CEE 207: TRANSPORTATION ENGINEERING (3CR)

http://lehigh.edu/~mepa

Instructor:
Mesut Pervizpour, Ph.D., PE.
Office: Fritz Lab, Room 401A
Phone: 610-758-2137
Email: mepa@lehigh.edu
Office Hours: T/TH 9-10am (in person or zoom)

Course:
CEE 207, Transportation Engineering
Spring 2026
Class Hours: **T & R**, 1:35 pm – 2:50 pm
Classroom: **Fritz 232**
TA: **Allison Connuck (amc526@lehigh.edu)**

Course Description: Principles of the design of transportation facilities with emphasis on highways and airports in the areas of geometric, drainage, and pavement design. Design problems. Prereq.: CEE 11.

Textbook:
Fundamentals of Transportation Engineering: A Multimodal Systems Approach, 7th Ed. By Jon D. Fricker and Rober K. Whitford, 2019

Tentative Grading:

Attendance/Participation	5%
Homework Assignments	20%
Course Project	10%
Mid-term Exams	30%
Final Exam	35%

Reference Materials:
The listed books are transportation design and guidebooks referenced in the class to supplement the textbook. Your textbook provides overviews of reference books by AASHTO and HCM that present the latest standards and guidelines. Purchase of reference materials is not necessary, as many are available at the Fairchild-Martindale Library.

1. *Principles of Highway Engineering and Traffic Analysis*, 7th Ed. by Fred L. Mannering, Scott S. Washburn, 2019 (M&K, ISBN 978-1-119-49396-9); exclusively on highway & traffic engineering
2. *Wiki Textbook: Fundamentals of Transportation,* (http://en.wikibooks.org/wiki/Fundamentals_of_Transportation)
3. *Traffic and Highway Engineering*, 5th Edition, by Nicholas J. Garber, Lester A. Hoel, 2020, ISBN 978-1-337-63102-0). This book emphasizes highways while including selected information on other modes. It is designed for a two-semester course sequence.
4. *A policy of Geometric Design of Highways and Streets* "AASHTO Green Book", American Association of State Highway and Transportation Officials (AASHTO), 7th Edition, 2018
5. *HCM*: Highway Capacity Manual, Transportation Research Board (TRB) 7th Edition, 2022
6. *Manual on Uniform Traffic Control Devices* (MUTCD), Federal Highway Administration (FHWA), 2009, http://mutcd.fhwa.gov/
7. *Highway Safety Manual*, AASHTO, 1st Edition, 2010 (and 2014 Supplement)
8. *Trip Generation Manual, 12th Edition*: An ITE Informational Report, ITE, 2025
9. *Traffic Engineering Handbook*, ITE, 7th Edition, 2016
10. *Roadside Design Guide*, AASHTO, 4th Edition, 2011
11. *Transport Research International Documentation* (TRID) http://trid.trb.org/
12. *Guide for the Development of Bicycle Facilities*, AASHTO, 5th Edition, 2024 (*2012 in library*)
13. *Guide for the Planning, Design, & Operation of Pedestrian Facilities*, AASHTO, 2nd Ed, 2021 (*2004 in library*)
14. *Wiki Textbook: Transportation Economics, https://en.wikibooks.org/wiki/Transportation_Economics*

Important Dates:

- First day of class: January 19, 2026
- Add/Drop deadline: January 30, 2026
- Spring Break (no classes): March 9 – March 13, 2026
- Course withdrawal deadline: April 10, 2026
- Course Project Presentation (Last week of classes): Week of April 27, 2026

Disclaimer: This document may change as the semester progresses.

Course Conduct:

- **Attendance Policy:** The content of the course builds on itself so consistent and engaged attendance is crucial to your success. Attendance will be taken during each class session. You are allowed *two unexcused* absences before your participation grade is affected. Excused absences are limited to those due to participation in university-sanctioned events or those accompanied by written confirmation from a doctor, the Dean of Students, etc. If you are sick, you must obtain a doctor's note. If you are absent or late (for excused or unexcused reasons), you will be responsible for any material covered and any announcements that were made in class that day.

- **Examinations:** Two midterm exams and a final exam will be given over the course of the semester. **An unexcused absence on the day of an exam will result in a grade of zero for that test**. In the case of a university-sanctioned event, please schedule a makeup exam with the instructor in advance of the exam date. If you miss an exam due to a certifiable emergency or illness, please notify the instructor as soon as possible, **providing appropriate documentation**; in these cases, a makeup exam will be arranged. All midterm exam dates are set as indicated on the syllabus. Any grade review you see justified should be brought to my attention within the first week of receiving the grade.

- **Homework Assignments:**
  - Homework will be assigned on an approximately weekly basis. **Students will upload their work as a single pdf file on Coursesite at the assigned time/date**. Assignments submitted after the deadline will incur a **10% deduction for each 12-hour period (or portion thereof) beyond the due time**.
  - Homework solutions must conform to the standards of good engineering practice:
    - Your name, assignment number, date, and page number **should appear on each page**.
    - Work should be done in dark colored pencil, **clearly legible**.
    - Solution to each problem **should consist of**: **1-** *given data*, **2-** *statement of what is to be found*, **3-** *the solution*, and **4-** *the answer*
    - Work should be **organized and presented neatly**. ***Assumptions*** should be clearly stated, ***units*** should be noted on answers and key intermediate results, and answers should be ***clearly identified***.

