MATH 3316: Statistical Inference

Fall 2015

Instructor: Dr. Suvra Pal

Office: PKH 442

Email: suvra.pal@uta.edu

Office Hours: Monday/Wednesday 2:00 pm - 3:00 pm or by appointment

Section Information: MATH 3316, 001

Time and Place of Class Meetings: The lectures are on Tuesdays and Thursdays from 11:00 am to 12:20 pm in PKH 107

Prerequisites

This course will have emphasis on both theory and actual data analysis. Basic knowledge of elementary statistics (e.g., MATH 1308) and level 1 calculus are required to follow the lectures and achieve success. In particular, students should understand univariate integration and differentiation. No prior knowledge of statistical software is required

Description of Course Content

A comprehensive study of basic statistical methods. Topics include descriptive statistics, numeracy, basic probability, basic principles of experimental design, inference, regression analysis, and use of R statistical package

Student Learning Outcomes

The course is oriented toward learning to handle data - from collection to description to formal inference. The students will have a solid understanding of basic statistical methods and the use of statistical software and will provide them a firm foundation for further advanced courses in Statistics

Required Text book and Software

- The textbook we are going to refer is

  Introduction to the Practice of Statistics (Eighth Edition). By Moore, McCabe, and Craig. Publisher: W. H. Freeman and Company

- We will also learn how to use the R statistical software to solve some problems of our interest. R is an open source statistical programing language which can be downloaded from

  `http://www.r-project.org`

  Another powerful user interface for R is RStudio, which can be downloaded from

  `http://www.rstudio.com`

Note that you must have both R and RStudio downloaded to use RStudio. Students are also free to use any other statistical softwares, for instance, Minitab, SPSS, Matlab, and SAS, among the others

Some Useful Links for R materials

- The R manual can be downloaded from `https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf`
- An introduction to R for beginners can be downloaded from `https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf`
- For interested readers, an excellent reference on statistical analyses using R can be downloaded from `http://www.ecostat.unical.it/tarsitano/Didattica/LabStat2/Everitt.pdf`

Descriptions of Major Assignments and Examinations

The different components of the course are assignments, two exams, and one final exam. Assignments will be handed in class, where the number of assignments will depend on the pace of lectures. Every assignment will have its own due date and no late assignments will be graded. When solving assignments, students are allowed to discuss with each other, however, the solution should be ones own. No forms of cheating or copying will be accepted (see the section on Academic Integrity). Exams will be in class as per the below schedule

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 have decided that attendance at class meetings is **not** required but strongly encouraged for better understanding of the subject area

Grading

The final mark for this course will be calculated as follows:

Component	Weight
Assignments	25%
Exam 1	20%
Exam 2	25%
Final Exam	30%

Grading Scale

Score	Grade
88.0%+	A
78.0% - 87.9%	B
69.0% - 77.9%	C
59.0% - 68.9%	D
58.9% and below	F

Note that the above cutoffs are strict

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 nine hours per week of their own time in course-related activities, including reading required materials, solving problems from the textbook, 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. See `http://catalog.uta.edu/academicregulations/grades/#undergraduatetext`

Exam Policy

Students are allowed to bring one 8.5 x 11 inches "cheat sheet" (double sided). Calculators are also allowed. Late arrivals (more than 15 minutes) will not be admitted and will receive a zero (that cannot be replaced). Any suspicion of cheating or use of unfair means will result in a zero (that cannot be replaced). To receive full credit on any question, students must show full work

Course Schedule

Week	Date	Section	Topic
1	27/08	4.1, 4.2	Randomness, Basic Ideas of Probability
2	01/09, 03/09	4.3, 4.4	Random Variables, Mean and Variance
3	08/09, 10/09	4.5	Probability Rules, Conditional Probability, Bayes Theorem, Independence of Events
4	15/09, 17/09	1.1 - 1.4	Different Types of Variables, Measures of Central Tendency and Spread, Five-Number Summary and Boxplots, Normal Distribution, Test for Normality
5	22/09, 24/09	2.1 - 2.3, 2.6, 2.7	Relationship Between Two Variables, Association, Correlation, Data Analysis for Two-way Tables
6	29/09, 01/10	Exam 1, 3.1 - 3.4	Design of Experiment, Sampling Design
7	06/10, 08/10	5.1, 5.2, 6.1	Sampling Distribution for Sample Mean, Sampling Distribution for Counts and Proportions, Normal Approximation, Continuity Correction, Introduction to Inference, Confidence Intervals
8	13/10, 15/10	6.2, 6.3	Hypothesis Testing, p-value, Level of Significance
9	20/10, 22/10	6.4, 7.1	Power of a Test, t and F distributions, Inference on Means
10	27/10, 29/10	7.2, 7.3	Comparing Two Means, Inference on Variance
11	03/11, 05/11	8.1, 8.2	Inference on proportion, sample size calculation
12	10/11, 12/11	9.1, 9.2	Inference for Two-Way Tables, Goodness of Fit Tests
13	17/11, 19/11	Exam 2, 10.1	Simple Linear Regression
14	24/11	10.1	Simple Linear Regression
15	01/12, 03/12	10.1, 10.2	Simple Linear Regression, One-Way ANOVA
16	08/12	10.2	One-Way ANOVA

I will be demonstrating the use of R in between lectures. R will be used more in Regression Analysis

Note: The above schedule is subject to change in any way that serves the educational needs of the students enrolled in this course

The exam schedule is as follows

Exam	Date	Material Tested
1	29/09	Chapters 1 - 4
2	17/11	Chapters 5 - 8
Final Exam	15/12, 11:00 am - 01:30 pm	Comprehensive

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://wweb.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 does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit `uta.edu/eos`. For information regarding Title IX, visit `www.uta.edu/titleIX`

Academic Integrity

Students enrolled at UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlingtons 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, Section 2.2, suspected violations of universitys 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 students suspension or expulsion from the University. This course includes a zero tolerance policy for academic dishonesty. Students found guilty of cheating will receive a grade of F for the course. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts" (Regents Rules and Regulations, Series 50101, Section 2.2)

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 students feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlingtons 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. 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 handicapped individuals

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`

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

Other Useful 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`