

GEOG 5301 Sustainable Transportation - Spring 2026

Instructor: Harvey Miller, Professor, Department of Geography

Class meetings: T H 2:20PM-3:40PM Denney Hall 253

Office hours: T H 1:00PM – 2:00PM Derby Hall 1176

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Course Description

The explosion in mobility over the past two centuries is one of the most profound changes in the history of human civilization. While mobility has benefits, it comes with environmental, social and economic costs. A prime challenge facing humanity in the 21st century is reducing or eliminating the massive harms caused by our transportation system while maintaining – and even increasing – accessibility to opportunities. This course examines the problem of creating sustainable transportation systems. We will examine the environmental and human problems associated with transportation, including climate change, air quality, consumption of non-renewable resources, safety, congestion and social equity. We will also examine possible solutions to these problems, including pricing, alternative fuels, autonomous vehicles, public transit, walkability, bikeability, urban form and intercity rail.

Learning Objectives

After successful completion of this course, students will:

1. Understand concepts surrounding sustainability and their application to the problem of mobility
2. Understand the technological and social processes that have created the mobility revolution
3. Understand the scientific basis for non-sustainable transportation and the implications for the environment, society and personal well-being.
4. Engage in informed discussions about policy, planning, technological and educational prescriptions that improve transportation sustainability
5. Be skilled in the articulation and communication of ideas about sustainable transportation

Lectures, Readings and Learning Technologies

This is an in-person class with lectures. You are expected to attend the regular lectures and participate in the class discussions.

There is no textbook for this course: I will post all readings at the Canvas class website. There are required and optional readings. I will also make announcements and provide other course information via this site. Please check this site regularly for updates; it is also a good idea to turn on notifications.

It is your responsibility to ensure access to the learning technology website and its tools. This includes seeking technical support from OSU staff when encountering any problems.

Students must themselves confirm that assignments are successfully posted or files are uploaded to Canvas in order to receive credit.

Course Organization

This course consists of several modules, each consisting of 1-3 lectures or films, organized in three major sections. (The whole numbers/underlined topics below correspond to individual Modules at the Canvas course site.)

Sustainable transportation: Concepts and history – the conceptual, historical, and theoretical backgrounds for understanding sustainability and mobility

1. Sustainability and mobility
 - 1.1. Sustainability concepts
 - 1.2. Sustainable and unsustainable mobility
2. History of transportation
 - 2.1 Global history of transportation
 - 2.2 Evolution of urban mobility

Sustainable transportation: Problems – the scientific evidence surrounding sustainable and unsustainable transportation

3. Nonrenewable energy and greenhouse gases
 - 3.1 Non-renewable energy and mobility
 - 3.2 Greenhouse gases and climate change
4. Public health: air quality and physical activity
 - 4.1 Air quality and health
 - 4.2 Physical inactivity and health
5. Safety and traffic congestion
 - 5.1 Road trauma and safety
 - 5.2 Traffic congestion
6. Social equity
 - 6.1 Mobility justice

Sustainable transportation: Solutions – regulatory, technological, policy and planning solutions to sustainable transportation problems

7. Cost, pricing and travel demand management
 - 7.1 Transportation cost and pricing
 - 7.2 Travel demand management
8. Alternative fuel and autonomous vehicles
 - 8.1 Alternative fuel vehicles
 - 8.2 EVs, batteries and critical minerals
 - 8.3 Connected and autonomous vehicles
9. Public transit, walking and biking

- 9.1 Public transit
- 9.2 Walking and walkability
- 9.3 Bicycling and bikeability
- 10. Urban form and neighborhood design
 - 10.1 Urban land use and mobility
- 11. Aviation and rail
 - 11.1 Commercial aviation
 - 11.2 Passenger rail

Each module at the Canvas site consists of the following components:

- **Required lectures and films** – PowerPoint slides for lectures and required films to watch on your own
- **Required readings and media** – papers, articles, websites that are required reading and viewing
- **Quiz** – short **online** quizzes (5-10 multiple choice, matching and true/false questions) administered via the Canvas course site. You must take these quizzes on your own. Each quiz is timed and you have only one attempt. Although the quiz is “open book”, you will not be able to complete it within the time limit unless you have carefully viewed the lecture/film and completed the required readings prior to taking the exam.
- **Optional readings and materials** – for deeper dives into each subject

Assignments

There is a series of short writing assignments, ranging from shorter assignments (500-700 words each) and longer assignments (700-1000 words each).