- **Academic integrity**. It has been my experience in the past that when students study in groups and communicate they perform better. Obviously, this is a generalization, and I am sure there are many exceptions. However, please note that ***your submitted work for this course should be conducted individually***. Academic Integrity is expected from all students in all matters related to this course. In particular, a student assumes responsibility for every assignment, project or exam that he/she submits. It is expected that all students will abide by these standards throughout the course. Violations of academic integrity standards will not be tolerated and will be handled according to the guidelines in the University's Student Conduct System.

- **Accommodations for Students with Disabilities**: Lehigh University is committed to maintaining an equitable and inclusive community and welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact Disability Support Services (DSS), provide documentation, and participate in an interactive review process. If the documentation supports a request for reasonable accommodations, DSS will provide students with a Letter of Accommodations. Students who are approved for accommodations at Lehigh should share this letter and discuss their accommodations and learning needs with instructors as early in the semester as possible. Please contact Disability Support Services in person in Williams Hall, Suite 301, via phone: 610-758-4152, via email: indss@lehigh.edu or online.

- **Principles of Equitable Community**: Lehigh University endorses The Principles of Our Equitable Community. We expect each member of this class to acknowledge and practice these Principles.

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Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

- **Harassment and Non-Discrimination**: Lehigh University upholds the *Principles of Our Equitable Community* and is committed to an educational, working, co-curricular, social, and living environment for faculty, staff, and students. The University does not discriminate in its admissions practices, employment practices, or educational programs or activities on the basis of age, color, disability, ethnicity, familial status, gender expression, gender identity, genetic information, marital status, national origin (including shared ancestry), pregnancy or related conditions, race, religion, sex, sexual orientation, and veteran or military status. Harassment or discrimination is unacceptable behavior and will not be tolerated. The University strongly encourages (and, depending upon the circumstances, may require) students, faculty, or staff who experience or witness harassment or discrimination, or have information about harassment or discrimination in university programs or activities, to immediately report such conduct.

Course Learning Objectives:

A list of topics of which students will be selectively introduced:

1. Understand safety issues as they apply to transportation systems, including crash data, and Highway Safety Manual methods.
2. Understand how to perform geometric design, including vertical and horizontal curve alignment for designing highways for safety.
3. Understand the basics of traffic flow theory and analysis, including speed, density, and flow.
4. Understand the basic principles of Level of Service (LOS) and capacity for designing highways, freeways and interchanges, and for interrupted flow, including queues and delays.
5. Understand the basics of queues and delay at signalized intersections.
6. Understand the principles of public mass transport.
7. Understand the requirements for travel by pedestrian and bike.
8. Understand how to perform a transportation impact analysis.
9. Understand the principles of pavement design

Tentative Course Outline / Topic:

~Week #	Topic	# Lectures
1	Introduction to Transportation Engineering, Overview, History, Agencies (F&W Ch1, G&H Ch1), Current Transportation System (F&W Table 2.1) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Introduction) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Decision_Making) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Networks)	2
2-3	Highway Traffic Models: Density, Speed & Flow (F&W Ch.2) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Traffic_Flow)	4
4-5	LOS, Capacity & Delay w/ signalized intersections, (F&W Ch. 3, HCM) (https://en.wikipedia.org/wiki/Level_of_service) (https://en.wikipedia.org/wiki/Highway_Capacity_Manual)	3
5-6	Travel Demand Models, Destination Choice, and Route Choice (F&W Ch4) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Trip_Generation) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Destination_Choice) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Route_Choice)	4
7-8	Public Mass Transport (F&W Ch10) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Transit_Demand)	3
	Midterm 1 (March 19)	

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~Week #	Topic	# Lectures
9	Human Factors, Vehicle Attributes, TCD-MUTCD, Warrant Study (F&W Ch6)	2
10-12	Geometric Design – Highway (Horiz., Vert., Superelevation, Intersection design) (F&W Ch.7 & 8) (https://en.wikibooks.org/wiki/Fundamentals_of_Transportation/Design)	6
13	Safety, Traffic Calming and Context Sensitive Solutions, Security of Transportation Infrastructure, Highway Safety (F&W Ch. 6, PennDot's Traffic Calming) (https://en.wikipedia.org/wiki/Road_traffic_safety)	4
	Midterm 2 (April 21)	
14	Pavement Design (F&W Ch9)	2
-	Bike and Pedestrian Design, Additional Topics: Intersection Design (F&W Ch8), Other Modes (https://en.wikibooks.org/wiki/Bicycles/Road_Safety)	1
14	Project Presentations (Week of April 27)	1
	Final Exam: Comprehensive Final	

- *Spring Break (March 9-13), Last day of Classes May 1st*

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