

The University of Texas at Tyler  
Department of Civil Engineering

**CENG 5354/4354 Transportation System Design and Planning**

**Course Syllabus (Fall 2022)**

**Date: August 16, 2022. This version supersedes all earlier versions.**

Time & Venue	Class times: TR, 3:30 p.m. – 4:50 p.m., Tyler: RBN 2011 HEC: A217
Instructor	Dr. Matthew Vechione Office: RBS 1011 Email: <a href="mailto:mvechione@uttyler.edu">mvechione@uttyler.edu</a> Phone: (903) 565-5711 Office hours: MWF 10:00 a.m. – 11:00 a.m. or by appointment
Teaching Assistant	TBD
Course Website	See UT Tyler's Canvas website. Canvas will be used to manage the course material for the semester. There you will find announcements, homework assignments, solutions, handouts, lesson videos, and other material pertaining to the class. <b>Please check there regularly.</b>
Course Objective	Design transportation systems such as highway facilities (e.g., freeway systems, unsignalized intersections, and signalized intersections) as well as transportation elements of buildings (e.g., driveways and parking lots). Introduce the planning of new highways and transit systems using mathematical models associated with the four-step travel demand planning process, including trip generation and trip attraction, trip distribution, mode choice, and traffic assignment.  Graduate students will complete an additional project.
Course Outcomes	In this course, you will learn to: <ol style="list-style-type: none"><li>1. Apply the fundamental traffic stream models to real-world traffic data to evaluate the performance of a highway.</li><li>2. Identify traffic detection devices and describe their use in traffic data collection.</li><li>3. Explain the queueing system with one or multiple servers.</li><li>4. Design a signing and striping plan using the Manual on Uniform Traffic Control Devices (MUTCD).</li><li>5. Design a signalized intersection.</li></ol>

	<p>6. Explain the travel demand forecasting four-step procedure (trip generation, trip distribution, modal split, and traffic assignment) and how it relates to a Traffic Impact Analysis (TIA).</p> <p>7. Use spreadsheets and microscopic traffic simulation software (e.g., Synchro) to evaluate the level of service of unsignalized and signalized intersections.</p>
Prerequisite/Co-requisite	1. CENG 3351 Transportation Engineering Systems
Required Text	<p>No required textbook. The recommended textbook for this class is:</p> <ul style="list-style-type: none"> <li>○ Transportation Engineering FE+ 1<sup>st</sup> Edition, Cheu, R. L. ISBN 978-1-09839-155-3, 2021.</li> </ul>
Grading	<p>Contributions towards final grade (out of 100%)</p> <ul style="list-style-type: none"> <li>• 5% Professional Practice (5 Student Organization Meetings)</li> <li>• 10% Quizzes</li> <li>• 15% Homework</li> <li>• 15% Exam 1</li> <li>• 15% Exam 2</li> <li>• 15% Project</li> <li>• 25% Final Examination</li> </ul> <p><b>Note:</b> There will be no makeup work or extra credit allowed/granted at the end or during the semester unless allowed/granted to everyone by the instructor. All assignments must be turned in at the appropriate time to receive credit.</p> <p>Letter grades will be assigned based on the final course grade:</p> <ul style="list-style-type: none"> <li>• A 90 and above</li> <li>• B 80 to 89.99</li> <li>• C 70 to 79.99</li> <li>• D 60 to 69.99</li> <li>• F below 60</li> </ul> <p>No letter grade will be released until it is official on PeopleSoft.</p> <p>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 <b>Final Examination</b> will automatically receive an <b>F</b> grade.</p>
Professional Practice	<p>You must attend <b>five professional practice meetings</b> to receive full credit for the professional practice portion of your grade in this course. You can attend ASCE, ITE, CMSA, IEEE, ASME, SAE, etc. student chapter meetings or when these student chapters host guest speakers. When you attend a meeting, you are expected to complete the template Word file and</p>

