






ECON 5625

Colloquium in Econometrics

Fall 2025

UMKC - Department of Economics

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Course Description & Learning Outcomes


This course first will be an introduction to casual inference methods used in today's academia. The first few lectures will be a recap of what was done in Econ 5525, where we will revisit concepts like Hypothesis testing, Linear Regression, Panel Data etc. After which, we will visit Causality with various different methods like Difference in Differences, Regression Discontinuity Design, Matching among others.




Learning Outcomes

Upon successful completion of this course, students should be able to:

- ✓ Have a detailed understanding of causal inference methods and their applications in econometric research,
- ✓ Master advanced econometric techniques including Difference-in-Differences, Regression Discontinuity Design, and Matching methods,
- ✓ Critically evaluate empirical research and identify appropriate causal identification strategies,
- ✓ Design and implement rigorous empirical research projects using modern econometric methods,
- ✓ Effectively communicate econometric findings through written reports and oral presentations.

Programming Resources

 **Note:** I will not be teaching how to code in this course. AI tools exist and please use them. However, the following resources are recommended:

-  **Python for Causal Inference:** [Python Causality Handbook by Matheus Facure](#)
-  **R Resources:** Code examples available in Cunningham's Mixtape
-  **Stata Resources:** Code examples available in Cunningham's Mixtape

Required Materials



Primary Textbooks

-  **Causal Inference: The Mixtape** by Scott Cunningham
 Available free online: <https://mixtape.scunning.com/>
 Physical copy: [Available on Amazon](#)
-  **Econometrics** by Bruce Hansen
 Available free online: <https://perhuaman.wordpress.com/wp-content/uploads/2014/06/econometrics-bruce-hansen-2014.pdf>
 Focus chapters: 3, 5, 8, 10, 13, 15, 19
-  **The Effect: An Introduction to Research Design and Causality** by Nick Huntington-Klein
 Available free online: <https://theeffectbook.net/>
 Physical copy: [Available on Amazon](#)
-  **Mostly Harmless Econometrics: An Empiricist's Companion** by Joshua D. Angrist and Jörn-Steffen Pischke
 Available at: [Princeton University Press](#)
 Also available: [Amazon](#)

Tentative Course Outline

This serves as the provisional course outline, and I will assess our progress as we proceed. If I observe that individuals are becoming proficient with the material, I may introduce additional and more advanced applications as the class progresses.



Week 1: Introduction & Review of Probability

-  **Readings:** Hansen Ch. 2, 5, 8; Mixtape Ch. 2.1 to 2.10
 **Topics:** Basic probability theory, Probability Distributions, Variance, Expected Value



Week 2: Labor Day

 **No Classes - Enjoy your break!**

Week 3: Regression Review

-  **Readings:** Hansen Ch. 10, 13, 15, 19; Mixtape Ch. 2.11 to 2.16
 **Topics:** Ordinary Least Squares, Endogeneity



Week 4: Diagnostics & Directed Acyclic Graphs (DAGs)

-  **Readings:** Mixtape Ch. 3 & 4; The Effect Ch. 6 to 8
 **Topics:** Hypothesis testing, Causal graphs, Backdoor criterion, Colliders and selection bias



Week 5: Potential Outcomes Model

 **Readings:** Mixtape Ch. 4
 **Topics:** Average treatment effects, Average Treatment on the treated, Simple Difference in Means



Week 6: Matching & Subclassification

 **Readings:** Mixtape Ch. 5; The Effect Ch. 14
 **Topics:** Propensity score matching, Covariate matching, Sensitivity Analysis



Week 7: Panel Data

 **Readings:** Mixtape Ch. 8; The Effect - Ch. 16; Hansen Ch. 19
 **Topics:** Fixed Effects & Random Effects



Week 8: Regression Discontinuity Design

 **Readings:** Mixtape Ch. 6; The Effect - Ch. 20
 **Topics:** Sharp RD, Fuzzy RD, Bandwidth selection, Robustness checks



Week 9: Instrumental Variables

 **Readings:** Mixtape Ch. 7; The Effect Ch. 19
 **Topics:** Two-stage least squares, Weak instruments, LATE interpretation

