Course Syllabus

Course Information

Course Number:	BUAN 6359.004
Course Title:	Advanced Statistics for Data Science
Term:	Fall 2025
Meetings:	Fridays, 10:00 AM – 12:45 PM at JSOM 2.903
Professor:	Dr. Aysegul Toptal
Office:	JSOM 2.409
Online Office Hours:	Tuesdays 9:00 AM – 12:00 PM, (by appointment, e-mail to schedule it, MS Teams will be used)
Email:	Aysegul.ToptalBilhan@utdallas.edu
Office Phone:	972-883-5993
Teaching Assistant (TA):	Abeer Muntaseem Ahmed
TA Email	AbeerMuntaseem.Ahmed@utdallas.edu
TA Office Hours	Wednesdays 12:00 PM – 2:00 PM (by appointment, e-mail to schedule it, MS Teams will be used)

Course Modality and Expectations

Instructional Mode	Class will be delivered face-to-face. If a need appears for a change in instructional mode, the class will be informed promptly.
Course Platform	Links will be provided on the course website (over eLearning) for recordings and/or virtual meetings (if a need arises).
Expectations	Students are expected to: 1) train themselves about learning management system and the web conferencing software that will be used in this course, 2) know the university resources to submit technology help requests, 3) conduct themselves with responsibility, 4) display tolerance and respect in all communication, 5) use effective time management for self-study, 6) check the course web site for materials, announcements, updates, 7) ask for help from the teaching staff in a timely manner if they are having any difficulty in following the course, 7) watch the recordings posted on the course web site in a timely manner, 8) ask for help from UTD police department for medical and security related issues (main number: 972-883-2222).

Course Pre-requisites, Co-requisites and/or Other Restrictions

Credit cannot be received for both: OPRE 6301 and OPRE 6359/BUAN 6359.

Course Description

This course uses statistical methods to analyze data from observational studies and experimental designs to communicate results to a business audience. The course mandates prior knowledge of fundamental statistical concepts such as measures of central location, standard deviations, histograms, the normal and t-distributions (knowledge of calculus is not required). The course also emphasizes interpretation and inference, as well as computation using a statistical software package such as R or Python.

Student Learning Outcomes

Active and informed participation is expected from every student. Class sessions will consist primarily of lecture, with some discussions and in-class exercises as appropriate to the topic being covered. In preparation for class and exams, students are expected to read the appropriate assigned readings and watch the recordings posted by the instructor.

This course involves a lot of computation, and there is no substitute for getting your hands dirty. In data analysis, you learn as much when things "don't work" than when they go as planned. This is not an R or Stata course, but a Statistics course in which we will use those packages as tools to achieve our objectives.

Learning outcomes – upon completion of this course, students will be able to accomplish the following:

1. Apply inferential tools such as hypothesis testing and confidence intervals in the analysis and solution of business problems, in the context of the appropriate probability distributions.
2. Be able to compare several population means and make conclusions using the hypothesis test framework.
3. Learn how randomization and sampling influence scope of inference.
4. Understand the limitations of linear regression and how to address them when the required assumptions are not satisfied.
5. Communicate the findings of a statistical analysis from these new methods in a clear, concise, and scientific manner.
6. Integrate and analyze real-world datasets using common software packages.

Recommended Textbooks and Materials

Recommended Books:

1) Ramsey, F. L., and Schafer, D. W. (2013). The Statistical Sleuth: A Course in Methods of Data Analysis (3rd Edition). Boston, MA: Brooks/Cole.
   Book files: www.statisticalsleuth.com
   This link has a package in R with all the files (Sleuth3) http://r-forge.r-project.org/R/?group_id=585
2) Keller, G. (2017). Statistics for Management and Economics (12th Edition). Boston, MA: Cengage Learning.
3) Davies, T. (2016). The Book of R: A First Course in Programming and Statistics (1st Edition). No Starch Press.

Software and Materials: R & R-Studio, a webcam.
Textbooks and some other bookstore materials can be ordered online or purchased at the UT Dallas Bookstore.

Calculator: A calculator is required for this course. You are required to bring your calculator to each exam. You will not be allowed to share calculators. You will not be allowed to use cell phones as a calculator.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the AccessAbility Resource Center has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Materials

The Instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. Some of these materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Assignments and Tentative Schedule

The following is a **tentative schedule**, which will be followed as closely as possible. However, should any changes become necessary, it will be announced and updated on the course web site. It is your responsibility to keep track of announcements regarding changes to this schedule.

