MATH 402–01E: Introduction to Mathematical Probability
Fall 2024 Syllabus

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Office Hours: Mon and Wed 10:00am–12:30pm, or by appointment*.
Preferred form of communication: Email
Communication Response Time: Usually within 24 hours during weekdays, M-F.

Must use your TAMUC e-mail account. In the subject line, please include the course information and the purpose of your email; for example, "*Math 402, Request for a meeting***", otherwise, emails may not be replied.*

Course Information

Course material

- **Main textbook**: *Probability and Statistics for Engineering and Scientists* (9th edition), by R.E. Walpole, R. H. Myers, S. L. Myers, and K. Ye (Prentice Hall, ISBN-13: 978-0-321-62911-1 & ISBN-10: 0-321-62911-6).
- **Second textbook**: Wackerly, D. D., Mendenhall, W., & Scheaffer, R. L. (2008). Mathematical statistics with applications (7th Ed.). Belmont, CA: Thomson Brooks/Cole.
- **Additional read**: *An introduction to mathematical statistics and its application* (5th edition), by R. J. Larsen and M. L. Marx.
- **Statistical software R**. It is freely available at `https://www.r-project.org`. We may use **RStudio**, which is an interface for **R**. You can download it for free at `https://www.rstudio.com/products/rstudio/download/`. To use Rstudio you must download and install both **R** and Rstudio.

Lecture notes will be uploaded online. You are responsible to study these notes. The contents (definitions, formulas, and examples) used (and modified) in the notes are mostly collected from the textbook mentioned above.

In this course, we will be using the statistical software **R**. Some of the exams, quizzes, and HW assignments may involve the statistical software **R**. The exams may involve also the interpretation of output from the **R**.

Prerequisite

MATH 2415 Calculus III or MATH 314 or three semesters of calculus with grade of "C" or better. Some basic differentiation and integration (such as integration by parts, double integrals, and improper integrals of exponential functions) will be necessary.

Course description

A calculus-based course in classical probability theory. Topics covered include probability axioms and properties, discrete and continuous random variables, joint distributions, conditional distributions, expectation and variance, covariance and correlation, sampling distribution, central limit theorem, and moment generating functions (if time permits).

Learning Outcome

In this course, you will learn the following topics:

- Intro to statistics and **R**: Descriptive statistics, type of data and their graphical presentations, measures of location and variability.
- Probability: Events, probability of events, various probability rules, and Bayes rules.
- Random variables and probability distributions: Discrete, continuous, and joint probability distributions.
- Mathematical expectation: Mean, variance, and covariance of random variables.
- Some discrete and continuous probability distributions: Binomial, Poisson distribution, normal, and more.
- Fundamental sampling distributions: Sampling distributions, Central Limit Theorem (CLT).
- Estimation techniques and moment generating functions (if time permits)

Calculator

For the exams and the quizzes, you will need to use a regular non-programmable calculator. Please bring one to each exam. No programmable calculators will be allowed during exams. Furthermore, calculators with built-in keys to perform integrations/derivatives are not allowed during the exams or quizzes. Use of such calculators will result in an automatic score of zero.

Statistical package

In this course, we will be using the statistical package **R**. It is freely available at the following website: `https://www.r-project.org`. Some of the exams, projects, and HW assignments may involve the statistical package **R**. The exams may involve also the interpretation of output from the statistical package **R**.

RStudio is a fancy interface for **R**. You can download it for free at `https://www.rstudio.com/products/rstudio/download/`. To use Rstudio you must download and install both **R** and Rstudio.

Webpage

Course-related materials (notes, HW, handouts, etc.) will be posted on the MyLeo Online (powered by D2L Brightspace). It is your responsibility to read the files and your email regularly for any important announcements.

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here: `https://community.brightspace.com/support/s/contactsupport`

Grading criteria

The following grading weights (percentage) show how your total score is going to be calculated at the end of the semester:

Grade distribution		Tentative dates
Midterm I	25%	1^{st} week of October
Midterm II	25%	1^{st} week of November
Quizzes	15%	Bi-weekly
HW	10%	Bi-weekly
Final	25%	Monday, December 9

All exams and quizzes will be given in class. The final will be held as per the university policies.

