

	<b>Course</b>	<b>STAT 3332.001 Statistics for Life Sciences</b>
	<b>Professor</b>	Robert Serfling
	<b>Term</b>	Spring 2010
	<b>Class Sessions</b>	MWF 11:30-12:15, GR 3.302

### Professor's Contact Information

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<b>Office Hours</b>	To be arranged – check website.
<b>Preferred Method of Contact</b>	I check <i>email</i> much more regularly than my telephone. But please email me <b>ONLY</b> at the above email address.

### General Course Information

<b>Prerequisite</b>	<i>MATH 1325 (Applied Calculus I)</i> or equivalent is required ( <b>absolutely!</b> ).
<b>Course Description</b>	<p>With <i>probability concepts</i>, one builds <i>models</i> for the random data sets that arise in connection with experiments or other situations involving random phenomena. Using such a model, one can predict key properties such as the average number of trials until the first success in a series of success-failure trials.</p> <p>With such data sets, <i>statistical methods</i> focus on <i>interpretation</i> of the data, in order to obtaining relevant information that enables one to figure out which model is the parent model for that data. For example, looking at some relevant data, one might try to determine the true rate of occurrence for a certain kind of mutation.</p> <p>This course introduces <i>basic concepts</i> of probability and statistics and a variety of <i>practical tools</i>, emphasizing the setting of the life sciences, especially the handling of data from biological experiments and studies of the effectiveness of medical treatments. Key topics include <i>descriptive statistics, common probability models, estimation methods, hypothesis testing methods, nonparametric methods, regression and correlation methods, experimental design, and analysis of variance.</i></p>
<b>Desired Learning Outcomes</b>	<p>A working knowledge of <i>basic statistical methods</i> used in the life sciences, readiness to conduct <i>statistical discussions</i>, and appreciation of <i>statistical thinking</i>. In particular, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Recognize which statistical method (confidence interval or hypothesis testing) is appropriate, based on the nature of the problem (one- or two-sample inference, one- or two-tailed tests, etc.).</li> <li>2. Apply statistical procedures to data and interpret the results, using sampling distributions (binomial, normal, t-, chi-square, F, etc.).</li> <li>3. Develop and fit a linear regression model to correlated variables, and evaluate the performance and accuracy of the model.</li> <li>4. Carry out analysis of variance and related procedures.</li> </ol>
<b>Required Text</b>	Rosner, B., <i>Fundamentals of Biostatistics</i> , 6 <sup>th</sup> edition, Duxbury, 2006.
<b>Other Materials</b>	Various handouts will be provided and further readings suggested.

**Syllabus (☺ indicates topic not in text)**

M 1/11 W 1/13 F 1/15	<b><i>General Overview</i></b> – Chapter 1; <b><i>Descriptive Statistics</i></b> – §§ 2.1-2.2 §§ 2.3-2.5; ☺ <i>The Median Absolute Deviation from the Median (MAD)</i> ☺ §§ 2.6-2.9	<b>H1 assigned.</b>
M 1/18 W 1/20 F 1/22	<b><i>Martin Luther King holiday – University closed</i></b> <b><i>Probability</i></b> – §§ 3.1-3.3 §§ 3.3-3.4	<b>H1 due. H2 assigned.</b>
M 1/25 W 1/27 F 1/29	§§ 3.5-3.6 § 3.6 § 3.7	<b>H2 due. H3 assigned.</b>
M 2/1 W 2/3 F 2/5	<b><i>Discrete Probability Distributions</i></b> – §§ 4.1-4.4 §§ 4.5-4.7 §§ 4.7-4.8	<b>H3 due. H4 assigned.</b>
M 2/8 W 2/10 F 2/12	§§ 4.8-4.9; ☺ <i>The Geometric Distribution</i> ☺ <b>TEST 1</b> (§§ 2.1-2.9, 3.1-3.7, and ☺ topics) §§ 4.10-4.11	<b>H4 due. H5 assigned.</b>
M 2/15 W 2/17 F 2/19	§§ 4.12-4.13 <b><i>Continuous Probability Distributions</i></b> – §§ 5.1-5.2 §§ 5.3-5.4; ☺ <i>The Exponential Distribution</i> ☺	<b>H5 due. H6 assigned.</b>
M 2/22 W 2/24 F 2/26	§§ 5.4-5.5 § 5.6 Problem Session on §§ 5.4-5.6	<b>H6 due.</b>
M 3/1 W 3/3 F 3/5	§§ 5.7-5.8 <b>TEST 2</b> (§§ 4.1-4.13, 5.1-5.6, and ☺ topics) <b><i>Estimation</i></b> – §§ 6.1-6.5	<b>H7 assigned.</b>
M 3/8 W 3/10 F 3/12	§§ 6.5 §§ 6.7, 6.10 <b><i>Hypothesis Testing: One-Sample</i></b> – §§ 7.1-7.4	<b>H7 due.</b>
3/15-20	<b><i>Spring Break</i></b> ☺ – <b><i>University closed</i></b>	
M 3/22 W 3/24 F 3/26	§§ 7.6, 7.9, 7.10 <b><i>Hypothesis Testing: Two-Samples</i></b> – §§ 8.1-8.4 §§ 8.5, 8.7	<b>H8 assigned.</b>
M 3/29 W 3/31 F 4/2	<b><i>Nonparametric Methods</i></b> – §§ 9.1-9.3 § 9.4; ☺ <i>The Siegel-Tukey Test</i> ☺ <b><i>Hypothesis Testing: Categorical Data</i></b> – §§ 10.1, 10.6	<b>H8 due. H9 assigned.</b>
M 4/5 W 4/7 F 4/9	§ 10.6 <b>TEST 3</b> (§§ 6.1-6.5, 6.7, 6.10, 7.1-7.4, 7.6, 7.9, 7.10, 8.1-8.5, 8.7, and ☺ topics) ☺ <i>Chi-Square Goodness-of-Fit Test, Model Specified</i> ☺	<b>H9 due. H10 assigned.</b>
M 4/12 W 4/14 F 4/16	§ 10.7 <b><i>Regression and Correlation Methods</i></b> – §§ 11.1-11.2 § 11.3	<b>H10 due. H11 assigned.</b>
M 4/19 W 4/21 F 4/23	§§ 11.4-11.5 § 11.6 §§ 11.7	<b>H11 due.</b>
M 4/26 W 4/28 F 4/30	<b><i>Multi-sample Inference (ANOVA)</i></b> – §§ 12.1-12.3 <b>TEST 4</b> (§§ 9.1-9.4, 10.1, 10.6, 11.1-11.3, and ☺ topics) § 12.7	
M 5/3	<b>TEST 5</b> (all material as in Tests 1-4, plus §§ 12.1-12.3, 12.7)	

