MATH 501 – Mathematical Statistics I
Course Syllabus

Instructor: Dr. Thomas R. Boucher, PhD
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Office Hours: MW 10:00-12:00, TR 3:30-4:30, or by appointment

Note: This syllabus details the rules and procedures by which this course is to be conducted. You are responsible for reading this syllabus and knowing the contents – enrollment in this course constitutes an acknowledgement of this responsibility and implied consent to these rules and procedures.

Description: Probability, distributions, moments, point estimation, maximum likelihood estimators, interval estimators, test of hypothesis.

Prerequisites: MATH 314 or three semesters of calculus.

Student Learning Outcomes: Upon successful completion of this course a student will understand

- Basic probability theory, including its theoretical underpinnings and calculus.
- Distribution theory for discrete and continuous random variables.
- Expectations of random variables.
- Random samples and sampling distributions of statistics.

Texts:
- Casella, C., and Berger, R (2002). *Statistical Inference*, 2nd Edition. Brooks/Cole Cengage Learning.
- Verzani, J., "simpleR: Using R for Introductory Statistics". Available FREE at http://cran.r-project.org/doc/contrib/Verzani-SimpleR.pdf

Software: R, latest version is 3.6.1 (Action of the Toes), though what we do should be version independent. R is a FREE and state of the art statistical computing environment. It is available for download at http://www.r-project.org/. There are R builds for Windows, Mac, and Linux/Unix operating systems. Instruction will be given for use in Windows but the builds for other OS's are very similar.

D2L: I will get a D2L coursesite up and running as soon as I am able. All handouts will be posted on the site. I will try where possible to post .pdf files rather than, or in addition to, Office documents. You will need the Adobe Reader (http://www.adobe.com/) which is another free download. However, Mac users may have to access Office documents occasionally. There are packages available that enable Mac users to work with Office documents (Office for Mac and OpenOffice come to mind).

Topics covered: We will cover most if not all of Chapters 1- 5. For details, see Class Schedule.

Grading: on a standard 100% scale:

- **HW: 30%**
- **EXAMS: 15% each**
- **FINAL: 25%**

  Disputed grades will only be changed if graded assignments are produced which indicate the recorded grade is erroneous.

Exams: There are 3 exams and a cumulative final. There will be no makeup exams. With proper documentation of a valid excuse for missing an exam, the % of your grade due to that exam will be rolled over into the cumulative final; absent such documentation a missed exam counts as a zero. Exams are take home, available online Thursday at 5pm and due the following morning at 8am. We will not meet as a class on these Thursdays.

Exam schedule:

- **Exam #1---**Thursday, September 19th
- **Exam #2---** Thursday, October 17th
- **Exam #3---** Thursday, November 14th
- **Final ---** due Friday, December 13th at 8am.

Homework: will be assigned in class.

Attendance/Class Participation/Academic Integrity: Students are expected to attend all lectures in a timely fashion and to participate in classroom and group discussions and activities; therefore no record of attendance is necessary.

ADA Statement: 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: 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

Accessibility: Texas A&M-Commerce University is committed to making every possible effort to ensure all electronic and information technology developed, procured, maintained, or used is accessible to individuals with disabilities. For more information visit the Center for Accessibility http://www.tamuc.edu/campuslife/campusservices/CITESupportCenter/accessibility/default.aspx or contact

Lydia Harkey, EIR Accessibility Officer
Lydia.Harkey@tamuc.edu
903-468-3029

Campus Concealed Carry: 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 (http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf) and/or consult your event organizer). 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.

Student Conduct: All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See Code of Student Conduct from Student Guide Handbook). Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: http://www.albion.com/netiquette/corerules.html
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.

Dr. Boucher   Fall 2019   Texas A&M University-Commerce

Tentative Class Schedule:

Week #	Topics
1	1.1– Set theory 1.2 - Basics of probability theory
2	1.2 - Basics of probability theory 1.3 - Conditional probability and independence
3	1.4 - Random variables, 1.5 – Distribution functions 1.6 - Density and mass functions
4	2.1 - Distributions of functions of a random variable **Exam #1**
5	2.2 – Expected values 2.3 - Moments and moment generating functions
6	3.2 – Discrete distributions 3.3 - Continuous distributions
7	3.4 – Exponential families 3.5 - Location and scale families
8	3.6 - Inequalities and identities, 3.8 – Miscellanea (Markov) **Exam #2**
9	4.1 – Joint and marginal distributions 4.2 - Conditional distributions and independence
10	4.4 – Hierarchical models and mixture distributions 4.5 - Covariance and correlation 4.3 – Bivariate transformations
11	4.7 – Inequalities
12	4.6 - Multivariate distributions **Exam #3**
13	5.1 – Random samples, 5.2 - Sums of random variables from a random sample 5.3 – Sampling from the Normal distribution
14	5.4 - Order statistics 5.5 – Convergence concepts
15	5.5 – Convergence concepts (5.6 - Generating a random sample) **Thanksgiving**
16	**Finals**

Final Exam: due Friday, December 13th at 8am