Dillard College of Business Administration

BUAD 5633: Business Process – Causal Inference
Tuesday and Thursday at 5:30 PM to 7:00 PM
Room DB 129
Spring 2025

Contact Information

Instructor: Dr. Andrew Holt
Email: Andrew.holt@msutexas.edu
Office: Dillard Building 217
Office Hours: Tuesday: 12pm – 2pm
Wednesday: 12pm – 1pm
Thursday: 12pm – 2pm
By appointments Monday-Friday 9am-12pm or online.

The subject line of any email you send to me must start with "**BusProcess:"** that way I know what class you are in. So for example, if you are wondering when the next exam is, then the subject line for the email should be "**BusProcess: Next Exam Date?**" If the subject line is wrong, then I will ignore your email or maybe I will ask you to resend your email with the correct subject line**.**

Course Materials

If you want to read a textbook, then I suggest the following two books; however, my lecture notes and slides will be available.

Introductory Econometrics: A Modern Approach by Jeffery Wooldridge
Using R for Introductory Econometrics by Florian

Download R for free here: https://cran.r-project.org/bin/windows/base/
Download RStudio for free here: https://posit.co/products/open-source/rstudio/

Course Description

Often, businesses want to know the effect their polices and decisions have on revenue, suppliers, customers; however, their policies cannot be implemented randomly. This poses a problem for a data scientist because most of the time non-random policies or decisions cannot be used to infer the effects of said policies or decisions.

This class is designed to teach students commonly used methods of causal inference that take advantage of quasi-natural experiments that allow for the analysis of business policies and decisions.

Objectives:

General Learning Goals: Students will be asked to demonstrate their critical thinking and problem-solving skills by applying statistical learning techniques in their homework assignments and exams. This course aims to contribute to developing students' ability to communicate their analyses in a professional manner. Student's will have to integrate the statistical knowledge they acquire from this course with multiple business disciplines.

Course Specific Learning Goals: Students should learn how to perform data analysis in R. Students are expected to learn the following statistical techniques: Linear Regression, Conditional RCT, Difference-in-Differences, Regression Discontinuity.

Assessments:

1. Homework Assignments: There will be 7 homework assignments. On days that homework will be due at the end of class, we will devote class time to working through the homework.
2. Exams: There will be one midterm exam and one final exam. Each exam is worth 26 points. Students are not allowed help from any other person for these exams. All electronic devices are banned. Students caught cheating on the exam will be given a 0 in the course.

Missed Exam Policy:

If you miss one of the midterm exams, then I will replace the missing grade with your final grade so long as you were excused. Unexcused midterm exam absences will result in only 90% of your grade on the final exam replacing the missing midterm grade.

Grading:

Assignment	Points
Homework Assignment # 1	5
Homework Assignment # 2	5
Homework Assignment # 3	5
Homework Assignment # 4	5
Homework Assignment # 5	5
Homework Assignment # 6	5
Homework Assignment # 7	5
Midterm Exam	30
Final Exam	30

A= 89.5-100% C =69.5-79.5%
B= 79.5-89.5% D= 59.5-69.5% F= <59.5%

Class Participation:

Students are expected to participate in all class discussions. Sleeping in class, using electronic devices, tardiness, and any class disruption will result in a lower grade. The instructor reserves the right to lower any student's final grade by a letter grade if the student failed to actively participate in class discussions. Because it is impossible to participate in class while not attending class, you must attend class to not receive a lower grade.

Cheating:

Cheating on an assignment will result in a 0 on the assignment and I will also report you to the Chair of the department.

Plagiarism Statement:

``By enrolling in this course, the student expressly grants MSU a “limited right” in all intellectual property created by the student for the purpose of this course. The “limited right” shall include by not be limited to the right to reproduce the student’s work product in order to verify the originality and authenticity.’’

Americans with Disabilities Act

This course follows the university policies and guidelines suggested by the Disability Support Services Office for qualified students. Students are referred to the Midwestern State University Undergraduate Catalog for details.

Campus Carry Policy

Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Areas excluded from concealed carry are appropriately marked, in accordance with state law. For more information regarding campus carry, please refer to the University’s webpage at link to MSU campus carry rules and policies.

Syllabus Change Policy

This syllabus is a guide for this course and is subject to change with advanced notice.

References:

Midwestern State University Student Handbook

Midwestern State University Undergraduate Catalog

Course Content

January 21 • Syllabus Day	January 23 • Lecture 1: OLS Procedure
January 28 • Lecture 2: Assessing the Procedure	January 30 • Lecture 3: Assessing Models
February 4 • **Homework 1 – OLS by Hand Due at the End of Class**	February 6 • Lecture 4: Intro to R
February 11 • Lecture 5: Multivariate Regressions	February 13 • Lecture 6: Interpretation, Natural Log, Dummy Variables
February 18 • Lecture 7: Interactions and Nonlinearities	February 20 • **Homework Day**
February 25 • **Homework 2 – Advanced Regressions in R Due at the End of Class**	February 27 • **Homework Day**
March 4 • **Review** • **Homework 3 Due Before Class**	March 6 • **Exam 1**
March 11 • **Spring Break**	March 13 • **Spring Break**
March 18 • Lecture 8: Diagnostic Tests	March 20 • Lecture 9: Causality
March 25 • Lecture 10: DAGS	March 27 • **Homework Day**
April 1 • **Homework 4 – Causality Due at the End of Class**	April 3 • Lecture 11: Regression Discontinuity
April 8 • Lecture 11: Regression Discontinuity • **Homework Day**	April 10 • **Homework 5 – Regression Discontinuity Due at the End of Class**
April 15 • Lecture 12: Fixed Effects	April 17 • **Holiday Break**
April 22 • Lecture 13: Two-Period DiD	April 24 • Lecture 14: Multiperiod DiD
April 29 • **Homework Day**	May 1 • **Homework 6 – DiD Due at the End of Class**
May 6 • **Homework Day**	May 8 • **Homework 7 Due Before Class** • **Review**
Exam 2 will be held sometime between May 9th and May 17th	