



STAT 2332 Introductory Statistics for Life Sciences
Spring 2020

| Section | Class Number | Schedule | Location |
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| STAT 2332.002 | 21320 | TTH 10:00 - 11:15am | ECSS 2.412 |
| STAT 2332.004 | 28041 | TTH 8:30am - 9:45am | JO 3.516 |

Professor's Contact Information

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| Professor | Kemelli Estacio-Hiroms |
| Office Phone | 972-883-4511 |
| Office Location | FN 2.206 |
| Email Address | kemelli.estacio-hiroms@utdallas.edu |
| Office Hours | Tuesdays and Wednesdays: 12:15 - 1:30pm |
| Preferred Method of Contact | Come to office hours, Email (with very few exceptions, expect a response in 1-2 business days; please include your class section Stat2332.002 or Stat2332.004 in the subject line of every email.) |
| Teaching Assistant, Contact Information, Office Hours | Stat2332.002: Mohammad Afser Uddin (Afser), MohammadAfser.Uddin@utdallas.edu Office hours: TBD Office location: TBD Stat2332.004: Indrajith Wasala Mudiyansele, Indrajith.WasalaMudiyansele@utdallas.edu Office hours: TBD Office location: TBD |

General Course Information

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| Prerequisite | One of the following 2 options is required: (a) <i>MATH 1325 (Applied Calculus)</i> , or (b) <i>MATH 2312 (Precalculus)</i> . This background is anticipated, but not emphasized, and can be refreshed as needed. |
| Course Description | 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. 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. Statistical science involves <i>basic concepts</i> about how to <i>make inferences from data</i> . It also involves <i>practical tools</i> 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> . This course emphasizes <i>critical statistical thinking</i> , especially for applications in the life sciences. <i>Key topics: design of experiments, descriptive statistics, correlation, regression, probability models, sampling, estimation, confidence intervals, and hypothesis testing</i> . |
| Desired Learning Outcomes | An appreciation of <i>critical statistical thinking</i> , a working knowledge of <i>basic statistical methods</i> used in the life sciences, and a readiness to conduct <i>statistical discussions</i> . Particular goals are to: 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.) |
| Calculator | A scientific calculator and Tables from the book will be required. |

