
ECON 4555
Transportation Economics and Policy Analysis Using Big Data and Artificial Intelligence
FALL 2026
MWF 11:15-12:05, MUEN E113

COURSE SYLLABUS

Overview:

This is a course in transportation economics and policy for undergraduates. Students will combine large real-world data sets with economic theory and advanced artificial intelligence tools to analyze transportation markets and policies. The course combines topics from environmental economics and industrial organization including: aggregate demand for transportation; disaggregate demand and mode choice; externality theory; intercity passenger and freight transportation; and policies such as price regulation, fuel taxes and congestion pricing. Instruction will emphasize the current literature and examples from recent policies.

Office Hours and Contact Information:

Professor: Jonathan Hughes
Office location: Economics 102
Office hours: MWF from 2:00 pm-3:00 pm (or by appointment)
Phone: (303) 735-0220
Email: jonathan.e.hughes@colorado.edu
Class web site: Canvas

Required Text:

The required text for the course is “Revitalizing a Nation: Competition and Innovation in the US Transportation System” by Clifford Winston and Jia Yan (2024). Hardcover, paperback, Kindle, eBook versions are all acceptable. CU Chinook currently links to a free eBook version.

Reading/Reading Quizzes:

Throughout the course I will assign readings to supplement the lecture material. I will give a short quiz on the week’s reading, once per week, on the assigned reading. I will drop your two lowest quiz grades. There will be no make-up quizzes.

Grading:

15% Reading quizzes (two lowest dropped)
40% Problem sets/empirical exercises
10% Project proposal
35% Final project

Problem Sets and Empirical Exercises:

Throughout the course students will be assigned problem sets that represent a mix of theory and empirical work. An important goal of this course is to expose students to the data sources used to analyze transportation markets and policies. Due dates are listed on the course syllabus.

For empirical exercises, we will be using data from recent studies and published government reports. We will utilize **ChatGPT** and the Python programming language for much of this work. Students are expected to maintain a subscription to **ChatGPT Plus** (\$20/month) during the course. Unfortunately, ChatGPT Edu at CU Boulder does not (yet) support Codex and other advanced features.

Late Assignments:

Problem sets and other assignments are **due before the start of class on the date due**. No late assignments will be accepted except in the case of documented medical or family emergency. Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with assignments or required attendance. If you foresee a conflict, contact me as soon as possible to make alternate arrangements for you to complete the requirements of this course.

Lecture Notes:

My lectures will make use of both the chalkboard (well iPad) and PowerPoint. The lecture notes will be available through Canvas. Please visit the class website often.

Classroom Behavior:

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

Additional classroom behavior information

- [Student Classroom and Course-Related Behavior Policy](#).
- [Student Code of Conduct](#).
- [Office of Institutional Equity and Compliance](#).

Accommodation for Disabilities:

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

If you have a temporary medical condition or required medical isolation for which you require accommodation, please contact me as soon as possible to arrange accommodations. Also see [Temporary Medical Conditions](#) on the Disability Services website.

Preferred Student Names and Pronouns:

CU Boulder recognizes that students' legal information does not always align with how they identify. If you wish to have your preferred name (rather than your legal name) and/or your preferred pronouns appear on your instructors' class rosters and in Canvas, visit the [Registrar's website](#) for instructions on how to change your personal information in university systems.

Honor Code:

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part of adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from Student Conduct & Conflict Resolution and will be subject to academic sanctions from the faculty member. Visit [Honor Code](#) for more information on the academic integrity policy.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation:

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits [protected-class](#) discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email OIEC@colorado.edu. Information about university policies, [reporting options](#), and [OIEC support resources](#) including confidential services can be found on the [OIEC website](#).

Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure the person impacted receives outreach from OIEC about resolution options and support resources. To learn more about reporting and support a variety of concerns, visit the [Don't Ignore It page](#).

Religious Holidays:

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance.

See the [campus policy regarding religious observances](#) for full details.

Mental Health and Wellness:

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact [Counseling and Psychiatric Services \(CAPS\)](#), located in C4C, or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through [AcademicLiveCare](#).

The AcademicLiveCare site also provides information about additional wellness services on campus that are available to students.

Tentative Course Outline:**Introduction****Part I: Urban Transportation**

Week 1 : Why Study Transportation Markets?

Week 2 : The Effect of Reductions in Vehicle Miles Traveled on Highway Fatalities and Congestion with Heterogeneous Motorists

Week 3: Is Public Bus Transit a Competitor or a Subordinate to Public Rail Transit?

Week 4: Measuring the Benefits of Ridesharing Service to Urban Travelers: The Case of the San Francisco Bay Area

Week 5: Consumer Adoption of Electric Vehicles: The Appropriate Role of the Private Sector and Government

Week 6: Consumer Adoption of Autonomous Vehicles: The Appropriate Role of the Private Sector and Government

Part II. Intercity Passenger Transportation

Week 7: Would US Travelers Benefit from Entry by Foreign Airlines? Simulating the Effect of Cabotage based on Low-Cost Carrier Competition in US and EU Markets

Week 8: Public Airport Competition and Some Potential Benefits of Private Airport Competition

Week 9: Private Airport Competition and Innovation: The Case of Heated Airport Runways

Part III. Freight Transportation

Week 10: Railroad Competition and Innovation

Week 11: The Potential Benefits of Autonomous Trucking

Week 12: Water Transportation and Drones

Part IV. Synthesis and Policy Recommendations

Week 13: Synthesis and Policy Recommendations

Week 14: Project presentations

Week 15: Project presentations