UTD	**Course**	**STAT 5351.001 Probability and Statistics I**
	Professor	Min Chen
	Term	Fall 2016
	Meetings	TR 4-5:15 pm, FO 1.202

Professor's Contact Information

Office Phone	
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Other Information	

General Course Information

Prerequisites	*Calculus through multivariable calculus* or equivalent is **required**.
Course Description	This course is taught as the first in a two-semester sequence, the second being STAT 5352 Probability and Statistics II. The sequence broadly covers (i) the most central probability concepts, methods, and tools, (ii) classical statistical decision theory and inference, and (iii) relevant applications that motivate and illuminate the theory and methods. STAT 5351 emphasizes *probability theory and models*, and STAT 5352 emphasizes *statistical methodology and inference*. Whereas *probability* is one of the rather beautiful topics within mathematics, *statistical science* is a separate discipline with its own special concepts that become implemented using tools from probability, other mathematical topics, and computer science. *Topics in STAT 5351*: Review of Combinatorial Methods and Binomial Coefficients. Probability Models, Conditional Probability, and Bayes' Theorem. Random Variables, Probability Distributions, and Probability Densities. Expected Value, Moments. Chebyshev's Inequality. Conditional Expectation. Binomial, Hypergeometric, Poisson, and other Discrete Probability Distributions. Exponential, Gamma, Normal, and other Continuous Probability Distributions. Functions of Random Variables. Sampling Distributions.
Desired Learning Outcomes	For STAT 5351: *A working understanding of basic probability concepts, theory, and tools, and their techniques of application*.
Required Text and Other Course Materials	Lectures will follow *John E. Freund's Mathematical Statistics with Applications*, 8th edition, I. Miller and M. Miller, 2014, Pearson, and other materials made available in *eLearning*.

Syllabus (*subject to revision except dates of tests*)

T 8/23	*§§ 1.1-1.2.* Combinatorial Methods.
R 8/25	*§§ 1.3-1.4.* The Binomial Coefficients. *The Theory in Practice.*
T 8/30	*§§ 2.1-2.3.* Sample Spaces. Events.
R 9/1	*§§ 2.4-2.5.* The Probability of an Event. Some Rules of Probability.
T 9/6	*§§ 2.6-2.7.* Conditional Probability. Independent Events.
R 9/8	*§§ 2.8-2.9.* Bayes' Theorem. *The Theory in Practice.*
T 9/13	***TEST 1 on 8/23-9/8***
R 9/15	*§§ 3.1-3.2.* Random Variables. Discrete Probability Distributions.
T 9/20	*§§ 3.3-3.4* Continuous Random Variables. Probability Density Functions.
R 9/22	*§§ 3.5-3.6.* Multivariate Distributions. Marginal Distributions.
T 9/27	*§§ 3.7-3.8.* Conditional Distributions. *The Theory in Practice*.
R 9/29	*§§ 4.1-4.3.* The Expected Value of a Random Variable. Moments. Variance.
T 10/4	*§§ 4.4-4.6.* Chebyshev's Inequality. Moment-Generating Functions. Product Moments. Covariance.
R 10/6	***TEST 2 on 9/15-10/4***
T 10/11	*§§ 4.7-4.9.* Moments of Linear Combinations of Random Variables. Conditional Expectations. *The Theory in Practice.*
R 10/13	*§§ 5.1-5.4.* Discrete Distributions: the Uniform , Bernoulli, and Binomial.
T 10/18	*§§5.5-5.6.* Further Discrete Distributions: the Negative Binomial, Geometric, and Hypergeometric.
R 10/20	*§§ 5.7-5.8.* Further Discrete Distributions: the Poisson and Multinomial.
T 10/25	*§§ 5.9-5.10.* The Multivariate Hypergeometric Distribution. *The Theory in Practice*.
R 10/27	*§§ 6.1-6.3.* Continuous Distributions: the Uniform, Gamma, Exponential, and Chi-Square.
T 11/1	*§§ 6.4-6.6.* The Beta and Normal Distributions. Normal Approximation to the Binomial Distribution.
R 11/3	*§§ 6.7-6.8.* The Bivariate Normal Distribution. *The Theory in Practice*.
T 11/8	***TEST 3 on 10/13-11/3***
R 11/10	*§§ 7.1-7.3.* The Distribution Function Technique. The Transformation Technique with One Variable.
T 11/15	*§§ 7.4-7.6.* The Transformation Technique with Two Variables. The Moment-Generating Function Technique. *The Theory in Application*.
R 11/17	*§§ 8.1-8.3.* The Sampling Distribution of the Sample Mean: Infinite and Finite Population Cases.
T 11/22	*☺ Fall Break – UTD Closed ☺*
R 11/24	*☺ Thanksgiving Day – UTD Closed ☺*
T 11/29	*§§ 8.4-8.6.* Sampling from a Normal Population: Roles of the Chi-Square, *t*, and *F* Distributions.
R 12/1	*§§ 8.7-8.8.* The Order Statistics of a Sample. *The Theory in Practice.*
T 12/6	***TEST 4 on 11/10-12/1***

