

Elementary Statistics

MATH 1342-42073

Syllabus

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Meeting time: TTH 2:50pm-4:05pm
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1 The Course

1.1 Course Description

A first course in statistics for students in business; nursing; allied health; or the social, physical, or behavioral sciences; or for any student requiring knowledge of the fundamental procedures for data organization and analysis. Topics include frequency distributions, graphing, measures of location and variation, the binomial and normal distributions, z-scores, t-test, chi-square test, F-test, hypothesis testing, analysis of variance, regression, and correlation. Skills: S Prerequisites: A satisfactory score on the ACC Mathematics Assessment Test. A second option is an appropriate secondary school course (Algebra II) and completion of any TSI-mandated mathematics remediation.

Note: Texas State University recently changed their Transfer Guide to show that MATH 1342 is no longer considered equivalent to their QMST 2333 (Quantitative Methods). ACC's BUSG 2371 is the correct equivalent to that course, which is needed for most majors in business.

1.2 Prerequisites

Students who satisfied the TSI math requirement by passing the THEA, COMPASS, or ASSET, or by ACC courses have satisfied the math prerequisite requirement for this course. Students should also have college-level reading skills. A student who is exempt from TSI or satisfied the TSI requirement in another way must also pass one of those tests unless she has passed high school Algebra II to satisfy the prerequisite. The new MATD 0385 (offered first in Fall 2009) is specifically designed to prepare students for 1332, 1333, and 1342.

Students in MATH 1342 will be expected to:

1. understand material from the text after reading it.
2. do homework using fairly complicated formulas after seeing one example
3. do some, but not much, algebraic manipulation of formulas

1.3 Course Rationale

Students will learn to

1. Determine the aspects of a question, if any, for which statistics can provide relevant information.
2. Analyze statistical studies, particularly regarding appropriate sampling and experimental design.
3. Select and use appropriate statistical analyses to get useful information from data.
4. Communicate knowledge using standard statistical language and also interpret it in non-technical language.

This course meets the Core Curriculum requirement in mathematics. It meets the requirement for an introductory statistics course for students in many majors such as business, health sciences, and social sciences.

1.4 Course Objectives

Overall Learning Outcomes:

1. Determine the aspects of a question, if any, for which statistics can provide relevant information.
2. Analyze statistical studies, particularly regarding appropriate sampling and experimental design.
3. Select and use appropriate statistical analyses to obtain useful information from data.
4. Communicate knowledge using standard statistical language and also interpret it in non-technical language.

Specific topics included are:

1. Interpret ideas of population versus sample, random variables, and techniques of descriptive statistics including frequency distributions, histograms, stem and leaf plots, boxplots, and scatterplots.
2. Calculate and interpret measures of central tendency and dispersion, including mean, median, standard deviation, and quartiles.
3. Apply the 68-95-99.7 rule to normal distributions and use the normal tables to answer questions about the proportion of scores in a certain range or find various percentiles.
4. Analyze relationships between two quantitative variables using correlation and linear regression. Analyze residual plots and determine how to handle outliers and influential points.
5. Analyze data presented in two-way and three-way tables to provide information about relationships between categorical variables, including understanding and interpreting situations to which Simpson's Paradox applies.
6. Apply ideas of appropriate sampling techniques and experimental design to data production.
7. Use the basic ideas of probability and apply them to statistics.
8. Use the sampling distributions of sample proportions and sample means to answer appropriate questions.
9. Estimate single means, difference of two means, single proportions and difference of two proportions using confidence intervals. Interpret the results.
10. Demonstrate skills in hypothesis testing for means and proportions, for single populations and comparison of two populations.
11. Demonstrate skills in hypothesis testing using the chi-squared test to compare several proportions and to test independence.
12. Demonstrate skills in inference for regression or ANOVA techniques.

Throughout the course, students will learn to do almost all the calculations by hand with a scientific calculator on small data sets and also students will

learn to use a substantial statistical computer software package to do the statistical calculations quickly and on larger data sets. Some of the more advanced regression analyses will not be done by hand.

