

	Course	STAT 2332.001 Introductory Statistics for Life Sciences
	Professor	Swati Biswas
	Term	Fall 2016
	Class Sessions	MW 11:30 am - 12:45 pm, GR 3.420

Professor's Contact Information

Office Phone	972-883-6686
Office Location	FO 3.704K
Email Address	swati.biswas@utdallas.edu
Course Website	https://elearning.utdallas.edu/ All course related materials, including lecture notes, will be posted here.
Office Hours	MW 12:45 pm – 1:45 pm or by appointment
Preferred Method of Contact	Email
Teaching Assistant, Contact Information, Office Hours	TBA

General Course Information

Prerequisite	One of the following 2 options is required: (a) MATH 1325 (Applied Calculus), or (b) MATH 2312 (Precalculus). This background is anticipated, but not emphasized, and can be refreshed as needed.
Course Description	<p>In the <i>life and health sciences</i>, decision-making using data is pervasive. Essential to this purpose is <i>proper design of the experiments</i> that acquire the relevant data. Also essential is <i>proper interpretation of the data</i>, once gathered. <i>Statistical science</i> centers on these challenging goals.</p> <p>For example, one may try to determine the true rate of occurrence for a certain kind of mutation. Or compare the effectiveness of two or more medical procedures. Or fit a line to explain the relationship between two variables. Or test whether two variables are related or independent.</p> <p>Statistical science involves <u>basic concepts</u> about how to <i>make inferences from data</i>. It also involves <u>practical tools</u> for implementing the concepts. Although its tools include some mathematical or computational steps, statistical science is not a branch of mathematics. It is very different and very special – a conceptual discipline centering on <i>data as a source of information that we can use profitably</i>.</p> <p>This course emphasizes <u>critical statistical thinking</u>, especially for applications in the life sciences. <u>Key topics:</u> <i>design of experiments, descriptive statistics, correlation, regression, probability models, sampling, estimation, confidence intervals, and hypothesis testing</i>.</p>
Desired Learning Outcomes	<p>An appreciation of <u>critical statistical thinking</u>, a working knowledge of <u>basic statistical methods</u> used in the life sciences, and a readiness to conduct <u>statistical discussions</u>. Particular goals are to:</p> <ol style="list-style-type: none"> 1. Understand some basics of experimental design. 2. Have familiarity with the most basic probability models. 3. Recognize which statistical method (confidence interval or hypothesis testing) is appropriate for a given typical problem. 4. Apply statistical procedures to data and interpret the results. 5. Critically read statistical work in published literature.

Required Text	Freedman, D., Pisani, R., and Purves, R. <i>Statistics</i> , 4 th edition, W. W. Norton, 2007. (The international edition is also acceptable.)
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Tentative Course Schedule

(Material between ☺ indicates an additional topic not in text)

