

CE 524 – Digital Tools for Transportation

Instructor: Roxana Javid, Ph.D.
Office: KAP 200A
Email: rjavid@usc.edu
Office Hours: TBA

Units: 4
Term: Spring
Schedule: Tue-Thu 11:00 am -12:50 pm
Location: TBA
Teaching Assistant: NA

Catalogue Course Description

Software and digital tools for traffic analysis, highway and railway design, transportation demand, and public transportation planning

Expanded Course Description

The course covers a comprehensive exploration of the transportation landscape, empowering you to leverage cutting-edge software tools such as PTV Vissim, PTV Visum, OpenRoads, and OpenRails. Students learn to perform in-depth traffic analysis, highway and railway design, transportation demand and public transportation planning. They also explore the latest advancements and gain practical expertise in shaping the future of transportation systems and infrastructure.

Learning Objectives and Outcomes

By the end of this course, students should be able to:

- Learn highway alignments and model corridors in OpenRoads software.
- Design railway corridors in OpenRails software
- Build and analyze signalized intersections in Vissim software.
- Develop transportation network and analyze travel demand data in Visum software.

Prerequisite(s): None

Co-Requisite(s): None

Concurrent Enrollment: None

Recommended Preparation: Previous coursework in transportation is not required, but exposure to an introductory transportation at the level of CE 471 would be beneficial.

Course Notes

All course materials — including discussions, lecture slides, assignments, solutions, and scores — will be posted online.

Required Textbook

This course does not require a textbook. All necessary materials will be provided through open educational resources (OER) and the instructor's handouts available online.

Description and Assessment of Assignments

The following components are used to assess the outcomes:

Homework Assignments(25%): At the end of each topic, homework assignments will be available; they are due one week from the assignment date, unless otherwise indicated. There are a total of 7 homework assignments. Students are expected to complete all homework assignments on time. Late assignments are accepted with a 20% penalty only for up to 24 hours after the due date; a submission after 24 hours will receive no credit. Homework assignments must be submitted electronically. If there is any evidence of cheating, relevant University policies and regulations will be applied. Homework assignments will be graded based on organization, neatness, accuracy, and effort.

Class Assignments (25%): Class activities are evaluated using class assignments, which will be assigned during the last 30 minutes of class every 2-3 weeks and are due by end of the class. Time is allotted during these class periods to discuss and solve the class assignment questions. Late assignments are accepted with a 20% penalty only for up to 24 hours after the due date; a submission after 24 hours will receive no credit. Grades will be based on the involvement in these class activities and the quality of the solutions.

Exam I (25%): There will be one in-lab open-book exam held during our regularly scheduled class time in Week 7. In case exam I is missed, an official, acceptable, and verified excuse must be presented to be able to make up the exam as early as possible. This excuse must be recorded within 24 hours. An unexcused failure to take the exam will result in a zero for the exam.

Final Exam (25%): There will be one in-lab open-book exam held on the Final Exam week. The exam is not cumulative, though the nature of the material is. There will be absolutely no exceptions to the final exam's date and time, so plan accordingly. The date and time for the final exam are dictated by the University (see <https://classes.usc.edu/>).

Academic Integrity

Unless otherwise noted, this course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). The general USC guidelines on Academic Integrity and Course Content Distribution are provided in the subsequent "Statement on Academic Conduct and Support Systems" section.

Use of Generative AI in this Course

Generative AI permitted but limited as follows: In this course, you are permitted to use artificial intelligence (AI)-powered programs to help you, but only on assignments that explicitly indicate a permitted use of AI. However:

- You should also be aware that AI text generation tools may present incorrect information, biased responses, and incomplete analyses; thus, their answers may not meet the standards of this course.
- To adhere to our university values, you must cite any AI-generated material (e.g., text, images, and other content) included or referenced in your work and provide the prompts used to generate the content. Using an AI tool to generate content without proper attribution will be treated as plagiarism and reported to the Office of Academic Integrity.

Please review the instructions in each assignment for more details on how and when to use AI Generators for your submissions.

Grading Breakdown

Final grades will be calculated as follows:

Assignment	% of Grade
Homework Assignments	25%
Class Assignments	25%
Exam I	25%
Final Exam	25%
TOTAL	100%

Course Schedule: A Weekly Breakdown

*This schedule serve as a guideline. It may be changed at the instructor's discretion

Week	Topics/Daily Activities	Readings	Assignments	Deliverables
1	PTV Visum User interface and data management	NA	NA	NA
2	PTV Visum, Demand and network management	Instructor's handout	HW1 assigned	
3	PTV Visum, Model calculations and analyzing output	Instructor's handout		HW1 due
4	PTV Vissim, basic network development, Demand data entry	Instructor's handout	HW2 assigned	
5	PTV Vissim, Signalized intersection control and performance measures	Instructor's handout		HW2 due
6	PTV Viswalk, pedestrian simulation in transit stations	Instructor's handout	HW3 assigned	
7	Exam I	NA	NA	HW3 due
8	PTV line, GTFS public transit data	Instructor's handout	HW4 assigned	
9	PTV line, Public transport service sequences & schedule, and timetable planning	Instructor's handout		HW4 due
10	PTV line, Accessibility and satisfaction of public transport service	Instructor's handout	HW5 assigned	
11	PTV Line, scenario analysis	Instructor's handout		HW5 due
12	OpenRoads Corridor Modeling and creating plan and profile sheets for roads	Instructor's handout	HW6 assigned	
13	Open Roads, Creating cross sections, report analysis and draw production of roads	Instructor's handout		HW6 due
14	OpenRails Corridor Modeling and creating plan and profile sheets for rails	Instructor's handout	HW7 assigned	
15	OpenRails, Creating cross sections, report analysis and draw production of rails	Instructor's handout		HW7 due
FINAL	Final Exam	Refer to the final exam schedule in the USC Schedule of Classes at www.usc.edu/soc .		

Statement on Academic Conduct and Support Systems

Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.