2 Textbooks

Elementary Statistics, 5th Edition, by David S. Moore (Freeman)
isbn:1429239301

This textbook is required. Homework problems will be assigned from it and students are expected to read sections on their own.

Required Technology: (More information - <http://www.austincc.edu/mparker/1342/tf>)

1. Scientific calculator
2. Access to MINITAB computer software. You are not required to buy this. Use it in the math labs, ICTS labs, and the Learning Labs. <http://irt.austincc.edu/CollegeComputers/> If you buy a copy, please see the appropriate section of the above website for information in installing it and making the textbook data available to it.
3. Internet access to use the supplements in StatsPortal or the Online Study Center. Internet access is provided in several computer labs at ACC.

Access to the electronic MINITAB Manual to accompany *The Basic Practice of Statistics*. Details are available at <http://www.austincc.edu/mthdept2/notes/1342>. This is available in StatsPortal. StatsPortal has many additional useful supplements.

3 Minitab & Technology

The statistical software Minitab is a required part of this course. Students can obtain a free version at home called Crunch-It. Students can also use Minitab at any of the computer learning labs on any of the ACC campuses. Minitab exercises will be an important part of the homework assignments. Problems with (M) have some part for which you are required to use MINITAB, specifically. Problems with (A) require an applet. Find these applets in StatsPortal or on the publishers website. You may use MINITAB on additional exercises if you wish. Find the data files for the textbook from

<http://www.austincc.edu/mparker/software/data/>. This website is used to get the data into both Minitab and into Crunch-It. There is a link to this from the course website at <http://www.austincc.edu/mparker/1342/tf/>. An orientation to the software is also available, and, mixed in with the data files are some notes with help. On the problems requiring technology, as on all homework, you should spend as much time and thought answering questions about what the results mean as you spend calculating. Your answers should reflect this. During the tests, you will not have computer access and may not even be allowed to use a graphing calculator. Test questions will be adjusted to reflect the tools you have available at that time. Ask your instructor in advance what you will be allowed to use on each test.

4 Instructional Methodology

This course is a lecture based course so attendance is highly recommended. The lectures will follow the assigned readings but will involve a significant amount of extra material and discussion, i.e. the textbook is necessary but not sufficient. Students are encouraged to take notes during class and to ask questions.

5 Grading

The course grade will be based on four exams, and homework. The distribution will be

Mid-term Exams	20%
Final Exam	20%
Homework	20%

5.1 Exams

There will be two mid-term exams and a final exam on the last day of class. They will be taken during class time. The nature of the material is cumulative; concepts presented early in the course are foundational and become important later on. The exams will be problems which will be highly correlated to those assigned as homework.

5.2 Homework

Homework will be periodically assigned. They will be due one week from when they are assigned unless otherwise mentioned by the instructor. I encourage students to attempt all the problems. Some problems will involve working problems by hand and others will involve using Minitab.

5.3 Blackboard

Blackboard (<http://acconline.austincc.edu>) is an on-line classroom management tool. It includes a grade book, a discussion board, ways to communicate between students and between students and professor.

Instructions on how to log into this course's Blackboard site can be found at <http://itdl.austincc.edu/blackboard/stlogin.htm>.

If you have not created your new ACC Username or Password through ACCeID Manager, then please go to this link:

<https://acceid.austincc.edu/idm/user/login.jsp>. Do not fill in your Username and Password on this page, since you do not have either yet. DO CLICK on First-Time Login. Your ACCeID will be the first letter of your legal, given, first name and your seven digit ACC ID number. For example, fictional student Adam Smith might have this Username a0067701. Once you submit this Username, just follow the instructions. Once you have done this, please make sure that your correct email address is listed on Blackboard. If it is not, please follow the instructions on this course's Announcement page of Blackboard.

I will use Blackboard to post grades, announcements, and homework assignments.

6 Policies

6.1 Attendance

Attendance is required in this course. Students who miss more than 4 classes may be withdrawn.