Week 10: Shift-share instruments

 **Readings:** In class readings
 **Topics:** Bartik instruments, Endogeneity



Week 11: Difference-in-Differences

 **Readings:** Mixtape Ch. 9.1 to Ch. 9.5; The Effect - Ch.18
 **Topics:** Parallel trends, Event studies

Week 12: Advances in Difference-in-Differences

 **Readings:** Mixtape Ch. 9.6; Papers in class
 **Topics:** Staggered Adoption, TWFE Violations

Week 13: Synthetic Control Methods

 **Readings:** Mixtape Ch. 10
 **Topics:** Synthetic control, Placebo tests, Inference methods

Week 14: Thanksgiving Break

 **No Classes - Enjoy your break!**

Week 15: Student Research Presentations I

 **Topics:** Student presentations of original research proposals

📅 Week 16: Student Research Presentations II

📌 **Topics:** Student presentations of original research proposals

🕒 Tentative Evaluation & Grading

❗ **Important:** It is your responsibility to follow emails and announcements sent through **Canvas**, and to stay up to date with the deadlines and course material.

📋 Assignments

📝 **In-Class Weekly Tests (20%)** - A simple in-person weekly quiz, consisting of 2-3 questions based on the material covered in the previous week (not multiple-choice questions). These quizzes will be open book and straightforward but will require effort.

Paper Presentations (30%) - All students will be required to present a paper in the semester. You will choose from a curated list of influential papers in causal inference.

Original Research Proposal & Presentation (50%) - You are required to develop an original research proposal that demonstrates your understanding of causal inference methods. This should focus on the econometric design you will be using for your dissertation research. The proposal includes both a written component and an in-class presentation.

🎓 Grading Scale

Percentage of Points Earned	Letter Grade Earned
93-100%	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
63-66%	D
60-62%	D-
0-59%	F

🍴 Basic Needs

It can be challenging to do your best in class if you have trouble meeting basic needs like safe shelter, sleep, and nutrition. If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, UMKC is here to help.

🏠 **UMKC Basic Needs:** [Basic Needs webpage](#) - Information on food assistance, housing assistance, and financial literacy

🏠 **Kangaroo Pantry:** [Kangaroo Pantry website](#) - Free food and other items for all UMKC students

 I strongly encourage you to set up an appointment with UMKC Basic Needs and/or me if you have a need for this type of assistance.

Academic Calendar

Students are encouraged to review important add, drop or withdraw dates in the [UMKC Academic Calendar](#) site.

Date	Description
August 26	Classes Begin (full 16-week session and first 8-week session)
September 1	Last day to add courses without an instructor signature (full 16-week session)
September 1	Last day to change a course from audit to credit (full 16-week session)
September 1	Last day for a 100% refund (full 16-week session)
September 1	Last day to register without paying late registration fee
September 22	Last day to drop a course and not have it appear on your transcript (full 16-week session)
September 22	Last day for a 50% refund (full 16-week session)
September 22	Last day to change a course from Credit to Audit (undergraduate - full 16-week session)
October 20	Last day for a 25% refund (full 16-week session)
October 20	Last day to withdraw with a "W" (graduate/professional - full 16-week session)
November 3	Deadline to apply for Fall 2025 graduation
November 10	Spring 2026 Priority Registration Begins
November 21	Last day to withdraw with a "W" (undergraduate - full 16-week session)
November 23-30	Fall Break
December 1	Spring 2026 Open Registration Begins
December 9	Finals Week (Law - full 16-week session)
December 12	School of Humanities and Social Sciences Reading Days
December 13	School of Humanities and Social Sciences Reading Days
December 13	Last day to withdraw with a "W" or "WF" (graduate/professional - full 16-week session)
December 13	Last day of classes (full 16-week session)
December 16	Finals Week (All Academic Units, except Law - full 16-week session)

Table 1: Fall 2025 Academic Schedule


Academic Integrity


The Board of Curators of the University of Missouri recognizes that academic honesty is essential for the intellectual life of the University. Faculty members have a special obligation to expect high standards of academic honesty in all student work. Students have a special obligation to adhere to such standards. Academic dishonesty, including cheating, plagiarism unauthorized use of artificially generated content or sabotage, is adjudicated through the University of Missouri Student Conduct Code and Rules of Procedures in Student Conduct Matters.