Week	Day	Chapter / Lecture	HW due*
MODULE 1			
Week 01	Aug. 29	• Introduction to the course • Unit 1 – Descriptive Statistics	
Week 02	Sept. 5	• Unit 1 (Cont'd) • Unit 2 – Probability	HW #1
Week 03	Sept. 12	• Unit 2 (Cont'd) • Unit 3 – Probability Distributions	
Week 04	Sept. 19	• Unit 3 (Cont'd)	HW #2
Week 05	Sept. 26	• Unit 4 – Sampling Distributions, Confidence Intervals and Hypothesis Testing	
Week 06	Oct. 3	• Unit 4 (Cont'd)	
Week 07	Oct. 10	• **Exam 1: Units 1, 2, 3, 4** • Unit 4 (Cont'd)	
MODULE 2			
Week 08	Oct. 17	• Unit 5 – Drawing Statistical Conclusions and Inference Using t-Distributions	HW #3
Week 09	Oct. 24	• Unit 6 – A Closer Look at Assumptions • Unit 7 – Comparison Among Several Samples and Multiple Comparison Problem	
Week 10	Oct. 31	• Unit 7 (Cont'd)	
MODULE 3			
Week 11	Nov. 7	• Unit 8 – Simple Linear Regression	
Week 12	Nov. 14	• **Exam 2: Units 4, 5, 6, 7** • Unit 8 (Cont'd) • Unit 9 – Multiple Regression	HW #4
Week 13	Nov. 21	• Unit 9 (Cont'd) • Unit 10 – Strategies for Variable Selection	
Week 14	Nov. 28	No Lecture (Thanksgiving Holidays)	
Week 15	Dec. 5	• **Exam 3: Units 7, 8, 9, 10**	
Week 16		Last Day of Classes is Dec. 9th	HW #5

*** Due date of a homework will be specified in the homework description. It will fall into the corresponding week, as stated in this table.**

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Grading Policy

The following table summarizes the grading policy.

Percentage		Scale			
Exam 1	28%	93 - 100 = A	84 - 87.99 = B+	76 - 79.99 = B-	64 - 70.99 = C
Exam 2	28%	88 - 92.99 = A-	80 – 83.99 = B	71 - 75.99 = C+	Below 64 = F
Exam 3	28%				
HW (5 assignments, 3.2% each)	16%				

Course & Instructor Policies

1. Students are responsible for checking the course website for course material, updates and announcements.
2. Students are responsible for all announcements made in class and in e-mails by the instructor through e-learning.
3. E-mails to the instructor and the teaching assistant(s) have to be sent from accounts assigned to you by UTD. No e-mail message from external domains will be replied. E-mails must be electronically signed (i.e., with your name and last name). Please include "BUAN 6359'' or "OPRE6359" in the subject line of your e-mail. Messages sent through MS Office Teams will not be replied, and voicemails left to the instructor's office phone number will not be responded. Best way to contact the instructor or the TA outside of the classroom, is to send your e-mail to the corresponding e-mail address in this syllabus.
4. Make-up exams will be offered only *under legitimate absences*, given that you provide justifying documents. For example:
   i) Illness: An official certification from your doctor-stating that you are not well enough to take the exam, is required. This certification must be e-mailed to me no later than three days (weekends included) after the date of the missed exam. An excuse of "I was not feeling well on the day of the exam" –without a doctor's report– does NOT make you eligible for a makeup exam.
   ii) Mandatory courtroom appearance: A copy of your official court summons with the date of your attendance, is required. This certification must be e-mailed to me no later than three days (weekends included) after the date of the missed exam.

   I only allow one missed exam to be made up for each student. You will be assigned zero for any other missed exam.
5. There will be NO extra credit in this course under any circumstances.
6. Exams may include a combination of true/false, multiple-choice, fill-in-the-blank, and essay type questions. All re-evaluation requests must be done in writing. A re-evaluation request may result in a lower, same or higher score. Office hours will be allocated for receiving feedback on your exams. You can only go over your exam during those designated times.
7. Exams will be held at UTD testing center (on a closed-book and closed-notes basis). You are allowed to bring one letter-size paper (8.5 inches wide and 11 inches long) for formulas and notes. You may use both sides of the paper. Formula sheets may be handwritten or typed.
8. Students are strongly encouraged to register a seat (for all three exams) early in advance via the following link, preferably during the first two weeks of Fall semester: https://ets.utdallas.edu/testing-center/. Once you start

your exam, you will have 120 minutes to work on it before you submit it. Students are expected to be familiar with the testing center procedures/policies - a copy of the **"Student Guidelines"** is available on the website https://ets.utdallas.edu/testing-center/students/. **There will be no make-up for students who are denied a seat by the testing center for late registering, etc.** (Registration to an exam closes 48 hrs. prior to exam time). The reserved time windows for the exams at the test center are as follows:

Exam Name	Exam Start Date, Time	Exam End Date, Time
Exam 1	10/6/2025, 8:30 a.m.	10/7/2025, 9:00 p.m.
Exam 2	11/10/2025, 8:30 a.m.	11/11/2025, 9:00 p.m.
Exam 3	12/1/2025, 8:30 a.m.	12/1/2025, 9:00 p.m.

