It is your responsibility to schedule lab time for exams and homework assignments if you do not have a suitable computer to install Minitab.

- **Blackboard:** Online assessments, such as quizzes and exams will be done through Blackboard. Additionally, the course calendar will be posted on Blackboard. Study guides, class powerpoints, and other resources will be available here.

- **Tegrity:** Tegrity classes are available on Blackboard and will contain information on how to use Minitab to accomplish some of our statistical analyses.

- **Calculator:** Each student will need a scientific calculator (recommended for statistics is the TI-83/84) for class and exams. Bring your calculator each class meeting. Cell phone calculators will not be permitted for use on your final exam.

**ATTENDANCE/TARDINESS:** Students are strongly encouraged to attend all class meetings. While there are occasionally good reasons to miss class, regular attendance (awake and listening) will assist you in learning. Further, active participation is encouraged and will contribute positively to your grade. Students tend to do well in the tests if they do not miss too many classes. Furthermore, students are expected to be aware of any changes in the dates of assignments or tests. Printed handouts will only be available the day they are handed out. After that you may retrieve them from Blackboard. Attendance sheets will be passed around most class days. If you are late to class or leave early, please do so with minimal disruption to the classroom environment.

**CELL PHONES:** Cell phones should be turned off or placed on vibrate during class. Test messaging, checking e-mail, and web surfing are all not appropriate when the instructor is talking or you are doing class work. Such behavior is grounds for removal from the class.

**ACADEMIC HONESTY:** Acts of academic dishonesty (cheating, plagiarism-includes not citing sources, submission of work for more than one class, fabrication, fraud, etc.) are expressly forbidden. Cheating includes copying or receiving help from another student on exams or quizzes and all work that is expressly an individual assessment. Merely copying someone’s work or allowing someone to copy your work is also considered cheating. Additionally, attaching student names to a group project that did not contribute substantially to the final work product is also cheating. Infringements will be dealt with according to CSU policy. If cheating occurs, the student will receive a grade of 0 for that component of the course. If cheating occurs on the final exam, the student will receive a grade of F in this course. Information regarding the official CSU policy regarding cheating and plagiarism can be found in the CSU Code of Student Conduct at [www.csuohio.edu/studentlife/StudentCodeOfConduct.pdf](http://www.csuohio.edu/studentlife/StudentCodeOfConduct.pdf)
COURSE WITHDRAWALS: The last day to drop (without a “W”) and the last day to withdraw are at the top of the syllabus. Withdrawing from the course may put you in violation of the federally mandated standards for academic progress (SAP) that you must maintain to be eligible for financial aid. You may refer to http://www.csuohio.edu/moneysmarts/financial-impacts-drops-and-withdrawals about the implications of withdrawing from the course for your financial aid or visit Campus 411.

STUDENTS WITH DISABILITIES: Students with documented disabilities are entitled to reasonable accommodations if needed. If you believe you need accommodations, please see Office of Disability Services at 216-687-2015 in MC 147 (www.csuohio.edu/offices/disability).

STUDENT WORK FOR COURSE PORTFOLIO: The professor reserves the right to retain, for pedagogical reasons, either the original or a copy of your work submitted either individually or as a group project for this class. Students’ names will be deleted from any retained items.

OTHER RESOURCES / ASSISTANCE TOWARDS SUCCESS: The instructor will place additional resources on Blackboard. If you find other resources that you think may be helpful to your classmates, please give them to the instructor for placement on Blackboard.

Priority for seeking in person help should be:
- Ask questions about the material during lecture or lab. Chances are that there are other students also confused and a brief question in class may save you hours of time later.
- Go to the instructor during office hours or by appointment.
- Go to the Math Learning Center (MLC) in MC230 for drop-in tutoring. The MLC has computers with Minitab for use and tutors available for help while using them. Bring your CSU ID.

