Mathematical Theory of Statistics MATH 5343.001
Department of Mathematics and Statistics
Spring 2020

A. COURSE INFORMATION

Course number/section: MATH 5343.001
Class meeting time: MWF 11:00 -11:50 AM
Class location: OCNR-117
Course Website: https://bb9.tamucc.edu/webapps/login/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Jose H. Guardiola
Office location: CI-309
Office hours: MW 9:00 -11:00 AM, F 9:00-10:00 AM
Telephone: (361) 825-5544
e-mail: jose.guardiola@tamucc.edu
Appointments: Via email

C. COURSE DESCRIPTION

This course concentrates on the mathematical foundations of statistics. Topics covered include:
• The mathematics of probability theory, set theory, counting techniques, probability axioms
• Random Variables
• Probability density functions and cumulative density functions
• Mathematical Expectations
• Common discrete and continuous distributions and their applications
• Functions of random variables, transformation techniques
• Sampling distributions
• An introduction to statistical estimation and hypothesis testing
• Method of Moments, Maximum Likelihood estimation, Bayesian estimation, Likelihood ratio test.
• Regression and correlation
• Proofs and demonstrations for important topics in statistics
• Discuss journal articles related to mathematical statistics

D. PREREQUISITES AND COREQUISITES

Prerequisites: MATH 3311, MATH 3342 and MATH 3470 or the equivalent, or instructor’s permission.
E. **REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES**


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.

At the end of the course, students will be able to:

1. Derive basic statistical ideas from the axioms of probability
2. Develop distributions of new random variables using transformations
3. Derive and prove statistical theorems from basic identities, underlying assumptions, related theorems and axioms
4. Analyze and construct bivariate and multivariate distributions and their relationship to random samples
5. Analyze and compare different types of distributional convergence
6. Construct estimators and hypothesis tests, verify properties and use them for the purpose of statistical inference. Prove theorems and formulas related to inferential statistics.

G. **INSTRUCTIONAL METHODS AND ACTIVITIES**

Methods and activities for instruction include the following:

- Lecture
- Homework
- Discussion
- Computer analysis
- Discussion of related literature
- Proofs and derivations

H. **MAJOR COURSE REQUIREMENTS AND GRADING**

Final course standing will be based upon homework, quizzes, and a final test each weighted as follows
### ACTIVITY

<table>
<thead>
<tr>
<th>Activity</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Two semester exams</td>
<td>25 % each</td>
</tr>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
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</tbody>
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Grades will be assigned according to the following scale.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>90%-100%</td>
</tr>
<tr>
<td>B</td>
<td>80%-89.99%</td>
</tr>
<tr>
<td>C</td>
<td>70%-79.99%</td>
</tr>
<tr>
<td>D</td>
<td>60%-69.99%</td>
</tr>
<tr>
<td>F</td>
<td>below 60%</td>
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</tbody>
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### I. COURSE CONTENT/SCHEDULE

Class schedule available online at Blackboard

Homework will be assigned by Chapter and due dates will be announced in class.

Exam Schedule:

Exam 1 – February 28th

Exam 2 – April 10th

Final Exam – Friday May 8th 11:00 AM – 1:30 PM

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**

Attendance will be taken each class. 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. The instructor is NOT responsible for informing absent students what was covered in previous classes, homework or any other announcements.

**Late Work**

Late homework will be limited to half credit and can only be accepted within one week of the due date. Homework is due at the beginning of the class.

**Exams Policy**

Two tests will be administered during the semester. Cell phones cannot be used as calculators. Makeup for a missed exam will only be considered for a justified reason, the student should contact me within 24 hours of the exam date explaining the reason for
missing the exam, and the makeup exam should be scheduled within a week.

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

**Laptop Use**
Laptop and tablets usage is permitted only for following the lecture material presented during class time.

**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.