



The University of Texas at Arlington

BIOL 5314-001: Biometry Fall 2015 Syllabus

Instructor(s): James P. Grover

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Office Hours: Monday, Wednesday 2 - 4 PM; Thursday 10 AM – noon; or by appointment

Section Information: BIOL 5314-001

Time and Place of Class Meetings: Science Hall 129, Monday and Wednesday 5:30 – 6:50 PM

Description of Course Content: An examination of statistical methods and procedures in relation to the design of biological experiments and the analysis of their results. Prerequisite: consent of the instructor.

Student Learning Outcomes: Awareness and understanding of statistical distributions, confidence interval estimation, hypothesis testing, techniques for analyzing continuous variables, categorical data, counts, and proportions. Ability to analyze data with techniques such as *t*-tests, contingency tables, linear regression, and analysis of variance. Ability to make and communicate interpretations and conclusions from statistical analysis.

Required Textbooks and Other Course Materials: Required textbook: Intuitive Biostatistics, 3rd edition, Harvey Motulsky, Oxford University Press. Required software: You will need to have the R program installed on a computer that you use. This is a free, open source software platform for statistical analysis, which can be downloaded from <http://cran.r-project.org>. Versions for Windows, Mac OS, and Linux are available. Supplementary materials may be recommended or made available during the course. Two supplementary books are recommended. First would be any general, brief guide to the R program. Many are available, a recommended choice is Introductory R, Robert J. Knell, Kindle book, Amazon (inexpensive, with all the basics needed in this course). The second is Statistics: An Introduction Using R, Michael J. Crawley, John Wiley & Sons. This book goes beyond scope of this course but has many relevant examples, and will be a valuable reference if you do more advanced work with R later in your career.

Descriptions of major assignments and examinations: Several homework assignments will be required. Each of these will require a report to be turned in, following a format to be discussed in class. Four reviews of scientific papers will be due. These should not exceed two pages in length, and further guidance will be given in class. There will be a take home final exam. Guidance on expectations for the exam will be given in class.

Late Work: The assignments in the course are an important part of the learning process and to benefit maximally you should plan to complete them on time. That said, it will usually be possible to tolerate a small amount of late work. Students who consistently turn in late work will be asked to consult with the instructor about the difficulties they face. For those who face unanticipated and uncontrollable difficulties in completing coursework, a grade of “incomplete” will be considered.

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I expect graduate students to consider their courses to be a serious professional obligation and to make every effort to attend. Students who must miss a class session should contact the instructor and develop a plan for remaining engaged with their learning. Students who consistently miss class will be asked to consult with the instructor about the difficulties they face. For those who face unanticipated and uncontrollable difficulties in completing coursework, a grade of "incomplete" will be considered.

Grading: Each assignment or exam will be graded on a 100-point scale. The final grade will be calculated as a weighted average of these grades using these weights:

Item	Weight
Homework	50%
Journal article reviews	20%
Final exam	30%

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see "Student Support Services," below.

Make-up Exams: The final exam will be a take home exam distributed on last day of class (December 9) and due on December 16. There should be no need for a make-up exam. If a student is unable to complete the exam because of unforeseen and uncontrollable circumstances a grade of "incomplete" will be considered.

Expectations for Out-of-Class Study: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 9 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. For graduate courses, see <http://catalog.uta.edu/academicregulations/grades/#graduatetext>.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/aao/fao/>).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the **Office for Students with Disabilities (OSD)**. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364.

Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671.

Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: The University of Texas at Arlington is committed to upholding U.S. Federal Law “Title IX” such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

In this course, I encourage collaborative learning. But I expect that written assignments will be prepared by each student independently and will consist only of their own original material, except where other material is properly attributed to its source and credited with a reference in a manner that meets the accepted practices of the research community in the biological sciences.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition,

no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located down the hallway to the right from the classroom door. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/universitycollege/resources/index.php>

The English Writing Center (411LIBR): Hours are 9 am to 8 pm Mondays-Thursdays, 9 am to 3 pm Fridays and Noon to 5 pm Saturdays and Sundays. Walk In **Quick Hits** sessions during all open hours Mon-Thurs. Register and make appointments online at <http://uta.mywconline.com>. Classroom Visits, Workshops, and advanced services for graduate students and faculty are also available. Please see www.uta.edu/owl for detailed information.

Course Schedule

Date	Topic	Chapters to read	Tasks due
31-Aug	Intro: Probability, statistics, and how we think	1	
2-Sep	No class		
7-Sep	Probability calculations	2	Assignment 1 due
9-Sep	Samples, populations, bias	3	
14-Sep	Confidence intervals, proportions and counts	4	Assignment 2 due
16-Sep	Summary statistics for continuous variables	7	
21-Sep	Summary statistics for continuous variables, cont., other kinds of variables	7, 8	Assignment 3 due; first paper review due
23-Sep	Scatter and dispersion, variance and standard deviation	9	
28-Sep	Probability concepts for continuous variables, the normal distribution	10	Assignment 4 due
30-Sep	Normal, lognormal, and other distributions	10, 11	
5-Oct	Confidence interval for the mean	12	Assignment 5 due
7-Oct	No class		
12-Oct	Theory of the t distribution, alternatives	13	Assignment 6 due
14-Oct	Error bars	14	Second paper review due

19-Oct	Hypothesis test, P values	15	Assignment 7 due
21-Oct	Hypothesis tests, cont., type I and II errors	15,16	
26-Oct	Contingency table analysis, comparing proportions	27	Assignment 8 due
28-Oct	Contingency table analysis, comparing proportions, cont.	27	
2-Nov	Comparing means of two samples	30	Assignment 9 due
4-Nov	Comparing means of two samples, cont.	30,31	Third paper review due
9-Nov	Correlation	32	
11-Nov	Simple linear regression	33	Assignment 10 due
16-Nov	Simple linear regression, cont.	33, 34	
18-Nov	Simple linear regression, cont.	34,35	
23-Nov	ANOVA	39	
25-Nov	ANOVA, cont., multiple comparisons (will be canceled if possible)	39,40	Assignment 11 due
30-Nov	The meaning of statistical significance	18,19	Fourth paper review due
2-Dec	Multiple tests, false discovery rate	18,22,23	Assignment 12 due
7-Dec	Power and choosing a sample size	20,26	
9-Dec	Scope of inference, the rest of statistics	all others	Final Exam distributed, Assignment 13 due
16-Dec			Final Exam due

Adjustments to the schedule may be necessary and if so, they will be announced in class.

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Library Information

Library Home Page <http://www.uta.edu/library>
 Subject Guides <http://libguides.uta.edu>
 Subject Librarians..... <http://www.uta.edu/library/help/subject-librarians.php>
 Course Reserves..... <http://pulse.uta.edu/vwebv/enterCourseReserve.do>
 Library Tutorials <http://www.uta.edu/library/help/tutorials.php>
 Connecting from Off- Campus <http://libguides.uta.edu/offcampus>
 Ask A Librarian <http://ask.uta.edu>

The subject librarian for your area can work with you to build a customized course page to support your class if you wish. For examples, visit <http://libguides.uta.edu/os> and <http://libguides.uta.edu/pols2311fm> .