The University of Texas at Tyler
Department of Civil and Environmental Engineering

CENG 4355/5355 Transportation Systems: Management and Operations

Course Syllabus (Fall 2019)

Date: August 14, 2019. This version supersedes all earlier versions.

Time & venue	Class times: T, 6:00 p.m. – 8:45 p.m., RBS Bldg. Rm. 2019
Instructor	Dr. Matthew Vechione Office: RBS 1011 Email: mvechione@uttyler.edu Phone: (903) 565-5711 Office hours: MW 9:30 a.m. – 10:30 a.m.; R 1:30 p.m. – 2:30 p.m.
Teaching assistant	N/A
Course website	See UT Tyler's Canvas Website
Course objective	Foundations of the transportation system management and operations, including arterial street systems and freeway systems. Introduce mathematical models that have been developed to analyzed traffic phenomena. The topics covered include human, vehicular, and traffic characteristics as they relate to driver-vehicle-roadway operational systems; traffic studies and methods of analysis and evaluation. Advanced theory and application of traffic control; signalization; and freeway operations. Graduate students will complete an additional project.
Prerequisite/Co-requisite	1. CENG 4351 Traffic Engineering: Operations and Control
Required Text	No prescribed textbook. References: o Traffic Engineering 5th Edition, Roess, Roger P.; Prassas, Elena S.; McShane, William R. Pearson Education, Inc. ISBN 978-0-13-459971-7, 2019. o May, A. D. (1990) Traffic Flow Fundamentals, Prentice Hall.
Grading	Contributions towards final grade (out of 100%) 10% Professional Practice (Attendance & ASCE Meetings) 20% Exam 1 20% Exam 2

	25% Final examination 15% Homework 10% Project In grading the homework, assignments, tests, exams, etc., no credit will be given to methods **not** covered in this class, although these methods, tables, formula may appear in the textbook. Errors or outdated material in the textbook should not be the reason for claiming full credit on work done. Letter grades will be assigned based on the final course grade: A 90 and above B 80 to 89.99 C 70 to 79.99 D 60 to 69.99 F below 60 No letter grade will be released until it is official on PeopleSoft. In consistency with the College of Engineering's policy, a student who does not score 50% or more of the total points allocated to the **Final Examination** will automatically receive an **F** grade.
Attendance	Attendance will be taken and/or signatures validated for every class activity. During some class meetings, the instructor will return the graded homework, assignments or exams towards the end of the meeting by calling names. Students who are not there to collect their work will be marked absent (although they may have signed on the attendance sheet earlier). To protect your confidentiality, graded homework, assignments and exams will not be placed at open area for collection. They will only be distributed by the instructor during class or office hours. Graded homework, assignments, and exams not collected after the final exam week will be disposed according to UT Tyler policy.
Exams	Exams are given during the class times. The dates of the Exams will be announced at least 1 week advance in class.
Final Exam	**The Final Exam is on 12/10, 6:30 p.m. – 8:30 p.m.** All material covered in the course will be tested.
General Exam Rules & Cheat Sheet	All exams are closed book. You are only allowed to bring your writing instruments, erasers, and NCEES approved calculators.

	Topics to be tested will be announced in class and on Canvas one week prior to the exam. The instructor will set questions from material taught in class. The meaning of "taught in class" includes verbal instructions or written notes on the white board and Canvas, briefing/ presentation during field trips, observation during field work/ experiments. They do not necessary appear in the textbook, distributed class notes, or homework. It is very important that you attend the class activities and take additional notes. To discourage students from focusing narrowly in only a few questions, **no** practice exam will be given. There are enough self-practice problems, which are not required as part of each homework assignment as well as in the textbook at the end of each chapter.
Calculators	In line with the Civil Engineering Department's policy, only calculators permitted by NCEES for use in the current semester's FE exam are permitted to be used in the CENG 4355/5355 examinations. No other model of calculator will be allowed. Models previously allowed by NCEES in the past but are no longer valid for the current FE exam are prohibited in the CENG 4355/5355 exams. Please check www.ncees.org for the latest permitted calculator models. It is the student's responsibility to check the validity of his/her calculator model, purchase, and be familiar with the functions of the permitted calculators prior to the exam. If an unapproved calculator is found during any exam, it will be taken away immediately and only be returned to the student after the exam. No borrowing of other students' calculators is allowed during exam.
Field Trip	To be announced/decided.
Design Project	A project will be given. All students are to work as a team to plan for field survey and data analysis.
Topical Presentation	At the end of the 3rd week, each student will propose/select a topic for presentation in the class. The purpose of this is to train students to learn a relatively advanced topic on his/her own, and to teach fellow classmates. The duration of the presentation depends on the class size. The dates of the presentations will depend on the topic of interest, to fit the class schedule.
Homework	About 15-20 homework problems will be assigned out of the textbook. The homework problems will be assigned at the completion of a topic and will be due in class on the day stated in the homework sheet and course schedule. Only selected homework problems will be graded. All homework solutions **must** be submitted on engineering paper (you can buy them in the Civil Engineering Department Office for $5.00, at Office Depot, or online), stapled at the top-left corner. Homework solutions not