M 8/22 W 8/24	<u>PART I. DESIGN OF EXPERIMENTS</u> Ch. 1: <i>Controlled Experiments.</i> Ch. 2: <i>Observational Studies.</i>
M 8/29 W 8/31	<u>PART II. DESCRIPTIVE STATISTICS</u> Ch. 3: <i>The Histogram.</i> Ch. 4, § 5.4: <i>The Average, the Median, the Standard Deviation, the Percentiles, and the Interquartile Range.</i> ☺ <i>The Boxplot</i> ☺ (W) QUIZ 1 on 8/22-8/24 Material
M 9/5 W 9/7	Holiday – Labor Day Ch. 5: <i>The Normal Approximation for Data.</i>
M 9/12 W 9/14	<u>PART III. CORRELATION AND REGRESSION</u> Ch. 8, §§ 9.3, 9.5: <i>Correlation. Outliers. Association is Not Causation.</i> Ch. 10, § 11.3: <i>Regression. Plotting Residuals.</i> (W) QUIZ 2 on 8/29-9/7 Material
M 9/19 W 9/21	Ch. 12: <i>The Regression Line (continued).</i> (W) TEST 1 on 8/22-9/14 Material
M 9/26 W 9/28	<u>PART IV. PROBABILITY</u> Ch. 13, §§ 14.1, 14.2: <i>What are the Chances? Counting Outcomes. Conditional Probability</i> <i>Independence. The Multiplication Rule. Listing the Ways. The Addition Rule.</i>
M 10/3 W 10/5	Ch. 15: <i>Permutations. Combinations. The Binomial Distribution.</i> <i>The Binomial Distribution (Continued).</i> (W) QUIZ 3 on 9/19-9/28 Material
M 10/10 W 10/12	☺ <i>The Geometric, Poisson, and Exponential Distributions</i> ☺ (W) TEST 2 on 9/19-10/5 Material
M 10/17 W 10/19	<u>PART V. CHANGE VARIABILITY</u> Ch. 16: <i>Law of Averages.</i> Ch. 17: <i>Expected Value and Standard Error.</i> Ch. 18: <i>The Normal Approximation for Histograms (Central Limit Theorem).</i>
M 10/24 W 10/26	<u>PART VI. SAMPLING</u> Ch. 19: <i>Sample Surveys.</i> Ch. 20: <i>Chance Errors in Sampling.</i> Ch. 21: <i>Estimation and Confidence Interval for a Population Percentage.</i> (W) QUIZ 4 on 10/10-10/19 Material
M 10/31 W 11/2	Ch. 23: <i>Estimation and Confidence Interval for a Population Mean. The t-distribution.</i> (W) TEST 3 on 10/10-10/26 Material
M 11/7 W 11/9	<u>PART VIII. TESTS OF SIGNIFICANCE</u> Ch. 26: <i>Hypothesis Testing. The One-Sample z-Test.</i> <i>Significance Level. P-Value. The One-Sample t-Test.</i>
M 11/14 W 11/16	Ch. 27: <i>Two-Sample Tests of Means and Proportions.</i> <i>Matched Data Tests.</i> (W) QUIZ 5 on 10/31-11/9 Material
M 11/21 W 11/23	Holidays – Fall Break and Thanksgiving
M 11/28 W 11/30	Ch. 28: <i>The Chi-Square Distributions. The Chi-Square Test of Goodness of Fit.</i> <i>Chi-Square Test of Independence</i> (W) QUIZ 6 on 11/14-11/28 Material

M 12/5 W 12/7	☺ <i>Chi-Square Test of Homogeneity</i> ☺, Review (W) TEST 4 on 10/31-12/5 Material
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Course Policies

Quizzes and Tests	<p>There will be <u>6 closed-book 15-minute quizzes</u>.</p> <p>There will be <u>4 closed-book 60-minute tests</u>.</p> <p>The quizzes and tests will be based on a specified range of course content (text, handouts, class sessions, recommended exercises). See the previous table for their coverage. In general, each quiz will be based on the material covered since the previous quiz up to (and including) the material covered in the previous week.</p> <p>The quizzes and tests are not intended to strain memory. As a practical matter, however, we need to be able to call forth from memory at least some basic information and details. I would not ask a student to state a complicated formula from memory but would require selecting the correct one from given choices. <i>Depth and scope of understanding of concepts and methods will be tested.</i></p> <p>Each quiz will consist of 8 multiple-choice questions of equal value, and each test will consist of 25 multiple-choice questions of equal value.</p> <p>For each quiz and test, each student must bring a scantron score sheet, FORM NO. F-1712-PAR-L. The scantron sheets should be <u>clean</u> and <u>not bent or mutilated</u>. These are available in the bookstore. The instructor will NOT be providing scantron sheets.</p> <p>Also, for each quiz and test, each student must bring a <i>NUMBER 2 pencil</i> with a good eraser, for use with the scantron sheet. The instructor will NOT be providing these.</p> <p>Due to the modular style of the course and the associated timely testing during the course, <i>a final exam will not be necessary. No final exam will be held.</i></p> <p>Note. Students must bring their UTD IDs to every quiz and test and be ready for them to be checked before or after the test.</p>
Clicker	<p>This course uses a classroom polling software called Turning Point Cloud. Students would need to purchase 1) a Turning License, and 2) a Turning Technologies RF-LCD Receiver (also known as a clicker). Both these items are available at the UTD Bookstore.</p> <p>If you had recently purchased an RF-LCD Clicker from the UTD Bookstore, you may be able to obtain a free Turning License. The UTD Bookstore has a limited time offer for legacy students, and it is on a first-come, first-served basis. Please check with the Bookstore for more details. Please visit http://www.utdallas.edu/elearning/resources for more details.</p> <p>Once you have purchased the above two items, follow the instructions</p>