Academic Support and Mentoring

The department of **Academic Support and Mentoring (ASM)** offers a wide range of services and programs to help students meet their academic goals. ASM offers peer tutoring, writing and presentation assistance, SI study groups, instructional videos and many more resources that are valuable to your success in this class.

 You can use **RooLearning+** for scheduling appointments and viewing when support for this class is available.

 Access RooLearning+ by downloading the app from the App Store (Apple) or Google Play (Android) and sign in with your SSO.

 The URL for the RooLearning+ site is umkc.tedu.app/student.

Attendance Policy

Students are expected to attend and participate in classes as indicated by the course modality (Classroom based, On-line, etc. available on [Pathway](#)). For more information on UMKC course modalities, please visit the [Registrar's page](#).

In order to comply with federal regulations associated with eligibility rules for federal financial aid, students not attending/participating a course during the first three weeks of the term will be administratively dropped from the specific course. Advance notice of attendance policies of academic units and individual instructors should be given, and such notice should be in writing. Students should notify instructors of excused absences in advance, where possible. Students who have an excused absence are expected to make arrangements with instructors for alternative or make-up work. Such arrangements should be made in advance of the absence, where possible. Instructors should accommodate excused absences to the extent that an accommodation can be made that does not unreasonably interfere with the learning objectives of the course or unduly burden the instructor. Attendance policies shall be applied in a non-discriminatory manner. Enrollment as a student is required to attend any class unless otherwise pre-approved by the instructor. Instructors are responsible for verifying student attendance and participation within the first three weeks (16 week course) through the Attendance Verification Survey (administered through UMKC Connect) as well as maintain records of participation throughout the term so that the last date of attendance for students with recorded "F" or "W" final grades may be submitted.

Campus Safety

Inclement weather, mass notification, and emergency response guide can be found on the [UMKC Alert page](#).

UMKC Connect

Important information is available to undergraduate students in **UMKC Connect**, a central location for faculty, advisors, student services and students to communicate and collaborate on a strategic plan for each student's academic success. Throughout the term, students may receive emails regarding course grades or academic performance. Students should regularly check their Connect dashboard and are expected to address information posted in a timely manner. This information may be shared with the student's Success Network made up of his or her academic advisor(s) and other campus resources so that UMKC may fully support the student's success. Students may schedule appointments to meet with members of their Success Network through UMKC Connect.

Grade Appeal Policy

The University grade appeal procedure is available only for the review of allegedly capricious grading and not for review of the instructor's evaluation of the student's academic performance. Capricious grading, as that term is used here, comprises any of the following:

- The assignment of a grade to a particular student on some basis other than the performance in the course;

- The assignment of a grade to a particular student according to more exacting or demanding standards than were applied to other students in the course; (Note: Additional or different grading criteria may be applied to graduate students enrolled for graduate credit in 300- and 400-level courses.)
- The assignment of a grade by a substantial departure from the instructor's previously announced standards

Student Accessibility Services and Accommodations

To obtain disability related accommodations and/or auxiliary aids, students with disabilities must contact [Student Accessibility Services](#) as soon as possible by calling 816-235-5612. Once verified, our office will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. You are also welcomed to contact the Student Accessibility Services office via email at disability@umkc.edu.

Counseling Services and Student Health & Wellness

UMKC students may experience many challenges in their lives while attending college - stress, depression, suicidality, trauma, relationship issues, health concerns, etc. As an institution, we care about your success and well-being, and want to make you aware of some helpful resources on campus.

- **UMKC Counseling Services:** [Counseling Services](#)
Located at Brookside 51 Building, 5110 Oak Street, Suite 201
Appointments: 816-235-1635
- **UMKC Student Health and Wellness:** [Student Health & Wellness](#)
Located at Brookside 51 Building, 5110 Oak Street, Suite 237
Appointments: 816-235-6133 or [schedule online](#)
- **MindBody Connection:** Located in the Student Union, 3rd floor, room 303G & 303H
Provides space for stress relief and mindfulness with massage chairs, art supplies, and quiet spaces
- **UMKC Student HelpLine:** 816-235-2222 - For any questions or concerns
- **Suicide Prevention Resources:** [UMKC's Policy on Suicide Prevention Resources](#)
- **Complaint Policy:** [File a complaint online](#)

= Equal Opportunity & Educational Access

UMKC is committed to providing equal opportunities to all students without unlawful discrimination on the basis of a protected identity, including race, color, national origin, ancestry, religion, sex, pregnancy, sexual orientation, gender identity, gender expression, age, disability, protected veteran status, or any other status protected by applicable state or federal law.