	submitted on engineering paper will received only 90% of the graded credit. In all your homework and exam solutions, you are expected to present, in written form, the formulae used, the variable values, intermediate calculations, final answers, and their units. Draw a box around your final answer. Not having any of the above will lead to points being deducted. Do not expect all the homework problems be similar to the examples covered during class time. In some cases, you are expected to read additional examples in the text book or think of the solution yourself or discuss with your classmates.
Late homework/ assignment policy	Absolutely **NO** late homework will be accepted. If it is not in my hands when I leave the classroom on the due date, I will not grade it and you will receive a zero for the assignment. No exceptions. Homework solutions are usually posted on Canvas two days after the due date.
Re-schedule of examination	There is no make-up or rescheduling of the Final Examination. Make-up for the Exams will only be arranged if you inform the instructor **prior** to or on the day **before** the exam, with a strong valid reason. Examples of strong valid reasons are official UT Tyler travel, accident, illness, child-birth, passing of an immediate family member, jury duty, or court appearance. These are not expected and cannot be rescheduled. You will be required to show documentary evidence for the valid reason (e.g., doctor's letter, police report, court letter). Events that can be pre-scheduled or rescheduled are not considered valid reasons. Examples of non-valid reasons are traffic, wedding, driving test, sending car for service, clash with another course schedule, etc. Job interviews will be considered on a case by case basis (again, with documentary evidence). If an emergency happens during the exam day, you should contact the instructor at the earliest possible time (or call the Civil Engineering office, contact one of your classmates or TA who will then inform the instructor). Any make-up exam will be given on the Dead Day. Each student is only allowed one (1) make-up exam. That is, he/she can only make-up Exam 1 or Exam 2, but not both. To compensate for the fact that you may apply what you learn in the entire course when answering make-up Exams 1 or 2, the make-up exam will be more difficult than the original exam.

	Students who fail to show up for the make-up or final exam with an invalid reason will be given 0 points for that exam; or for a valid reason an incomplete "I" grade. He/she must take the exam the next time this course is being offered to have the "I" grade change to a letter grade. All the assessment components and marks will be retained for the calculation of the final letter grade. The letter grade will be benchmarked against the same class for the semester in which the exam had been missed.
Collaboration/ cheating	Cheating is unethical and not acceptable. Plagiarism is using information or original wording in a paper without giving credit to the source of that information or wording: it is also not acceptable. Do not submit work under your name that you did not do yourself. You may not submit work for this class that you did for another class. If you are found to be cheating or plagiarizing, you will be subject to disciplinary action, per UT Tyler catalog policy.
Audio/video recording	Recording of class instructions by any phone, audio or video device is not permitted. The only exception is at the request of Student Accessibility and Resources, or at the request of Department, College, or University for teaching evaluation.
Phone/iPod/iPad, laptop, etc.	Please turn off your cell phone or switch it to silent mode during class time. If you need to answer a phone call, please leave the class quietly and only answer outside the class door. You are not allowed to answer any phone calls during the examination.
Disability	In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA), and the ADA Amendments Act (ADAAA), the University of Tyler at Texas offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible a diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The **Student Accessibility and Resources** (SAR) office will contact you when your application has been submitted and an appointment with an Accessibility Case Manager. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Suggested Topics for Graduate Student Presentations

- ITS for border crossing and homeland security
- Queueing and environmental impacts for border crossing and homeland security
- ITS and queueing at airports
- ITS in Tyler: challenges and opportunities
- Smart Cities and applications for Tyler (e.g. bus service)
- Making UT Tyler smarter (small version of a Smart City)
- Impact of autonomous vehicles on Texas highway infrastructure
- Blockchain and it's use in traffic engineering

Students are free to propose his/her own topic, related to their thesis topic, as well.

Tentative Schedule

Lesson	Date	Topic	HW Assigned	HW Due
1	8/27	Course Introduction Traffic Detection	Project	
2	9/3	Macroscopic Flow Macroscopic Speed	HW 1	
3	9/10	Macroscopic Density Macroscopic Traffic Stream Models	HW 2	HW 1 Presentation Topic
4	9/17	Shock Wave Analysis Platoon Dispersion	HW 3	HW 2
5	9/24	Vehicle-Human Factors Microscopic Flow	HW 4	HW 3
6	10/1	Microscopic Speed Microscopic Density		HW 4 Presentation Abstract
	10/8	**Exam I**		
7	10/15	Car-Following Models Parking Studies	HW 5	
8	10/22	Gap Acceptance Kinematic & Hydrodynamic Models	HW 6	HW 5
9	10/29	Queueing Theory	HW 7	HW 6
10	11/5	Cell Transmission Model	HW 8	HW 7
11	11/12	Intelligent Transportation Systems		HW 8 Presentation Consultation
	11/19	**Exam II**		
	11/26	No Class (Thanksgiving)		
12	12/3	Class Presentations		Project
	12/10	**Final Exam**		

Desired Learning Outcomes

In this course, you will learn to:

1. Develop an organized approach to solving transportation systems management and operations problems.

2. Identify various traffic detectors commonly used in the industry and in research.

3. Identify and select the most appropriate queueing model in various applications for parking management.

4. Apply the fundamental traffic stream models to real-world traffic data to evaluate the performance of a freeway segment.

5. Understand the effects of common traffic phenomena, such as shock waves, platoon dispersions, and gap acceptance.

6. Understand the microscopic characteristics of drivers' behavior, especially as it relates to the car-following model.

7. Conduct and evaluate a traffic and/or parking study; and apply the concepts from class to analyze the data collected.