	provided on the course website to create your clicker account.
Grading Criteria	<p>Class Participation will count for 5% of the overall course score. <u>Clicker will be used for this purpose.</u> Multiple choice questions will be asked in class and students have to choose an answer using their clickers. Each question will be worth 2 points of which 1 point is just for participation. So, correct answer = 2 points, incorrect answer = 1 point, no answer chosen/absent = 0 point.</p> <p>The highest 5 quiz grades will be averaged together and count for 20% of the overall course score. <u>The lowest quiz grade will be dropped.</u></p> <p>The <u>lowest grade of Tests 1-3 will be dropped.</u> The remaining two test grades plus the Test 4 grade will be averaged together and count for 75% of the overall course score.</p> <p><u>The Test 4 grade will not be dropped.</u></p> <p>The course grade is based on the overall course score, as follows: A+ 98-100; A 93-97.9999; A- 90-92.9999; B+ 87-89.9999; B 83-86.9999; B- 80-82.9999; C+ 77-79.9999; C 73-76.9999; C- 65-72.9999; D+ 60-64.9999; D 55-59.9999; D- 50-54.9999; F 0-49.9999</p> <p>In the interest of <u>equitable treatment of all students</u>, no individual requests for special projects, extra assignments, extra tests, etc., will be granted.</p>
Missed Tests and Quizzes	<p>If one quiz is missed, it will count as dropped quiz. For a further missed quiz, <u>if the absence is excused (based on documentation of why the absence)</u>, then the average of the two non-dropped quizzes will be used for the missing grade.</p> <p>If one test is missed, it will count as the dropped test. For a further missed test, <u>if the absence is excused (based on documentation of why the absence)</u>, then the average of the two non-dropped tests will be used for the missing grade.</p> <p><u>If the absence is not excused, the further missed test or quiz receives the grade of zero. Absences due to oversleeping, car troubles, forgetfulness, etc., will not be excused.</u></p>
Late Arrivals, Early Departures	<p><u>NOTE. For each quiz and test, arrival after someone has finished and departed is NOT permitted.</u> Noncompliance results in a grade of zero for that quiz or test. For this reason, departures from tests will be allowed only after 30 minutes.</p>
Policy on Use of Electronic Devices	<p>Use of laptops, iPads, or tablets is only permitted for notes taking. Any other use could result in dismissal from class session. Use of other electronic devices such as iPods, telephones, PDAs, pagers, playstations, etc is NOT permitted during class. Any such use could result in dismissal from class session.</p>
Student Conduct And Discipline	<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. See the UTD publication, <i>A to Z Guide</i>, issued to each registered student.</p>
Academic Integrity	<p>The faculty expects from students a high level of responsibility and academic honesty. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, and falsifying of records. Violators face disciplinary proceedings.</p>
Email	<p>UTD encourages faculty to consider email from students official only if it originates</p>

and Technical Support	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.
Withdrawal	Deadlines for withdrawal from courses are published in each semester's course catalog. <i>A faculty member cannot drop or withdraw a student.</i> It is the student's responsibility to handle withdrawal procedures from any class to avoid receiving a grade of "F".
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.
Disability Services	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. Occasionally, an assignment requirement may be modified (for example, a research paper versus an oral presentation for a student who is hearing impaired). 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.
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. Missed assignments, quizzes, tests, or exams, will be covered by the professor's policy for excused missed or late work.
Copyright Notice	A UTD student is required to follow the UTD copyright policy. See http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm .
UT Dallas Syllabus Policies and Procedures	The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.