Midterms: There will be two midterms that weigh 50% of the overall grades. Midterms will be heavily based on the HW and problems solved in classes (this does not mean there will be no questions from the notes and handouts!). You **must** study notes/handouts for proofs and derivations.

HW/Quizzes: There will be **7–9** HW and quizzes. **No** late submission will be allowed. Proper instruction for the quizzes will be provided in class (and via online announcement). Quizzes will be given based on the problems assigned on your HW (of course, you will find the modified version of problems assigned on the HW). This means, if you do not study and understand yours HW (and relevant topics), you may not perform well on the quizzes. This will directly or indirectly impact on your overall grade.

Final: The final will be a comprehensive exam. But it will be heavily weighted on the recent topics. Only the topics from Midterms that are the most relevant will be covered in the final. The final will be be held on **Friday, December 9 at 8:00am–10:00am**.

Attendance and Class Performance: Attendance is mandatory. There will be many class activities that involve problem solving and discussion. Based on the performance in class, your grade will be curved at the end.

Here is how grades will be awarded based on your weighted numerical score (out of 100):

A : ≥ 90,	B: 80 – 89.9,	C: 70 –79.9,	D : 60 –69.9,	F: < 60,

Make-ups

No makeup midterms/exams will be given (except for religious holidays or officially sanctioned extracurricular activities as specified by the university policies). If you miss an exam for a medical reason, you are supposed to provide a medical excuse from a doctor or the TAMU–Commerce Student Heath Service.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

- **Syllabus Change Policy:** The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance

  Any modifications will be announced in class. Thus, it is the student's responsibility to always come to class. (Most important announcements may also be put online or send via email; however, it is your responsibility to come to class to hear any important announcements such as corrections to homework and other stuff.)

University Specific Procedures/Policies

Following are some important links for University policies. You must follow these rules strictly.

- **TAMUC Attendence:** For more information about the attendance policy please visit the Attendance webpage and http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

- **Student Conduct**: All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook. http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx.

  Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: https://www.britannica.com/topic/netiquette.

- **Academic Integrity:** Students at Texas A&M University–Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

  Undergraduate Academic Dishonesty 13.99.99.R0.03

  http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

  Graduate Student Academic Dishonesty 13.99.99.R0.10

  https://inside.tamuc.edu/aboutus/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10.pdf

- **Student Disability Resources and 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 have a disability requiring an accommodation, please contact:

  Office of Student Disability Resources and Services
  Texas A&M University–Commerce
  Gee Library- Room 162
  Phone (903) 886-5150 or (903) 886-5835
  Fax (903) 468-8148
  Email: studentdisabilityservices@tamuc.edu
  Website: Office of Student Disability Resources and Services
  https://www.tamuc.edu/student-disability-services/.

- **Nondiscrimination Notice:** Texas A&M University–Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

- **Tutoring**: The Math Lab is designed to supply free tutoring to students and is aimed at helping students at the remedial, Freshman, and Sophomore levels. Tutoring for higher-level courses is available, dependent on each tutor's ability. The Math Lab is located in Binnion Hall 328. Please remember to sign-in when you use the math lab. For more details: https://rb.gy/seiea.

  Additional turing help available at: https://rb.gy/pd5lt.

- **Writing Center:** Students are encouraged to visit the A&M–Commerce Writing Center for writing assistance. Visit the website at: https://www.tamuc.edu/writing-center/

- **Campus Concealed Carry Statement:** Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University–Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M–Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer. Web url: `http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf`

  Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M–Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

- **A&M-Commerce Supports Students' Mental Health:** The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit `www.tamuc.edu/counsel`.

- **AI Use in Courses (Draft):**

  Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

  Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

  Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

  In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

  13.99.99.R0.03 Undergraduate Academic Dishonesty

  13.99.99.R0.10 Graduate Student Academic Dishonesty

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The course materials are only for use in this course. You cannot distribute the course materials without permission of the instructor.
