MTH 114-02 Spring 2017
Statistics for Natural Sciences
Prof. A. Wittenstein

Contact Information

Office: Science 409
Email: Wittenstein@adelphi.edu
Course Web Page: http://www.adelphi.edu/~wi16133/mth114/s17/
Office Hours: Tu 5:45-6:15pm & Th 4:00-4:30pm, or by appointment

Class Meetings

T/Th 4:30-5:45pm, Science 227 (Tu 1/24 → Th 5/11).
--T 3/15 & Th 3/17 Adelphi Spring Break – No Classes --T 5/16: Final Exam – from 3:30-5:30pm
--If class time is missed for any reason (university weather closing, instructor unavailability, etc.), it will be made up on T 4/25 (Adelphi Research Day), W 5/10 & Th 5/11 (Emergency/Study Days), and/or via online lessons/labs.

Prerequisite

High School Mathematics through Intermediate Algebra (i.e. Algebra 2)

Course Description

MTH 114 is a fast-paced introductory statistics course designed for students in science-oriented majors to:

- Develop tools for making decisions when faced with data.
- Learn techniques for analyzing and displaying data using illustrative examples drawn from the sciences.
- Learn techniques for performing statistical tests using illustrative examples drawn from the sciences.
- Make extensive use of statistical software in integrated labs and lectures as an aid to reason.

General Education

- This course counts as a "Formal Sciences Distribution Course".
- This course satisfies the University Learning Goal in "Quantitative Reasoning".

Course Learning Goals

Throughout the course, students will:

- Communicate statistics effectively, both orally and in writing.
- Apply statistical concepts to the development and evaluation of data, especially in the natural sciences.
- Utilize SPSS (Version 23) statistical software in the analysis of data, especially in the natural sciences.

During the units of the course, students will:

- Create graphical displays (i.e. histograms) & find numerical summary measures (i.e. mean, range, IQR).
- Calculate basic probabilities, z-scores, and t-scores.
- Calculate and interpret confidence intervals.
- Conduct hypothesis tests (i.e. single and paired sample t-tests, ANOVA, chi-square)
- Calculate and interpret regression models (i.e. linear, non-linear, multiple, logistic)
- Conduct non-parametric tests of significance (i.e. Mann-Whitney, Wilcoxon, Kruskal-Wallis, Friedman)

Grading

Assignments	30%	Midterm Exam	20%: Tuesday 3/7: in class-date tentative
Quizzes	20%	Final Exam	30%: Tuesday 5/16: 3:30pm-5:30pm

The final course grade corresponding to each final numerical course grade will be no lower than:

A+ = 97 & up	A = 93-96.9	A- = 90-92.9	B+ = 87-89.9	B = 83-86.9	B- = 80-82.9	
C+ = 77-79.9	C = 73-76.9	C- = 70-72.9	D+ = 67-69.9	D = 63-66.9	D- = 60-62.9	F = 0-59.9

Attendance

Attendance is required. After four absences, your grade will be lowered by one-third of a grade (e.g., A to A-, A- to B+, etc.). You are also responsible for whatever work is covered in class ***whether or not you are there***. Absence from quizzes and exams will be excused only for a good and **well-documented** reason. The decision to allow a make-up quiz or exam will be made in accordance with the policies of Adelphi University.

Please arrive to class *on time* whenever possible. Also, lateness or leaving early will count as partial absences. But, I would much rather you arrive late or leave early, then miss an entire class session. If you know in advance that you will be absent or late for a class, please e-mail me to let me know. If you need to be absent for any class meetings due to religious observance, please notify me within the first two weeks of the semester.

If I know in advance that I will be absent or late for a class, then I will post this information to Moodle, and Moodle will automatically send an e-mail to your Adelphi e-mail account. ***In the rare case that I am not there at the start of class and there is no announcement on Moodle or the classroom door, then you should wait in the classroom until at least 4:55pm, as I am probably just running late.***

Course Materials

Textbooks

There are two textbooks for this course. Both are required.

- *Understandable Statistics*, Charles Brase and Corrinne Brase (11th edition), ISBN: 9781285460918.
- *How to Use SPSS*, Brian Cronk (9th edition), ISBN: 978-1-936523-44-3.

You need the indicated edition of each text for this course, so do not purchase other editions of either text.
You need to bring the *How to Use SPSS* text to each class meeting.

Graphing Calculator

- Each student must have a Texas Instruments (TI) 83 or 84 for their own use during this course.
- Students will not be allowed to share or borrow calculators during labs, quizzes, or exams for any reason!

SPSS

- As requested by other departments, we will be using the SPSS statistical software package in this course.
- **You should not purchase SPSS on your own.** SPSS is very expensive software, and there are open source (free) alternatives to SPSS available for statistical analysis outside of this course.
- Adelphi has a license for SPSS, and the software is available on computers throughout the campus, particularly in the Library. Please use Adelphi's resources to complete your SPSS-based assignments.
- For course assignments where you are allowed or required to use SPSS, it will be specified in the assignment. When it is not specified, you are required to do the assignment without SPSS.
- Learning to use SPSS software is a key objective of this course. Therefore, you will be required to do many in-class and homework exercises in SPSS. Doing these exercises in any other way, including by hand, by calculator, or with a program like Microsoft Excel, will result in a *grade of 0* for those exercises.
- Since all course exams and quizzes are closed-book and closed-computer, you will not use SPSS on them. However, you may be given SPSS output and asked questions about it on quizzes and exams.

