

CEE 597S & 697G: Transportation Sustainability

Course Syllabus

Lecture: Monday and Wednesday 2:30pm – 3:45pm
Engineering Laboratory Room 327

Instructor: Eleni Christofa
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Office Hours: Monday and Wednesday 4:00pm-6:00pm
Tuesday 5:00pm-6:00pm
By appointment via e-mail

Catalog Description

An overview of sustainable transportation planning practices and management strategies and policies; current transportation trends; environmental and energy policies; non-motorized modes (mainly bicycles and pedestrians); public transportation; life-cycle assessment for transportation infrastructure; alternative fuel vehicles; vehicle emission estimation models; demand management strategies (including parking policies, pricing strategies).

Engineering Science Credits: 2 **Engineering Design Credits:** 1

Required or Elective: Elective

Prerequisite: 310 or equivalent

Credit Hours: 3

Textbooks and Other Resource Materials

The assigned readings will be available for download at <http://guides.library.umass.edu/sustrans>. In addition, I will often assign readings from the following two books that are available through the UMass Libraries e-reserves:

1. Black, W.R. (2010). *Sustainable Transportation: Problems and Solutions*. The Guilford Press, New York, NY. Available at: <http://uma.eblib.com/patron/FullRecord.aspx?p=465652>.
2. Shiller, P.L., E. Bruun, and J.R. Kenworthy. (2010). *An Introduction to Sustainable Transportation*. Earthscan, London, Washington DC. (I will provide the url link once I have it).

Course Outline

Week	Date	Topic
1	1/21	Introduction; Unsustainable Transportation-Transportation Problems
2	1/26	Energy and Environmental Policies I
	1/28	Energy and Environmental Policies II
3	2/2	Alternative Fuels, Vehicle Technologies (I)
	2/4	Alternative Fuels, Vehicle Technologies (II)
4	2/9	Literature Searching, Search Alerts, Citation Management (Guest Lecturer: Maxine Schmidt)
	2/11	Emissions Modeling
5	2/17	Ecodriving (<i>Note it's a Tuesday</i>)
	2/18	Ramp Metering, Variable Speed Limits
6	2/23	Non-motorized Modes (I)
	2/25	Life-Cycle Assessment (LCA)
7	3/2	Non-motorized Modes (II)
	3/4	Non-motorized Modes (III)
8	3/9	Non-motorized Modes (IV)
	3/11	Non-motorized Modes (V)
9	Spring Break	
10	3/23	Personal Rapid Transit, Public Transportation (I)
	3/25	Personal Rapid Transit, Public Transportation (II)
11	3/30	Ridesharing, Carsharing, Parking Management (I)
	4/1	Ridesharing, Carsharing, Parking Management (II)
12	4/6	Pricing (I)
	4/8	Pricing (II)
13	4/13	Freight, Green Logistics (I)
	4/15	Freight, Green Logistics (II)
14	4/20	<i>No class– Monday schedule will be followed</i>
	4/22	Aviation
15	4/27	<i>Student Presentations</i>
	4/29	<i>Student Presentations</i>

Attendance Policy

Students are expected to attend each class and arrive on time. Each student is responsible for the material covered and for all assignments made in class whether or not he or she attends the class. Attendance will be considered in assigning final grades.

Academic Honesty Policy

The student will be required to use published and unpublished literature in preparing course assignments. Literature includes books, reports, papers, articles, speeches/oral presentations, interviews, and websites. Plagiarism in any form will not be tolerated and will result in a grade of zero. Plagiarism includes, but is not limited to, the following:

- Using thoughts or words of others and representing them as your own, including copying text from other sources without attribution. Direct quotation of other source

material may be used if it is highlighted by quotation marks and/or italic font, and the source is acknowledged. Plagiarism also includes the description of concepts or ideas which you have taken from other sources, not copied word for word, but for which you do not attribute the source.

- Copying of papers prepared by other students, regardless of the source.
- Submitting a paper, and representing it as your own work, which was prepared by another.
- Downloading text from a website which you do not attribute the source.

University Academic Honesty Policy and Guidelines will be followed.

The student will be instructed on methods for proper referencing of cited literature using Transportation Research Board (TRB) format (see TRB website).

Assignments Due Date Policy

All class assignments are due on the day assigned at the beginning of the class. No late submissions will be accepted.

Assessment Methods (grading and instructor feedback)

- Weekly Reading Summary = 15%
Every week students will be submitting a 1-2 page summary of the readings assigned for that week.
- Weekly Article Presentation = 20%
Every week two students will be assigned to bring and discuss articles (from newspapers, the Internet, etc.) related to transportation sustainability.
- Assignments = 20%
There will be an assignment approximately once a month. The assignments could vary from short essays and paper critiques, to for example performing analysis with the Environmental Protection Agency's vehicle emissions model. Additional problems per assignment will be assigned to the CEE 697G students.
- Project = 40%
This will be a team project (2-3 students per team) which will include identifying a transportation related problem on campus, performing a literature review and search of case study on how other campuses/towns have dealt with this issue, and proposing solutions to improve the sustainability of campus. The exact topic should be decided after discussion with the instructor.
- Attendance/Class Participation = 5%
Students are expected to attend each class and arrive on time. They are also expected to participate in roundtable policy and critique discussions in class.

Course Performance Indicators (CPIs)

1. I know the three aspects of sustainability, and I can discuss how transportation planning practices and management strategies affect these aspects.
2. I have knowledge about current environmental and energy policies.
3. I have knowledge about contemporary transportation issues in the U.S. and world-wide.
4. I can use the EPA's vehicle emission model, called MOVES, to estimate vehicle emissions.
5. I know how to perform a life-cycle assessment analysis.
6. I can discuss the advantages and disadvantages of different pricing and management strategies.
7. I have knowledge of design practices that improve bike and pedestrian conditions.
8. I have improved my ability to communicate in writing and orally.

Program Outcomes from ABET Criterion 3 (a-k) addressed in the course

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Mapping of Course Performance Indicators to Program Outcomes

CPIs	ABET (a-k) Mappings
1	f, g, h, i
2	h, j
3	f, h, j
4	a, b, k
5	a, b, h, k
6	f, g, h
7	a, c, e
8	g

Prepared by: Eleni Christofa

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