

BUAN/OPRE 6359: Advanced Statistics for Data Science
University of Texas at Dallas

Course Syllabus

Disclaimer:

The material contained in this syllabus is subject to change upon announcement by the instructor in class.

Course Information:

Course Number: BUAN/OPRE 6359.501
Course Title: Advanced Statistics for Data Science
Term: Spring 2022
Lecture Time: Thursday, 7:00pm - 9:45pm
Lecture Location: JSOM 1.117
Instructional Mode: Face to Face
Course Platform: Class will be delivered face-to-face in the classroom.

Instructor: Negin Enayaty Ahangar, Ph.D.
Office Information: JSOM 3.420
Office Hours: Monday/Wednesday, 1:00pm - 2:00pm (by appointment)
Email: Negin@UTDallas.edu

Teaching Assistant: Nikhil Bharadwaj
Online office Hours: Tuesday/Thursday, 1:00pm - 2:00pm
Email: Nikhil.Bharadwaj@UTDallas.edu

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 STATA.

Learning Outcomes:

Upon completion of this course, students will be able to accomplish the following:

- Develop and test hypotheses using multiple statistical methods.
- Understand differences between observational and experimental studies.
- Learn how randomization and sampling influence scope of inference.
- Explore experimental and observational designs that compare multiple populations when the response is continuous or binary.
- Communicate the findings of a statistical analysis from these new methods in a clear, concise, and scientific manner.
- Integrate and analyze real-world data sets using common software packages.

Course Materials:

Required textbook:

1. The Statistical Sleuth: A Course in Methods of Data Analysis - 3rd edition
 - Author: Fred Ramsey and Daniel Schafer
 - Ebook ISBN: 9781285287706 (Cengage Unlimited eTextbooks: ISBN 9780357693339)
 - Book files: www.statisticalsleuth.com

Recommended textbooks:

1. Statistics for Management and Economics - 11th edition
 - Author: Gerald Keller
 - Ebook ISBN: 9780357685778 (Cengage Unlimited eTextbooks: ISBN 9780357693339)
2. The Book of R: A First Course in Programming and Statistics - 1st edition
 - Author: Tilman M. Davies
 - Ebook ISBN: 9781593277796

Required software: R & R-Studio, Microsoft Excel

Grading Criteria:

Grades are assigned based upon the following weighting. The grading scheme will depend on the performance of students in the class.

Assignments	25%
Exam1	25%
Exam 2	25%
Exam 3	25%

Course Policy:

1. General:

- It is your responsibility to read the syllabus and check the eLearning for announcements/changes daily.
- You must pay close attention to all the due dates from the first day of class and schedule your personal activities around those dates.
- For any grade posted on eLearning, you have one week, after it is posted, to email the instructor a regrading request.

2. Exams:

- Exams will be taken in the classroom. The details will be announced through eLearning prior to each exam.
- Exams will NOT be returned to students. However, you have one week, after grades are posted on eLearning, to check your graded test in the instructor's office hours and have the instructor's feedback.
- There will be NO make-up for any missed exam except for medical emergencies in which a written statement is required for justifying the situation along with the physician's address and phone number.

3. Assignments:

- The assignments will be assessed through eLearning.
- There will be NO make-up for any missed assignment.

4. Extra Credit:

- Extra credit will NOT be offered.

5. Academic Dishonesty/Cheating:

- Students are required to read, understand and abide by the university policy on academic honesty.
- Any student who is found responsible for committing an act of academic dishonesty will receive a grade of F or 0 (zero) on that quiz, exam, assignment, project or course.
- The instructor reserves the right to change the grading policy without any notice due to unforeseen circumstances such as dishonesty, cheating, etc.

6. Mobile Phones, Laptops & Electronic Devices:

- Taking unauthorized pictures or recording during the lecture/classroom from presented materials with a mobile phone, laptop, camera or any other device is an infringement of privacy rights and is prohibited.

7. Class Recordings: Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility 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 Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct. The instructor may record meetings of this course. Any recordings will be available to all students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility 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 Office of Student AccessAbility accommodation. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the Student Code of Conduct.**8. Class Materials:** Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.**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.

UT Dallas Syllabus Policies and Procedures:

The information contained in the following link constitutes the University's policies and procedures segment of course syllabus. Please see <https://go.utdallas.edu/syllabus-policies>.

COVID-19 Guidelines and Resources:

The information contained in the following link lists the University's COVID-19 guidelines and resources for students. Please see <https://go.utdallas.edu/syllabus-policies>.

Classroom Conduct Requirements Related to Public Health Measures:

UT Dallas will follow the public health and safety guidelines put forth by the Centers for Disease Control and Prevention (CDC), the Texas Department of State Health Services (DSHS), and local public health agencies that are in effect at that time during the Fall 2021 semester to the extent allowed by state governance. Texas Governor Greg Abbotts Executive Order GA-38 prohibits us from mandating vaccines and face coverings for UT Dallas employees, students, and members of the public on campus. However, we strongly encourage all Comets to get vaccinated and wear face coverings as recommended by the CDC. Check the Comets United: Latest Updates webpage for the latest guidance on the Universitys public health measures. Comets are expected to carry out Student Safety protocols in adherence to the Comet Commitment. Unvaccinated Comets will be expected to complete the Required Daily Health Screening. Those students who do not comply will be referred to the Office of Community Standards and Conduct for disciplinary action under the Student Code of Conduct - UTSP5003.

The following is a tentative schedule, which will be followed as closely as possible. However, should any changes become necessary, it will be announced via eLearning. It is your responsibility to keep track of announcements regarding changes to this schedule.

Course Calendar:

Week	Date	Topic	Lecture	Homework
1	Thursday, January 20	Descriptive Statistics	Lecture 1	
2	Thursday, January 27	Probability	Lecture 2	
3	Thursday, February 3	Probability Distributions	Lecture 3	
4	Thursday, February 10	Sampling Distributions and Confidence Intervals	Lecture 4	
5	Thursday, February 17	Hypothesis Testing	Lecture 5	Assignment 1
6	Thursday, February 24	Hypothesis Testing Drawing Statistical Conclusions	Lecture 5 Lecture 6	(Lectures 1-5)
7	Thursday, March 3	Exam 1	Lectures 1-5	
8	Thursday, March 10	Inference Using t-distributions A Closer Look at Assumptions	Lecture 6 Lecture 6	
9	Thursday, March 17	Spring Break		
10	Thursday, March 24	Comparisons Among Several Samples Linear Combinations and Multiple Comparisons of Means	Lecture 7 Lecture 7	Assignment 2 (Lectures 6-7)
11	Thursday, March 31	Exam 2	Lectures 6-7	
12	Thursday, April 7	Simple Linear Regression	Lecture 8	
13	Thursday, April 14	A Closer Look at Assumptions for Simple Linear Regression	Lecture 8	
14	Thursday, April 21	Multiple Regression Inferential Tools for Multiple Regression	Lecture 9 Lecture 9	Assignment 3
15	Thursday, April 28	Strategies for Variable Selection	Lecture 10	(Lectures 8-10)
16	Thursday, May 5	Exam 3	Lectures 8-10	