Attendance and Participation

You are expected to attend class; this will be part of your final grade. You must sign in every day in the classroom. Your grading will be based on the percentage of class meetings attended. If you must miss class due to illness or some unforeseen or unavoidable conflict, you must contact me for an excused absence. Be prepared to provide documentation for your unavoidable absence if requested.

Evaluation

Your final grade will be based on the following:

- Quizzes (total): 40%
- Assignments (total): 40%
- Attendance: 20%

I use the OSU standard scale to assign the final course grade. I will use the rules of scientific rounding for borderline cases provided that the student has demonstrated good faith effort throughout the semester– e.g., 92.5% and above could be rounded up to 93%. Good faith effort means coming to class regularly, turning assignments in on time and completing quizzes on time unless there is an excused reason. Opportunities for individual extra credit will not be provided under any circumstances.

Grading scale: A 93-100%; A- 90-92%; B+ 87-89%; B 83-86%; B- 80-82%; C+ 77-79%; C 73-76%; C- 70-72%; D+ 67-69%; D 60-66%; E 0-59%

Policies

Academic misconduct. Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so please review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report those suspicions to the Committee on Academic Misconduct. If COAM determines that a student violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in the course and suspension or dismissal from the University.

Artificial Intelligence and Academic Integrity. There has been a significant increase in the popularity and availability of a variety of generative artificial intelligence (AI) tools, including ChatGPT, Sudowrite, and others. These tools will help shape the future of work, research and technology, but when used in the wrong way, they can stand in conflict with academic integrity at Ohio State.

All students have important obligations under the Code of Student Conduct to complete all academic and scholarly activities with fairness and honesty. Our professional students also have the responsibility to uphold the professional and ethical standards found in their respective academic honor codes. Specifically, students are not to use unauthorized assistance in the laboratory, on field work, in scholarship, or on a course assignment unless such assistance has been authorized specifically by the course instructor. In addition, students are not to submit their work without acknowledging any word-for-word use and/or

paraphrasing of writing, ideas or other work that is not your own. These requirements apply to all students undergraduate, graduate, and professional.

In this course, you may use generative AI and AI assisted technologies for your assignments only under the following limited conditions (adapted from the scientific journal *Computers, Environment and Urban Systems*):

- Generative AI technologies may only be used in the writing process to improve the readability and language of the manuscript, not as a substitute for your original writing.
- It must be applied with human oversight and control; you should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete or biased. You are ultimately responsible and accountable for the contents of the work.
- You **must** include the following statement with your work:
 - During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and takes full responsibility for the content of the final product.
- You **must** include the **exact prompts** that you used with the AI, added as an appendix to your assignment report.

- **You may not use generative AI for the examinations under any circumstance.**

Religious accommodations. Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, I will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement **and** the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the [Civil Rights Compliance Office](#).

Disability and accommodations for illness. The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If students anticipate or experience academic barriers based on a disability (including mental health and medical conditions, whether chronic or temporary), they should let their instructor know immediately so that they can privately discuss options. Students do not need to disclose specific information about a disability to faculty. To establish reasonable accommodations, students may be asked to register with Student Life Disability Services (see below for campus-specific contact information). After registration, students should make arrangements with their instructors as soon as possible to discuss your accommodations so that accommodations may be implemented in a timely fashion.

If students are ill and need to miss class, including if they are staying home and away from others while experiencing symptoms of viral infection or fever, they should let their instructor know immediately. In cases where illness interacts with an underlying medical condition, please consult with Student Life Disability Services to request reasonable accommodations.

Intellectual diversity. Ohio State is committed to fostering a culture of open inquiry and intellectual diversity within the classroom. This course will cover a range of information and may include discussions or debates about controversial issues, beliefs, or policies. Any such discussions and debates are intended to support understanding of the approved curriculum and relevant course objectives rather than promote any specific point of view. Students will be assessed on principles applicable to the field of study and the content covered in the course. Preparing students for citizenship includes helping them develop critical thinking skills that will allow them to reach their own conclusions regarding complex or controversial matters.

Grievance procedures. According to University Policies, if you have a problem with this class, you should seek to resolve the grievance concerning a grade or academic practice by speaking first with the instructor or professor. Then, if necessary, take your case to the

department chairperson, college dean or associate dean, and to the provost, in that order. Specific procedures are outlined in Faculty Rule 3335-8-23. Grievances against graduate, research, and teaching assistants should be submitted first to the supervising instructor, then to the chairperson of the assistant's department.