Tentative Course Schedule*

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| Week 1 | T 1/14 | <u>PART I. DESIGN OF EXPERIMENTS</u> Syllabus Ch. 1: Controlled Experiments |
| | Th 1/16 | Ch. 2: Observational Studies |
| Week 2 | T 1/21 | <u>PART II. DESCRIPTIVE STATISTICS,</u> Ch. 3: The Histogram Ch. 4: The Average, Median, Standard Deviation |
| | Th 1/23 | Ch. 5.4: Percentiles, and Interquartile Range Additional topic: The Boxplot QUIZ 1 on Week 1 + Syllabus |
| Week 3 | T 1/28 | Ch. 5: The Normal Approximation for Data |
| | Th 1/30 | <u>PART III. CORRELATION AND REGRESSION</u> Ch. 8: Correlation Ch. 9.3: Outliers Ch. 9.5: Association is Not Causation |
| Week 4 | T 2/4 | Ch. 10: Regression Ch. 12: The Regression Line |
| | Th 2/6 | Ch. 11.3: Plotting Residuals QUIZ 2 on Weeks 2-3 |
| Week 5 | T 2/11 | Ch. 13: What are the Chances? Ch. 14.1, 14.2: Counting Outcomes Ch. 13 (Cont.): Conditional Probability |
| | Th 2/13 | <u>PART IV. PROBABILITY</u> TEST 1 on Weeks 1-4 |
| Week 6 | T 2/18 | Ch. 13 (Cont.): Independence. The Multiplication Rule. Listing the Ways. The Addition Rule. |
| | Th 2/20 | Ch. 15: Permutations. Combinations. Binomial Formula. |
| Week 7 | T 2/25 | Additional topics: The Binomial and Geometric Distributions. |
| | Th 2/27 | Additional topics: Poisson and Exponential Distributions QUIZ 3 on Weeks 4-6 |
| Week 8 | T 3/3 | <u>PART V. CHANCE VARIABILITY</u> Ch. 16: Law of Averages. Ch. 17: Expected Value and Standard Error. |
| | Th 3/5 | TEST 2 on Weeks 5-7 |
| Week 9 | T 3/10 | Ch. 18: The Normal Approximation for Histograms (Central Limit Theorem) |
| | Th 3/12 | <u>PART VI. SAMPLING</u> Ch. 19: Sample Surveys Ch. 20: Chance Errors in Sampling. |
| Week 10 | T 3/17 | Spring Break – No class |
| | Th 3/19 | Spring Break – No class |
| Week 11 | T 3/24 | Ch. 21: Estimation and Confidence Interval for a Population Percentage. |
| | Th 3/26 | Ch. 23: Estimation and Confidence Interval for a Population Mean. The t-distribution. QUIZ 4 on Weeks 7-9 |
| Week 12 | T 3/31 | <u>PART VIII. TESTS OF SIGNIFICANCE</u> Ch. 26: Hypothesis Testing. The One-Sample z-Test. |
| | Th 4/2 | TEST 3 on Weeks 8-11 |
| Week 13 | T 4/7 | Ch. 26 (Cont.): Significance Level. P-Value. The One-Sample t-Test. |
| | Th 4/9 | Ch. 27: Two-Sample Tests of Means and Proportions. |
| Week 14 | T 4/14 | Ch. 27 (Cont.): Matched Data Tests. |
| | Th 4/16 | Ch. 28: The Chi-Square Distributions. The Chi-Square Test of Goodness of Fit. |
| Week 15 | T 4/21 | Ch. 28 (Cont.): Chi-Square Test of Independence. |
| | Th 4/23 | Additional topic: The Chi-Square Test of Homogeneity QUIZ 5 on Weeks 11-14 |
| Week 16 | T 4/28 | Review |
| | Th 4/30 | TEST 4 on Weeks 12-16 |

Course Policies

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| <p>Quizzes and Tests</p> | <p>There will be <u>5 closed-book 15-minute quizzes</u>. There will be <u>4 closed-book 60-minute tests</u>. 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>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 class or week. 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>For each quiz and test, each student must bring a <u>scantron score sheet, FORM NO. F-1712-PAR-L</u>. The scantron sheets should be clean and not bent or mutilated. These are available in the bookstore. The instructor will NOT be providing scantron sheets. Also, for each quiz and test, each student must bring a <u>NUMBER 2 pencil</u> with a <u>good eraser</u>, for use with the scantron sheet. The instructor will NOT be providing these. Students must bring their <u>UTD IDs</u> to every quiz and test and be ready for them to be checked before or after the test.</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>Clicker</p> | <p>This course uses a classroom polling software for popup quizzes called Turning Point Cloud, and in order to participate in the polling activities, students need to purchase a Turning License.</p> <p>In class, to participate in the polling sessions, students will need to carry either a mobile device (smartphone/ tablet/ laptop) or a Turning Technologies RF - LCD Receiver (also known as a Clicker). For mobile devices, the Session ID is Statistics2332. If you use the clicker, the channel is 11.</p> <p>If you use a smartphone or tablet, get the ResponseWare App. From a laptop, go to responseware.com in your browser.</p> <p>Both the Turning License and the Clicker are available at the UTD Bookstore.</p> <p>Once you have purchased the license, follow the instructions provided on the course page in eLearning to create your clicker account. Please visit http://www.utdallas.edu/elearning/resources/Clickers/ for more details.</p> |
| <p>Grading Criteria</p> | <p><u>Class Participation will count for 5% of the overall course score.</u> Clickers/mobile devices will be used for this purpose. 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 4 quiz grades will be averaged together and count for 25% of the overall course score. <i>The lowest quiz grade will be dropped.</i></p> <p><i>The lowest grade of Tests 1-3 may be dropped to improve your grade.</i> The remaining two test grades plus the Test 4 grade will be averaged together and count for 70% of the overall course score. <i>The Test 4 grade will not be dropped.</i></p> <p>The course grade is based on the overall course score, as follows:</p> <p>A+ 98-100; A 93-97.99; A- 90-92.99; B+ 87-89.99; B 83-86.99; B- 80-82.99; C+ 77-79.99; C 73-76.99; C- 65-72.99; D+ 60-64.99; D 55-59.99; D- 50-54.99; F 0-49.99</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> |