Other on-line resources:
- http://www.learner.org/resources/series65.html
- http://interactmath.com (choose our textbook or from other statistics textbooks)
- http://www.khanacademy.org/math
TENTATIVE SCHEDULE: A tentative schedule is posted and updated using Blackboard. Changes to this schedule will be announced in class. It is the student’s responsibility to attend class and be aware of any changes to the schedule.

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<tr>
<th>Wk</th>
<th>Week Of</th>
<th>Topics</th>
<th>Textbook Chapter</th>
<th>AAO Segments</th>
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<tr>
<td>1</td>
<td>1/18</td>
<td>Introduction: Syllabus, Review, Intro to Inference</td>
<td>7, 8</td>
<td>22</td>
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<tr>
<td>2</td>
<td>1/25</td>
<td>CI one group (proportion, mean, median); test for normality</td>
<td>8</td>
<td>9, 24, 26</td>
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<td>3</td>
<td>2/1</td>
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<tr>
<td>4</td>
<td>2/8</td>
<td>HT one group (proportion, mean, median)</td>
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<td>25</td>
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<td>5</td>
<td>2/15</td>
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<td>6</td>
<td>2/22</td>
<td>Exam 1, CI/HT two dependent groups (mean, median, proportion)</td>
<td>10, 15</td>
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<tr>
<td>7</td>
<td>2/29</td>
<td>CI/HT two independent groups (mean, median, proportion); test for equal variance</td>
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<td>27, 28</td>
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<td>8</td>
<td>3/7</td>
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<td>9</td>
<td>3/14</td>
<td>SPRING BREAK</td>
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<td>3/21</td>
<td>Exam 2</td>
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<td>11</td>
<td>3/28</td>
<td>One-way ANOVA / Kruskal-Wallis (means, medians); post-hoc tests</td>
<td>14, 15</td>
<td>31</td>
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<tr>
<td>12</td>
<td>4/4</td>
<td>Two way ANOVA; interaction plots</td>
<td>14</td>
<td>13, 29</td>
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<td>13</td>
<td>4/11</td>
<td>Chi-square</td>
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<td>14</td>
<td>4/18</td>
<td>Correlation and Regression</td>
<td>12</td>
<td>10, 11, 12, 30</td>
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<td>15</td>
<td>4/25</td>
<td>Multiple Regression</td>
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<td>15</td>
<td>5/2</td>
<td>Catch-up and Review</td>
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<td>15</td>
<td>5/9</td>
<td>Final – T, May 10th, 10:15-12:15</td>
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Directions for Installing Minitab 17 from Blackboard

- In Blackboard, Click on the file Minitab 17.zip from the Minitab folder and save the file in a folder on the hard drive (easiest place is probably the desktop) where you know where the file is.
- Right click on the .zip file (on the desktop).
- Select the Extract option and work through the winzip wizard. Extract the files to a directory somewhere on your hard drive or make a folder on your desktop and extract the files to there or extract directly to the root of the c:\ drive.
- Whatever folder you extracted the files too, then click on the setup.exe file and work through the prompts. (Note: If you execute the setup file while on the zipped file, the license file may not attach properly.)
- Now launch Minitab 17, there should be an icon on your desktop.
- If prompted to specify the license manager or choose a file, choose Specify the License File, click Browse and go to c:\Program Files\Minitab\Minitab 17 and the file is minitab.lic or if you have a 64-bit version of Windows, it is at c:\Program Files (x86)\Minitab\Minitab17
- Click Open. Click OK.

Some notes about Minitab

- It will not work on a Mac unless you have a windows emulator. There is a version called Minitab Express for Mac except that it has a completely different interface than for the one in lab.
- It will not work on Chromebooks
- It is available in labs on campus: RT1501 (if not a class session), RT1530 (satellite math lab), 1st floor library. It should be available in most labs on campus. If not, please let me know.

Minitab worksheets (.MTW, not project files) for our class will be found in one of two places:

1. On Blackboard in the folder “Minitab Datasets”
2. In Minitab, in the “Sample Data Folder”
   a. FILE> OPEN WORKSHEET
   b. Look in Minitab Sample Data Folder