Creating an environment free from harassment, discrimination, and sexual misconduct. The Ohio State University is committed to building and maintaining a welcoming community. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Civil Rights Compliance Office (CRCO):

- Online reporting form: <http://civilrights.osu.edu/>
- Call 614-247-5838 or TTY 614-688-8605
- civilrights@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Civil Rights Compliance Office to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Week	Date	Day	Module	Lecture	Comments
1	1/13/2026	T	Class orientation	Syllabus and course overview	
	1/15/2026	H	1. Sustainability and mobility	1.1. Sustainability concepts	
2	1/20/2026	T		1.2. Sustainable and unsustainable mobility	
	1/22/2026	H	2. History of transportation	2.1 Global history of transportation	
3	1/27/2026	T		Q&A - Doug Gordon + Sarah Goodyear (The War on Cars)	Guest presentation
	1/29/2026	H		2.2 Evolution of urban mobility	
4	2/3/2026	T	3. Nonrenewable energy and greenhouse gases	3.1 Non-renewable energy and mobility	
	2/5/2026	H		3.2 Greenhouse gases and climate change	Online class
5	2/10/2026	T	4. Public health: air quality and physical activity	4.1 Air quality and health	
	2/12/2026	H		4.2 Physical inactivity and health	
6	2/17/2026	T	5. Safety and traffic congestion	5.1 Road trauma and safety	
	2/19/2026	H		5.2 Traffic congestion	
7	2/24/2026	T	6. Social equity	6.1 Mobility justice	
	2/26/2026	H		Q&A with filmmaker - Matt Martin (Free to Ride)	Guest presentation
8	3/3/2026	T	7. Cost, pricing and travel demand management	7.1 Transportation cost and pricing	
	3/5/2026	H		7.2 Travel demand management	
9	3/10/2026	T	8. Alternative fuel and autonomous vehicles	8.1 Alternative fuel vehicles	
	3/12/2026	H		8.2 EVs, batteries and critical minerals	
10	3/17/2026	T	Spring Break		
	3/19/2026	H			

11	3/24/2026	T		8.3 Connected and autonomous vehicles	
	3/26/2026	H		Peter Norton webinar (online; on your own)	No class meeting
12	3/31/2026	T	9. Public transit, walking and biking	9.1 Public transit	
	4/2/2026	H		9.2 Walking and walkability	
13	4/7/2026	T		9.3 Bicycling and bikeability	
	4/9/2026	H	10. Urban form and neighborhood design	10.1 Urban land use and mobility	
14	4/14/2026	T		Guest lecture - Justin Goodwin (City of Columbus)	Guest presentation
	4/16/2026	H	11. Aviation and rail	11.1 Commercial aviation	
15	4/21/2026	T		11.2 Passenger rail	
	4/23/2026	H		Epilogue: Why is sustainable mobility so difficult?	

Week	Date	Day	Films (watch on your own)	Assignments (due by following Monday 9:00 AM)	Quizzes (due Friday by 5:00 PM)
1	1/13/2026	T			
	1/15/2026	H		Essay: My transportation story	
2	1/20/2026	T			
	1/22/2026	H			Sustainable mobility concepts
3	1/27/2026	T			
	1/29/2026	H	<i>Taken for a Ride (1996)</i>	Concept Explainer: Sustainable vs. unsustainable mobility	History and evolution of transportation
4	2/3/2026	T			
	2/5/2026	H			Nonrenewable energy and greenhouse gases
5	2/10/2026	T			
	2/12/2026	H		Public Health Commentary: Air quality, physical activity and health	Public health: air quality and physical activity
6	2/17/2026	T			
	2/19/2026	H			Safety and traffic congestion
7	2/24/2026	T			
	2/26/2026	H	<i>Free to Ride (2016)</i>	Equity Perspective Essay: Mobility Justice	Transportation equity and justice
8	3/3/2026	T			
	3/5/2026	H			Cost, pricing and travel demand management
9	3/10/2026	T	<i>Who Killed the Electric Car? (2006)</i>		
	3/12/2026	H		Technology Assessment Brief: EVs	
10	3/17/2026	T			
	3/19/2026	H			
11	3/24/2026	T			
	3/26/2026	H	<i>Look Who's Driving (2019)</i>	Technology Assessment Brief: AVs	Alternative and connected autonomous vehicles

12	3/31/2026	T			
	4/2/2026	H			
13	4/7/2026	T			
	4/9/2026	H		Pre-proposal: Active transportation	Public transit, walking and biking
14	4/14/2026	T			
	4/16/2026	H			Urban form and neighborhood design
15	4/21/2026	T			
	4/23/2026	H		Pre-proposal: VMT reduction plan	Aviation and rail