6.2 Missed Exams

There are two types of missed exam situations:

1. (Advance Notice) If a student will miss an exam and gives advance notice I will place an exam in the testing center for the student to take. The exam may or may not be the same exam that will be given at the scheduled time in class.
2. (Non-advance Notice) If a student misses an exam and can provide documentation, e.g. doctor's note etc., that the absence was due to a legitimate and unavoidable dilemma, an exam will be placed in the testing center for the student to take. The exam may or may not be the same exam that will be given at the scheduled time in class.

6.3 Late Work

No late work will be accepted.

6.4 Withdrawals

It is the student's responsibility to initiate all withdrawals in this course. The instructor may withdraw students for excessive absences (4) but makes no commitment to do this for the student. After the withdrawal date, neither the student nor the instructor may initiate a withdrawal. The last day to withdraw is November 23, 2009.

6.5 Reinstatement Policy

In order to be reinstated, the student must demonstrate that he is caught up with the required work as of the date on which he wishes to be reinstated. This must be done before the official last date to withdraw for the semester.

6.6 Incomplete Grade Policy

Incomplete grades (I) will be given only in very rare circumstances. Generally, to receive a grade of "I", a student must have taken all examinations, be passing, and after the last date to withdraw, have a

personal tragedy occur which prevents course completion.

6.7 Scholastic Dishonesty

Acts prohibited by the college for which discipline may be administered include scholastic dishonesty, including but not limited to, cheating on an exam or quiz, plagiarizing, and unauthorized collaboration with another in preparing outside work. Academic work submitted by students shall be the result of their thought, work, research or self-expression. Academic work is defined as, but not limited to, tests, quizzes, whether taken electronically or on paper; projects, either individual or group; classroom presentations; and homework.

Students who violate the rules concerning scholastic dishonesty will be assessed an academic penalty that the instructor determines is in keeping with the seriousness of the offense. This academic penalty may range from a grade penalty on the particular assignment to an overall grade penalty in the course, including possibly an F in the course. ACC's policy can be found in the Student Handbook under Policies and Procedures or on the web at: <http://www.austincc.edu/handbook>

6.8 Student Discipline

Classroom behavior should support and enhance learning. Behavior that disrupts the learning process will be dealt with appropriately, which may include having the student leave class for the rest of that day. In serious cases, disruptive behavior may lead to a student being withdrawn from the class. ACC's policy on student discipline can be found in the Student Handbook under Policies and Procedures or on the web at: <http://www.austincc.edu/handbook>

6.9 Students with Disabilities

Each ACC campus offers support services for students with documented physical or psychological disabilities. Students with disabilities must request reasonable accommodations through the Office of Students with Disabilities on the campus where they expect to take

the majority of their classes. Students are encouraged to do this three weeks before the start of the semester. Students who are requesting accommodation must provide the instructor with a letter of accommodation from the Office of Students with Disabilities (OSD) at the beginning of the semester. Accommodations can only be made after the instructor receives the letter of accommodation from OSD.

6.10 Academic Freedom

Institutions of higher education are conducted for the common good. The common good depends upon a search for truth and upon free expression. In this course the professor and students shall strive to protect free inquiry and the open exchange of facts, ideas, and opinions. Students are free to take exception to views offered in this course and to reserve judgment about debatable issues. Grades will not be affected by personal views. With this freedom comes the responsibility of civility and a respect for a diversity of ideas and opinions. This means that students must take turns speaking, listen to others speak without interruption, and refrain from name-calling or other personal attacks.

7 Course Outline

The tentative schedule is as follows giving a rough and incomplete description of the topic and the chapter in the textbook corresponding to the topic.

Topic	Chapter
Preliminaries	1&2
Normal Distributions	3
Scatterplots and Correlation	4
Regression	5
Two-way tables	6
Data	7
Sampling	8
Experiments	9
Data Ethics	-
Probability	10
Sampling Distributions	11
Inference	14,15, & 16
Inference about Populations	17
Two-Sample Problems	18
Population Proportions	19
Comparing two Proportions	20
Inference review	21
The Chi-Square Test	22
Inference for Regression	23