Discrimination & Harassment

Compliance with UM System Collected Rules and Regulations (CRRs) 600.000 is monitored by the [Office of Equity & Title IX](#), but it is the responsibility of the entire university community to provide equal opportunity through relevant practices, initiatives, and programs. If you or someone you know has experienced discrimination or harassment based on their protected identity, we encourage you to visit [Making a Report](#).

For those who have experienced discrimination or harassment, please see the [Support and Connections](#) pages of our Equity & Title IX website for a list of campus and community support services.

Sexual Harassment under Title IX

UM System Collected Rules and Regulations (CRRs) 600.020 prohibits all students, employees, volunteers, and visitors from engaging in sexual harassment, including sexual assault, dating violence, domestic violence, and stalking,

in a university education program or activity against a person in the United States. If you or someone you know has experienced sexual harassment, please visit the [Support and Connection](#) pages of our Equity & Title IX website for a list of support services on campus and in the community. For information on how to make a report to the university, visit [Making a Report](#).

Accommodating Pregnancy & Related Conditions

UMKC provides reasonable accommodations to students related to pregnancy and childbirth, including adjustments to attendance requirements, course due dates, leaves of absence, and other accommodations. If you have questions or would like to request arrangements, please visit [Pregnancy & Related Accommodations](#) or contact the Office of Equity & Title IX at (816) 235-1771 or eqtix@umkc.edu.

Confidential Resources

Students may seek confidential support from:

- [RISE: Resources, Intervention, Support, & Education](#)
- [Counseling Services](#)
- [Student Health & Wellness](#)

Right to Free Expression

It is vitally important for UMKC to foster and maintain an educational environment that promotes free discussion, inquiry and expression by students inside the classroom and beyond, without fear that their exercise of such rights will have negative repercussions in areas over which the university has responsibility. It is equally important that students understand the narrow line separating their First Amendment rights and the legal and privacy rights of others so that students can exercise those rights within appropriate boundaries.

Per UM System Collected Rules and Regulations (CRRs) 200.015 your instructors should encourage free discussion, inquiry, and expression in courses, conferences and meetings. Student performance shall be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards.

Classroom Expectations: In exercising your right to free expression, UMKC requests students adhere to these five guidelines:

- Share responsibility for including all voices in the conversation, leaving sufficient time for others to engage in the discussion. Listen respectfully, avoiding interruptions or distractions.
- Recognize how your own identity and experiences inform your opinions and reactions to others. Be open to changing your perspectives when exposed to the ideas of others
- Speak with care, acknowledging that your words may be perceived as disrespectful, marginalizing, biased, or harmful.
- Understand that everyone makes mistakes; view these mistakes as valuable in the learning process. Notice your own defensive reactions, and channel them into furthering a productive discussion
- Differentiate between safety and comfort; accept discomfort as necessary for learning and exploring ideas through a social justice lens.

Although your right to free expression is protected, your instructors have the authority to take action under CRR 200.010 when they believe the conduct of any student unreasonably disrupts the classroom environment and prevents others from learning or threatens or endangers the health or safety of any person. If you feel your instructor was in error in taking action under CRR 200.010 related to your right to free expression, visit [Making a Report](#).

! Expressions of Perceived Bias

UMKC is committed to equity, diversity, inclusion and respectful interaction. In support of our campus community, the university provides the opportunity for students, employees, volunteers, and visitors to report expressions of perceived bias and to request UMKC respond to such expressions.

An expression of perceived bias may occur when someone believes that they have been subjected to harassment, bullying, stereotyping, microaggressions, abuse, marginalization, or any other form of targeted misconduct because they identify or are associated with a particular group. If you believe you have experienced an expression of bias or you become aware of such an expression, visit [Making a Report](#). Support: If the conduct of others prevents you from fully participating in the classroom or in university activities, UMKC offers confidential support through [Counseling Services](#) and [RISE: Resources, Intervention, Support, & Education](#). Additional campus and community support services are listed on the [Support and Connections](#) pages of our Equity & Title IX website.