## Course Policies

<p><b>Homework and Tests</b></p>	<p>There will be <u>11 homework assignments</u> to be handed in and graded.</p> <p>Also, there will be <u>5 closed-book 45-minute tests</u>, each based on a specified range of course content (text, handouts, class lectures, homework). Tests 1-4 will have limited ranges. Thus the course will be taught in a <u>modular</u> style. The 5<sup>th</sup> test will be comprehensive, however, covering the entire course.</p> <p>The tests are not intended to strain memory. As a practical matter, however, we do need to be able to call forth from memory at least some basic information and details. Thus, for example, I would not ask a student to state a complicated formula from memory but might require selecting the correct one from given choices.</p> <p>Due to the modular style and associated timely testing during the course, <i>a final exam will not be necessary</i>. No final exam will be scheduled.</p> <p>Note. Students must bring their UTD IDs to every test, in case IDs are checked before or after the test.</p>
<p><b>Grading Criteria</b></p>	<p>The <u>lowest homework grade will be dropped</u>. The remaining 10 homework assignments will each count for 2% of the course grade.</p> <p>The <u>lowest test grade will be dropped</u>. The remaining 4 tests will each count for 20% of the final grade.</p>
<p><b>Late Homework</b></p> <p><b>Missed Tests</b></p> <p><b>Late Arrivals</b></p>	<p>Homework will be collected at the <i>beginning of class</i> on the due date. Late homework will not be accepted unless the lateness is excused.</p> <p>If one test is missed, it will count as the dropped test. For a further missed test, if the absence is excused, then the Test 5 grade will be used also for the missing grade. Otherwise, the missed test receives the grade of zero.</p> <p><i>NOTE. For each test, students finishing the test <u>may not leave until 25 minutes have elapsed</u>. After students finishing the test begin to leave, any students arriving <u>late</u> to take the test will <u>not</u> be permitted to start and will receive the grade of zero for that test or exam.</i></p>
<p><b>Student Conduct and Discipline</b></p>	<p>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. It is the responsibility of each student to be knowledgeable about those which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, <i>A to Z Guide</i>, issued to each registered student.</p>
<p><b>Academic Integrity</b></p>	<p>The faculty expects from students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student, each student must demonstrate a high standard of individual honor in his or her scholastic work. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions that are related to the submission as one's own work of material that is not one's own. This may include cheating, plagiarism, collusion, and falsifying of academic records. Students suspected of academic dishonesty face disciplinary proceedings.</p>

<p style="text-align: center;"><b>Email and Technical Support</b></p>	<p>UTD encourages faculty to consider email from students official only if it originates from a UTD student account. This allows UTD 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 provides a method for students to forward their UTD email to other accounts. Assistance is available via assist@utdallas.edu or the UTD Computer Helpdesk at 972-883-2911.</p>
<p style="text-align: center;"><b>Withdrawal</b></p>	<p>Deadlines for withdrawal from courses are published in each semester's course catalog. <i>A faculty member cannot drop or withdraw a student.</i> Rather, it is the student's responsibility to handle withdrawal procedures from any class. The <i>proper paperwork and procedure</i> must be used to avoid receiving a final grade of "F" in a course in which the student remained enrolled but did not participate.</p>
<p style="text-align: center;"><b>Incomplete Grades</b></p>	<p>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.</p>
<p style="text-align: center;"><b>Disability Services</b></p>	<p>Disability Services seeks to provide students with disabilities educational opportunities equivalent to those of their non-disabled peers. The Office of Disability Services is located in room 1.610 in the Student Union, and its hours are Monday-Thursday 8:30 a.m. to 6:30 p.m. and Friday 8:30 a.m. to 5:00 p.m. Essentially, the law requires colleges and universities to make reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind.</p> <p>Occasionally, an assignment requirement may be modified (for example, a research paper versus an oral presentation for a student who is hearing impaired).</p> <p>Classes including students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance. The student should notify the professor of the need for such accommodations. Disability Services provides students with letters to present to faculty members.</p>
<p style="text-align: center;"><b>Religious Holy Days</b></p>	<p>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. Missed assignments, quizzes, tests, or exams, will be covered by the professor's policy for excused missed or late work.</p>
<p style="text-align: center;"><b>Copyright Notice</b></p>	<p>The U. S. copyright law (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials, including music and software. Copying, displaying, reproducing, or distributing copyrighted works may infringe the copyright owner's rights and is subject to appropriate disciplinary action as well as criminal penalties provided by federal law. Usage of such material is only appropriate when that usage constitutes "fair use" under the Copyright Act. A UTD student is required to follow the UTD copyright policy. See <a href="http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm">http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm</a>.</p>