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| <p>Missed Tests and Quizzes</p> | <p>If one quiz is missed, it will count as dropped quiz. For a further missed quiz, <i>if the absence is excused based on documentation, eg. Doctor's Note</i>, then <i>the average of the non-dropped quizzes will be used for the missing grade.</i></p> <p>If one test is missed, it will count as the dropped test. Again, the Test 4 grade cannot be dropped.</p> <p><i>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.</i></p> |
| <p>Late Arrivals, Early Departures</p> | <p><i>NOTE. For each quiz and test, arrival after someone has finished and departed is NOT permitted. Noncompliance results in a grade of zero for that quiz or test.</i></p> <p><i>For this reason, departures from tests will be allowed only after 30 minutes.</i></p> |
| <p>Policy on Use of Electronic Devices</p> | <p>Use of laptops, tablets or smartphones is only permitted for note-taking and pop quizzes. 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> |
| <p>Sharing Confidential Information</p> | <p>Students considering sharing personal information in email, in person, or within assignments or exams should be aware that faculty members and teaching associates/assistants and graduate/research assistants are required by UT Dallas policy to report information about sexual misconduct to the UT Dallas Title IX Coordinator. Per university policy, Sexual Misconduct Policy - UTDBP3102, faculty have been informed that they must identify the student to the UT Dallas Title IX Coordinator. Students who wish to have confidential discussions of incidents related to sexual harassment or sexual misconduct should contact the Student Counseling Center (972-883-2575 or the 24/7 Crisis Hotline at 972-UTD-TALK or 972-883-8255), the, a health care provider in the Student Health Center (972-883-2747), a clergyperson (or other legally recognized religious advisor) of their choice, or an off-campus resource (e.g., rape crisis center, doctor, psychologist). Students who are sexually assaulted, harassed, or are victims of sexual misconduct, domestic violence, or stalking, are encouraged to directly report these incidents to the UT Dallas Police Department at 972-883-2222 or to the Title IX Coordinator at 972-883-5202. Additional information and resources may be found at https://www.utdallas.edu/institutional-initiatives/title-ix/resources/.</p> |
| <p>Student Conduct And Discipline</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. See the UTD publication, <i>A to Z Guide</i>, issued to each registered student.</p> |
| <p>Academic Integrity</p> | <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> |
| <p>Email and Technical Support</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.</p> |
| <p>Withdrawal</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> It is the student's responsibility to handle withdrawal procedures from any class to avoid receiving a grade of "F".</p> |
| <p>Incomplete Grades</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>Disability Services</p> | <p>It is the policy and practice of UT Dallas to make reasonable accommodations for students with properly documented disabilities. If you are a student with a disability and believe you will need academic accommodations for this class, I encourage you to register with the Office of Student AccessAbility (OSA). Some aspects of this course, the assignments, the in-class activities, and the way the course is typically taught may be accommodated to facilitate your participation and progress. OSA will assist you in determining academic accommodations that are appropriate for your situation. Any information you provide is private and confidential and will be treated as such. To avoid any delay, please contact OSA as soon as possible. Please note that accommodations are not retroactive and disability accommodations cannot be provided until an OSA Letter of Accommodation has been given to the instructor. Students who have questions about receiving accommodations, or those who have, or think they may have, a disability (mobility, sensory, health, psychological, learning, etc.) are invited to contact OSA for a confidential discussion. OSA is located in the Student Services Building, SSB 3.200. They can be reached by phone at 972-883-2098, or by email at studentaccess@utdallas.edu.</p> |

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| 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.