MATH 501 – Mathematical Statistics
Course Syllabus

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Binnion 310
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Office Hours: MTWRF 10:00-12:00, 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 3.2.2 (Fire Safety), 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.

eCollege: I will get an eCollege 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 open book.

Exam schedule:

- **Exam #1---**Thursday, September 19th
- **Exam #2---** Thursday, October 17th
- **Exam #3---** Thursday, November 14th
- **Final ---** Thursday, December 12th 4:30pm – 7:30pm

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: Office of Student Disability Resources and Services, Texas A&M University-Commerce, Gee Library, Room 132, Phone (903) 886-5150 or (903) 886-5835, Fax (903) 468-8148, email: StudentDisabilityServices@tamuc.edu

Basic Tenets of Common Decency: "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (Student's Guide Handbook, Policies and Procedures, Conduct.) This means that rude and/or disruptive behavior will not be tolerated.

Tutoring: Services up to the level of Calculus I provided by the Math Skill Center (Binnion Hall Room 328) with the following hours: M and W, 8am–8pm; T and R, 8am–6pm; and F 8am–3pm.

Calculator Loan Program: we have set up a calculator loan program to support students. They can borrow a calculator for a semester with a fee ($10-$15 for TI-83/84). Go to the Math department office.

Tentative Class Schedule:

Week of/ Days	Topics
8/31 MW	1.1– Set theory 1.2 - Basics of probability theory
9/7 W	1.3 - Conditional probability and independence
9/14 MW	1.4 - Random variables 1.5 – Distribution functions 1.6 - Density and mass functions
9/21 MW	2.1 - Distributions of functions of a random variable **Exam #1**
9/28 MW	2.2 – Expected values 2.3 - Moments and moment generating functions
10/5 MW	2.4 - Interchanging integration and differentiation/summation and differentiation 3.2 – Discrete distributions
10/12 MW	3.3 - Continuous distributions 3.4 – Exponential families
10/19 MW	3.5 - Location and scale families **Exam #2**
10/26 MW	3.6 - Inequalities and identities 4.1 – Joint and marginal distributions
11/2 MW	4.2 - Conditional distributions and independence 4.3 – Bivariate transformations
11/9 MW	4.5 - Covariance and correlation 4.6 - Multivariate distributions
11/16 MW	4.7 – Inequalities **Exam #3**
11/23 M	5.1/5.2 – Random samples, sums of random variables from a random sample **Thanksgiving**
11/30 MW	5.3 – Sampling from the Normal distribution 5.4 - Order statistics
12/7 MW	5.5 – Convergence concepts 5.6 - Generating a random sample
12/14	**Finals**

Final Exam: TBA