	take a picture of yourself at the meeting as proof of your attendance. The template can be found on Canvas.
Exams	<p>There will be 2 midterm examinations (held during the scheduled class time) and one final examination. The exams are <b>TENTATIVELY</b> scheduled for:</p> <ul style="list-style-type: none"> <li>• Exam 1: September 29<sup>th</sup></li> <li>• Exam 2: November 10<sup>th</sup></li> <li>• Final Exam: TBD Based on University Schedule</li> </ul> <p>Exams dates may be moved up or pushed back depending on the progress of the lectures. You can use a calculator and instructor-approved reference material. Solutions to exams will <b>NOT</b> be posted. No make-up exams will be given except for medical or other similar hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero on the exam.</p>
General Exam Rules & Cheat Sheet	<p>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.</p> <p>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.</p> <p>To discourage students from focusing narrowly on only a few questions, <b>no</b> practice exam will be given. There are enough self-practice problems in the textbook at the end of each chapter.</p>
Calculators	<p>In line with the Civil Engineering Department's policy, <b><u>only calculators permitted by NCEES for use in the current semester's FE exam are permitted to be used in the CENG 5354 / 4354 examinations</u></b>. 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 5354/4354 exams. Please check <a href="http://www.ncees.org">www.ncees.org</a> for the latest permitted calculator models. Examples include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Hewlett Packard: HP 33s, HP 35s, and no others</li> <li>• Casio: All FX 115 models</li> <li>• Texas Instruments: All TI30X or TI-36X models</li> </ul>

	<p>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. At the discretion of the course instructor, any calculator not meeting the requirements stated (especially in the case of a graphing calculator) may be used but only after an inspection of the device and a clearing of all the memory within the device, performed for the instructor at a time immediately prior to the exam. At any time during the exam, your calculator is subject to a random search by the instructor. Failure or refusal to clear all memory or to surrender your calculator to search will disqualify you from the exam immediately, unless you can produce a calculator meeting the requirements as stated above. No borrowing of other students' calculators is allowed during exam.</p>
Field Trip	To be announced/decided.
Design Project	The design project consists of a Traffic Impact Analysis (TIA) in Tyler. Each group will present their findings and recommendations at the dates shown in the course schedule.
Topical Presentation	Graduate students will complete an additional project. The students must submit a paper in the form of a journal paper (introduction, literature review, methodology, data, results, discussion, conclusion).
Homework	<p>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 course schedule. <b>Homework will be uploaded to Canvas as a single Word document (.doc or docx) or PDF.</b> All homework solutions <b>must</b> 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.</p> <p>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.</p>
Late Homework/ Assignment Policy	<p>Absolutely <b>NO</b> late homework will be accepted. If it is not uploaded to Canvas before the submission window closes, I will not grade it, and you will receive a zero for the assignment. No exceptions.</p> <p>Homework solutions are usually posted on Canvas two days after the due date.</p>

Final Day to Withdraw	The final day to withdraw from the course without penalty is <b>November 4<sup>th</sup></b> .
Census Dates	The university requires that instructors report the attendance to the Registrar's Office at various points in the semester. Therefore, on <b>September 1<sup>st</sup></b> . I will report the attendance for the class.
UT Tyler Honor Code	Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.
Students' Rights and Responsibilities	To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <a href="http://www.uttyler.edu/wellness/rightsresponsibilities.php">http://www.uttyler.edu/wellness/rightsresponsibilities.php</a>
Campus Carry	We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <a href="http://www.uttyler.edu/about/campus-carry/index.php">http://www.uttyler.edu/about/campus-carry/index.php</a>
UT Tyler: A Tobacco-Free University	All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.  Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.  There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit <a href="http://www.uttyler.edu/tobacco-free">www.uttyler.edu/tobacco-free</a> .
Grade Replacement / Forgiveness and Census Date Policies	Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <a href="http://www.uttyler.edu/registrar">http://www.uttyler.edu/registrar</a> . Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.  Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for