Moodle Learning System

- To access Moodle, log on to your eCampus account, then click on the Moodle tab.
- All grades (for assignments, quizzes, and exams) will be posted to Moodle.
- All lecture PowerPoint slides, assignments, and assignment solutions, will be posted to Moodle.
- If you have not used Moodle before, a tutorial can be found at: http://fcpe.adelphi.edu/moodle/student/
- If a class meeting is cancelled for any reason, you are required to log on to the class Moodle page for instructions and assignments.
- Assignments can be submitted through Moodle. This may be necessary due to an absence or when the assignment requires the submission of SPSS files.

Course Topics

1. Understanding, Displaying, and Summarizing Data
2. Probability, Normal Curves, and Sampling Distributions
3. Confidence Intervals for Estimating the Population Mean
4. Hypothesis Testing: single and paired sample t-tests, ANOVA, chi-square
5. Correlation and Linear Regression Theory
6. Other Types of Regression: multiple, non-linear, logistic
7. Non-parametric tests of significance: Mann-Whitney, Wilcoxon, Kruskal-Wallis, Friedman

*A day-by-day calendar can be found on Moodle. This calendar will be updated throughout the semester as dates may shift, such as when a topic which is planned for 1 day actually takes 2 days, or vice-versa.

Course Assignments

Since this course meets for three credit hours per week, it is expected that on average you do about 4-6 hours of work for this course per week outside of class time.

Reading Assignments

While the class meetings will highlight the important parts of the material, you are expected to read the Brase textbook as well, as it provides additional examples and explanations of the material. The assignments, quizzes, and exams will assess understanding of classroom and textbook material. So make sure to ask me, or the course tutors, about anything you do not fully understand prior to each assignment due date, quiz, or exam.

Required Homework Exercises

Required homework exercises will be assigned at most class meetings and due on the Tuesday of the week after they are assigned, unless announced otherwise. They are to be submitted either on paper in class or through the Moodle Learning System. **Late homework will not be accepted for credit.**

Some Required Homework Exercises will involve doing calculations. You need to show your work, not just the correct answer, to receive full credit. Other exercises will require you to use SPSS, and you will need to submit the SPSS files on Moodle. Also, you will have exercises that involve providing a verbal answer or explanation. The grades for those exercises will be based on the accuracy and completeness of your responses.

The Required Homework Exercises are meant as a form of assessment in this course. Students should make sure they understand the material (lecture and reading assignments) prior to working on these exercises. One way to do this is to first do exercises similar to the Required Homework Exercises.

In general, class time cannot be allotted to the review of homework. However, the answers, and in some cases sample solutions, to the Required Homework Exercises will be posted on Moodle, within one week after the homework due date. For further review of graded homework, see course tutors or attend my office hours.

Statistical Lab Reports

There will be at least two lab reports assigned throughout the semester. You must work on these labs independently! Directions for the labs will be handed out at a later date. **Late reports will not be accepted**.

Lab reports are to be typed. ***All answers are to be in full sentences with correct spelling and grammar.***

Assignments Grading

Assignments count for 30% of the semester grade. A small part of this will be for in-class exercises (often involving SPSS). Most of this will be for the grades on the Required Homework Exercises and Lab Reports.

No credit will be given to student assignments, or portions thereof, that are substantially similar. I will not try to figure out who copied from whom; it is *your* responsibility to not let anyone copy your work.

Course Tutors

The Department of Mathematics and Computer Science will provide free tutors for this course on the fourth floor of the Science Building. More information will be posted on Moodle during the 1st or 2nd week of the semester.

It is departmental policy that: "Tutors should never assist students on take-home tests, quizzes, or graded homework assignments; instead they should work on practice problems that help students review key procedures and concepts to prepare for the assignment."

Academic Honesty

Students enrolled in this course are expected to abide by Adelphi University's Honor Code and its policies on Academic Honesty, which can be viewed on the web at http://academics.adelphi.edu/policies/honesty.php. The purpose of the Honor Code is to protect the academic integrity of the University by encouraging consistent ethical behavior in assigned coursework by students. The following is excerpted from the Student Honor Code:

The code of academic honesty prohibits behavior, which can broadly be described as lying, cheating, or stealing. Violations of the code of academic honesty will include, but are not limited to, the following:

1. **Fabricating data or citations**
2. **Collaborating in areas prohibited by the professor**
3. **Unauthorized multiple submission of work**
4. **Sabotage of others' work, including library vandalism or manipulation**
5. **Plagiarism: presenting any work as one's own that is not one's own**
6. **The creation of unfair advantage**
7. **The facilitation of dishonesty**
8. **Tampering with or falsifying records**
9. **Cheating on examinations through the use of written materials or giving or receiving help in any form during the exam, including talking, signals, electronic devices, etc.**

Violations of these standards, including (but not limited to) plagiarism of any portion of an assignment or misconduct during quizzes & exams, will be dealt with in accordance with University regulations & procedures and reported to the Provost's office.

Student Course Evaluations

About 2 weeks before the start of Final Exams, the course evaluation will become available to you on eCampus. Availability will end just before the first day of the Final Exam Period. Your feedback is valuable to me in making improvements to the course for future students. Please be assured that your responses are anonymous and that the results will not be available to me until after your final course grades are submitted to the University.

Disabilities

If you have a disability that may impact your ability to carry out assigned course work or complete quizzes and exams, and are not already enrolled in the Learning Disabilities Program, it is important that you contact the staff in the Disability Support Services Office (DSS), University Center, Room 310, (516) 877-3145, DSS@adelphi.edu. DSS will review your concerns and determine, with you, appropriate and necessary accommodations. All information and documentation of disability is confidential.

If you have a physical, medical, or learning disability and require accommodations, please notify the instructor and present appropriate documentation within the first two weeks of the semester.

STUDENT ACKNOWLEDGEMENT:
I HAVE READ AND UNDERSTOOD THE SYLLABUS FOR SPRING 2017 MTH 114-02

Signature: _____ Printed Name: _____ Date: _____