Course Policies

Homework Assignments and Tests	There will be regular homework assignments during the semester. The maximum score of 10 will be given if detailed solutions are provided of at least 90% of the exercises. There will be 4 *closed-book 60-minute tests*, each based on the course content (text, class lectures, recommended exercises, materials supplied in eLearning) over a specified range of dates. Thus the course will be taught in a modular style, although it must be understood that each module will not only present new content but also draw upon the content of previous modules. The tests are not intended to strain memory. However, as a practical matter, we do need to be able to call forth from memory at least some basic information and details, and to be able to apply the theory and methods in particular application contexts. If a very complicated formula is needed in a test, it will be provided, but relatively simple formulas must be recalled from memory. *Depth and scope of understanding of concepts and methods, and of their techniques of application, will be tested.*
Grading Criteria	The overall course score is consisted of: Homework: 10%; Test 1 and 2: 20% each; Test 3 and 4: 25% each. ***The course grade is based on the overall score***, as follows: A 93-100; A- 90-92.9999; B 83-89.9999; B- 80-82.9999; C 73-79.9999; C- 65-72.9999; D 55-64.9999; D- 50-54.9999; F 0-49.9999. EXAMPLE: An overall score of 89.9999 receives the grade of B. The grade of A- starts with a score of 90.0000. Rounding of overall scores is not carried out. ***Letter grades are assigned according to these stated intervals.*** *In the interest of equitable treatment of all students*, **no individual requests for special projects, extra assignments, extra tests, etc., will be granted**.
Missed Test	In the case of a missed test, a makeup test (either written or oral)

	will be conducted if the absence is excused. ***Absences due to oversleeping, car troubles, forgetfulness, etc., are not excused***.
Student Conduct and Discipline	The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of university business. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, provided to all registered students each academic year.
Academic Integrity	The faculty expects from students a high level of responsibility and academic honesty. Students guilty of academic dishonesty are subject to disciplinary proceedings.
Email	The University of Texas at Dallas encourages faculty to consider email from a student official only if it originates from the student's UTD email account. This allows the university to maintain a high degree of confidence in the identity of all individuals corresponding and in the security of the transmitted information. UTD furnishes each student with a free email account, and the Department of Information Resources at UTD provides a method for students to forward their UTD email to other accounts.
Withdrawal	Deadlines for withdrawal from courses are published in each semester's course catalog. A faculty member cannot drop or withdraw a student. Rather, it is the student's responsibility to handle withdrawal procedures with the Registrar.
Incomplete Grades	As per university policy, incomplete grades are granted only in the case of work unavoidably missed (and excused) and not already covered by the professor's policy on missed work or activities, and only if at least 70% of the course work has been completed. An incomplete grade must be resolved within eight weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade becomes changed automatically to F.
Student Accessibility	Student Accessibility seeks to provide students with special requirement the same educational opportunities as available to others.
Religious Holy Days	The University of Texas at Dallas excuses students from class or other required activities for the purpose of travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated. In the case of such an absence, the student is encouraged to notify the instructor as soon as possible, preferably in advance. Regarding missed assignments, quizzes, tests, or exams, the student excused for such a purpose will be covered by the professor's policy for missed or late work.
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