Exam start time is the earliest time an exam can be taken. All students must complete/submit their exams no later than the exam's end time.

9. Copying, displaying, reproducing, or distributing copyrighted works may infringe the copyright owner's rights and such infringement is subject to appropriate disciplinary action as well as criminal penalties provided by federal law. Lecture notes and video recordings will be posted on the course web site only for the usage of students registered to this section of the course. Sharing the lecture notes and video recordings with others by distributing, posting on web sites, etc., is not permissible.
10. The instructor's and the teaching assistant's office hours are by appointment only. Appointments will be given for ten minutes. You are suggested to e-mail the instructor or the TA to make an appointment at least 24 hours in advance.
11. Students in this course suspected of academic dishonesty are subject to disciplinary proceedings, and if found responsible, the following minimum sanctions will be applied:
    - Exams – Zero for the Exam
    - Homework – Zero for the Assignment

Homework Assignments:

1. There will be five homework assignments. You will be asked to submit your solutions through e-learning. The Late Submission policy is as follows: Ten points will be deducted from a late submission on the due-date (that is, after the specific date and time indicated on the homework statement). Additional thirty points will be deducted per day past the due date. No homework submissions will be accepted three days after the due-date. For each homework, you will have two attempts to submit before the deadline. The latest submission before the deadline will be graded. Any submission through e-mail to overwrite a wrong document, which has already been submitted on e-learning, will not be accepted.
2. Discussion of the course material and working in groups are effective ways of learning. However, this does not mean that you can copy the homework from one of your friends. You can discuss the solution of a problem with your friends, but you should be alone, without any written solution in front of you, when you actually solve the problem.

Classroom Citizenship:

1. Class begins on time. Please maintain class decorum and be respectful towards fellow students in the class. If you have a doubt or misunderstanding regarding course work, feel free to discuss it with me.
2. In case we have to shift to online teaching due to unforeseen circumstances:
    a. Please do not use the Chat Feed on MS Teams during live virtual meetings. You may raise your hand and the instructor will call on you.
    b. You will be muted by default during virtual class meetings. When you raise your hand and the instructor calls on you, you need to turn on your microphone.

3. Using your phone during class is not permitted and it is rude. Keep it on silent at all times and away from your desk. Taking unauthorized pictures or video during meetings, with your mobile phone or a camera, is an infringement of privacy rights and it is prohibited.
4. Students are encouraged to bring a laptop to face-to-face class meeting. Use of computers for the purpose of e-mail, internet, games, instant messenger, etc., are strictly prohibited and regarded as class disruptions.
5. Please bring your nameplate to every face-to-face class meeting.

Technical Requirements

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage.

Course Access and Navigation

This course can be accessed using your UT Dallas NetID account on the eLearning website.

Please see the course access and navigation section of the Getting Started with eLearning webpage for more information.

To become familiar with the eLearning tool, please see the Student eLearning Tutorials webpage.

UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The eLearning Support Center includes a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

Communication

This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the Student eLearning Tutorials webpage for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

Server Unavailability or Other Technical Difficulties

The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online eLearning Help Desk. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

Campus Health and Resources

The information contained in the following link http://www.utdallas.edu/community-health/covid-19/ aim to create a healthy campus. As of the beginning of this Fall semester, COVID-19 is no longer considered a public health emergency by the CDC. However, here are some important points to remember:

- Vaccinations are widely available. The vaccine will help protect against the transmission of the virus to others and reduce serious symptoms in those who are vaccinated.
- A faculty member can ask, but not require, students to wear masks in the classroom. A faculty member can choose to wear a mask to provide additional protection and can stand at some distance from students.
- Faculty and staff should isolate if they show symptoms of COVID-19.
- A faculty member may change to online teaching mode if he/she (himself/herself) is required to quarantine.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"*As a Comet, I pledge honesty, integrity, and service in all that I do.*"

Accommodations for Students with Disabilities

Please review the related section within the UT Dallas Syllabus Policies and Procedures webpage (https://coursebook.utdallas.edu/syllabus-policies#accommodations-for-disabilities).

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students.

Please go to Academic Support Resources webpage for these policies.

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 UT Dallas Syllabus Policies webpage for these policies.

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