1 Course Information

Meetings TBA

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Office CI 312

Phone 361-825-2724

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ClassURL I will be using a Blackboard 9 page for this course. You can log on by going to bb9.tamucc.edu or iol.tamucc.edu.

OfficeHrs MW 3:30-5:30 pm; T 1-3 pm; other times by appointment.

2 Course Description

This course is an introduction to probability and statistics for Mathematics graduate students with little or no previous training in those topics. Topics include discrete and continuous probability, descriptive statistics, the t-test, one-way analysis of variance, multiple comparison tests and regression. The focus throughout is on data analysis rather than theory.

3 Prerequisites

Graduate status in the ACM track of the Mathematics Masters program.

4 Text and Other Supplies

Texts


Software

We will be using the statistical package R. This is open source and may be downloaded for free. To get your own copy: go to www.cran.r-project.org and download your favorite flavor. While there, go to the Manuals link on the left and also download the Introduction to R.
5 Student Learning Outcomes

Probability and distributions
• Students will be able to apply counting arguments to justify the theoretical underpinnings of statistical techniques
• Students will be able to perform calculations using discrete and continuous probabilities to analyze data.

Summary statistics and confidence intervals
• Students will use graphs and summary calculations to make preliminary investigations of datasets
• Students will compute confidence intervals using classical methods based on the Central Limit Theorem and using bootstrapping techniques

Conceptual framework for design and analysis of experiments
• Students will understand three approaches to analysis of experiments: hypothesis testing based on Monte Carlo techniques; hypothesis testing based on frequentist techniques; and Bayesian analysis
• Students will be able to analyze descriptions of experiments to determine appropriate statistical experimental design.

Regression
• Students will be able to diagnose situations in which regression is the appropriate statistical tool.
• Students will be able to use R to perform all relevant statistical calculations for a regression.
• Students will be able to diagnose and correct problems with regression models.

ANOVA
• Students will be able to diagnose situations in which ANOVA is the appropriate statistical tool.
• Students will be able to use R to perform all relevant statistical calculations for an ANOVA.
• Students will be able to diagnose and correct problems with ANOVA models.
• Students will be able to perform and interpret post-hoc tests for one-way ANOVAs.

6 Instructional Methods and Activities
Methods for instruction include the following:
• Pre-recorded lectures on topics in Probability and Statistics
• Weekly one-on-one meetings with the instructor
• Additional reading assignments beyond the scope of the lectures
7 Evaluation and Grade Assignment

Methods of evaluation and the criteria for grade assignments are as follows:

<table>
<thead>
<tr>
<th>Type of Assignment</th>
<th>Weighting in Final Grade</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>60%</td>
<td>Assignments will be weekly.</td>
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</table>
| Midterm and final exam | 20% each                | • Tests will be take home  
|                    |                          | • Dates, times TBA        |

Based on the above, grades will be assigned according to the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Average</th>
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<tbody>
<tr>
<td>A</td>
<td>85-100</td>
</tr>
<tr>
<td>B</td>
<td>72-84</td>
</tr>
<tr>
<td>C</td>
<td>59-71</td>
</tr>
<tr>
<td>D</td>
<td>46-58</td>
</tr>
<tr>
<td>F</td>
<td>0-45</td>
</tr>
</tbody>
</table>

8 Tentative Course Schedule

Week_1  Probability, part I; intro to R
Week_2  Probability, part II; R as probability calculator
Week_3  Probability, part III; handling data in R
Week_4  Descriptive statistics; statistical graphs in R
Week_5  Sampling distributions, simulation, and the Central Limit Theorem; starting this week, “how to do this in R” is the standard assignment
Week_6  Point estimates of parameters; confidence intervals using CLT
Week_7  Confidence intervals using bootstrap; credible intervals using MCMC
Week_8  Concepts of hypothesis testing; relationship to interval estimation
Week_9  One sample t-tests, power calculations using simulation
Week_10 Two sample t-tests
Week_11 One-way ANOVA
Week_12 Multiple comparisons
Week_13 Correlation & Regression
Week_14 Prediction intervals; Bayesian approaches to testing

9 Class Policies

Timeliness

It is your responsibility to keep track of course deadlines and due dates. In particular:

• Homework assignments show up on Blackboard; I also announce due dates in class. “I didn’t know it was due” is not a valid excuse.
• If you are unable to attend a test and you wish to make it up, I need to hear from you no later than 24 hours after the missed test. You should be able to provide adequate documentation of why your absence was necessary. If you wait more than 24 hours to contact me, you will also need to provide adequate documentation of why you were unable to meet the 24-hour deadline. As an example, “I was called out of town unexpectedly on business” might be a valid reason to miss a test, but it is not an adequate reason to miss the 24-hour notification requirement.

• The end of the semester is a busy time for me as well as you, and I do not have time to proctor final exams outside the assigned schedule. Please do not approach me with stories of non-refundable plane tickets, asking for a separate exam time. The exam schedule for this semester was posted in plenty of time for you to make the correct flight arrangements. I will only consider alternate exam times if either (i) you have three finals scheduled for the same day and invoke the University’s rule allowing you to reschedule one of them; or (ii) you have a legitimate academic or professional conflict with the scheduled time. If one of these situations applies to you, please give me adequate notice to work out an alternate time.

Incompletes
A grade of I (Incomplete) will only be given in exceptional circumstances, such as a death in the family or personal injury that might prevent someone from taking the final test. In this case, it is the responsibility of the student to notify me as soon as possible, preferably by e-mail, and to complete the required "Incomplete Form" available from the University Registrar. If this is not done, a score of 0% will be assigned for any incomplete tests and a final grade will be computed using the criteria described above.

Academic Continuity
In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi, this course will continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

Dropping the Course
Although obviously I hope all goes smoothly for you this semester, events can sometimes occur that make dropping a course necessary or wise. I encourage you to consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Friday, Nov. 7, is the last day to drop a class with an automatic grade of “W” this term.

10 University Statements

Academic Integrity/Plagiarism
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a grade of 0% on that assignment or test.
Grade Appeals (College of Science and Engineering Version)

As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at <http://www.tamucc.edu/provost/university_rules/index.html>, and the College of Science and Engineering Grade Appeals webpage (<http://sci.tamucc.edu/students/GradeAppeal.html>). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

Disabilities Accommodations

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

Classroom/professional behavior

Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.