Statistical Modeling and Data Analysis
MATH 3345.001
Department of Mathematics & Statistics
Fall 2019

A. COURSE INFORMATION

Course number/section: MATH 3345-001
Class meeting time: TR 2:00–3:15 PM
Class location: CI-222
Course Website: Blackboard (bb9.tamucc.edu)

B. INSTRUCTOR INFORMATION

Instructor: DR. LEI JIN
Office location: CI 307
Office hours: TR 10:50 AM – 11:50 AM; 3:20 PM – 4:20 PM; F 9:00 – 10:00 AM.
other times by appointment
Telephone: 361-825-2099
E-mail: lei.jin@tamucc.edu
Appointments: Via Email

C. COURSE DESCRIPTION

Catalog Course Description
An introduction to probability/statistical modeling and data analysis techniques to investigate data. Topics include exploratory data analysis, probability models and simulation, sampling distributions, statistical inference. Applications to real world problems. Students will be expected to present and justify results orally and in writing.
Extended Course Description: None

D. PREREQUISITES AND COREQUISITES

Prerequisites
MATH 2414 - Calculus II, and COSC 1330 - Programming for Scientists, Engineers, and Mathematicians or equivalent.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
Introductory Statistics with Randomization and Simulation vy by David M Diez, Christopher D Barr, Mine Çetinkaya-Rundel

Recommended
Statistical Modeling: A Fresh Approach, D. Kaplan.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:
1. explore and summarize sample data using graphical and numerical tools
2. state commonly used probability models, and tell which model(s) might apply to given experimental situations, perform probability calculations and simulation using R or a similar language
3. understand the concept of a sampling distribution as it applies to the analysis of sample data, and use simulation to estimate sampling distributions
4. calculate point and interval estimates of probability model parameters using R or a similar language
5. understand the hypothesis testing process in general and perform hypothesis tests for probability model parameters using R or a similar language
6. explain and/or justify the results of the above work to a scientific audience orally and in writing.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Classroom meetings will be primarily lecture, with some demonstrations and in-class problem solving. There will substantial homework and computer assignments.

H. MAJOR COURSE REQUIREMENTS AND GRADING

The following assessments will be given during the semester:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Semester projects</td>
<td>40%</td>
</tr>
<tr>
<td>2 in class semester tests</td>
<td>2 x 20% = 40%</td>
</tr>
<tr>
<td>Final</td>
<td>20%</td>
</tr>
</tbody>
</table>

Grade Scale:
From these evaluations, your grade will be computed using the standard scale: A = 90-100; B = 80-89; C = 70-79; D = 60-69; F = below 60.

I. COURSE CONTENT/SCHEDULE

- Week 1: Introduction;
- Weeks 2-3: Software & Exploratory data analysis
- Weeks 4-5: Probability distributions: calculation & modeling
- Week 5: Test 1 (Oct 3rd)
- Weeks 6: Sampling distributions & resampling
• Week 7: Confidence Intervals: bootstrap & parametric methods
• Weeks 8-9: Hypothesis Testing I: the logic of hypothesis testing and one sample inference
• Weeks 9-10: Hypothesis Testing II: models, bootstrap & parametric methods
• Week 10: Test 2 (Nov 7th)
• Weeks 11-12: Regression, models & data analysis & presentation
• Week 12: Reading day (Wednesday) – Thanksgiving
• Weeks 12-14: models & data analysis & presentation
• Week 15: Final

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
Talking during class time and tardiness are often disruptive to the whole class and are not appreciated. If you are delayed and arrived late please do so quietly. Excessive tardiness, disruptive talking, disruptive behavior or performing activities not related to the class will be counted as absences and cancel bonus points for attendance. The instructor is NOT responsible for informing absent students what was covered in previous classes, homework or any other announcements.

Late Work and Make-up Exams
It is your responsibility to keep track of course deadlines and due dates. NO late HW/Quizzes will be accepted. No Make-up HW/Quizzes will be allowed. Two lowest scores on HW/quizzes will be dropped to compensate possible missing HW/Quizzes due to some valid excuses.
All students should plan to take their tests at the scheduled times. If you do not have a valid written excuse and you miss a test, you will NOT be allowed to make up the test and you will score a zero for that test. To request a make-up test, a valid written excuse must be provided within ONE DAY after the missed test. The make-up test must be taken in three days after the scheduled test time. In the case that you have a valid written excuse and you are not able to take a makeup test in time, your score of the test will be replaced by the score on your final exam with some adjustment (according to the medians of two tests).

Cell Phone Use
Cell phones and such must be turned off before class.

Final
Final exam will be administered on December 10, 1:45 – 4:15 PM. It is a comprehensive examination over all material covered during the semester. ABSOLUTELY NO EARLY final examination, so make travel arrangements
accordingly. A missed final exam will result on a score of 0 points.

K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  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 failing grade.

- **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.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high-quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.* 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. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
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 at 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.

- **Disability Services**
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 (361) 825-5816 or visit Disability Services 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.

http://disabilityservices.tamucc.edu/

- **Statement of 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 would 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.

L. **OTHER INFORMATION**

- **Academic Advising**
The College of Science & Engineering requires that students meet with an Academic
Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.