	<p>only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.</p> <p>The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:</p> <ul style="list-style-type: none"> <li>• Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.</li> <li>• Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)</li> <li>• Schedule adjustments (section changes, adding a new class, dropping without a “W” grade)</li> <li>• Being reinstated or re-enrolled in classes after being dropped for non-payment</li> <li>• Completing the process for tuition exemptions or waivers through Financial Aid State-Mandated Course Drop Policy</li> </ul>
<p>State-Mandated Course Drop Policy</p>	<p>Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.</p>
<p>Disability / Accessibility Services</p>	<p>In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible 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 <a href="https://hood.accessiblelearning.com/UTTyler">https://hood.accessiblelearning.com/UTTyler</a> and fill out the <u>New Student</u> application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <a href="http://www.uttyler.edu/disabilityservices">http://www.uttyler.edu/disabilityservices</a>, the SAR office located in the University Center, # 3150 or call 903.566.7079.</p>

Student Absence due to Religious Observance	Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.
Student Absence for University-Sponsored Events and Activities	If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time, the instructor will set a date and time when make-up assignments will be completed.
Social Security and FERPA Statement	It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.
Emergency Exits and Evacuation	Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.
Student Standards of Academic Conduct	<p>Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.</p> <p>i. <b><u>Cheating</u></b> includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>• copying from another student's test paper;</li> <li>• using, during a test, materials not authorized by the person giving the test;</li> <li>• failure to comply with instructions given by the person administering the test;</li> <li>• possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;</li> <li>• using, buying, stealing, transporting, or soliciting in whole or part the contents of a non-administered test, test key, homework solution, or computer program;</li> <li>• collaborating with or seeking aid from another student during a test or other assignment without authority;</li> <li>• discussing the contents of an examination with another student who will take the examination;</li> </ul>

	<ul style="list-style-type: none"> <li>• divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;</li> <li>• substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;</li> <li>• paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;</li> <li>• falsifying research data, laboratory reports, and/or other academic work offered for credit;</li> <li>• taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and</li> <li>• misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.</li> </ul> <p>ii. <b>“Plagiarism”</b> includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another’s work and the submission of it as one’s own academic work offered for credit.</p> <p>iii. <b>“Collusion”</b> includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.</p> <p>iv. All written work that is submitted will be subject to review by plagiarism software.</p>
<p>UT Tyler Resources for Students</p>	<ul style="list-style-type: none"> <li>• <a href="http://writingcenter@uttyler.edu">UT Tyler Writing Center</a> (903.565.5995), <a href="mailto:writingcenter@uttyler.edu">writingcenter@uttyler.edu</a></li> <li>• <a href="mailto:tutoring@uttyler.edu">UT Tyler Tutoring Center</a> (903.565.5964), <a href="mailto:tutoring@uttyler.edu">tutoring@uttyler.edu</a></li> <li>• The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.</li> <li>• <a href="http://counselingcenter@uttyler.edu">UT Tyler Counseling Center</a> (903.566.7254)</li> </ul>
<p>Information for Classrooms and Laboratories</p>	<p>It is important to take the necessary precautions to ensure a healthy and successful year. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be</p>



	<p>diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing and vaccinations, which have proven to be successful in slowing the spread of viruses. Encourage those who don't feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is important to reduce exposure (<a href="#">CDC quarantine/isolation guidelines</a>). Please work with your faculty members to maintain coursework and please consult <a href="#">existing campus resources</a> for support.</p>
Recording of Class Sessions	<p>Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.</p>

## Tentative Schedule

Lesson	Date	Topic	Text	HW Assigned	HW Due
1	8/23	Course Introduction	2		
2	8/25	Traffic Descriptors and Traffic Stream Models	4	HW 1	
3	8/30	Traffic Data Collection and Visualization	5		
4	9/1	Probabilistic Traffic Models	6	HW 2	HW 1
5	9/6	Queueing Models	7		
6	9/8	At-Grade Intersections and Interchanges	10,11	HW 3	HW 2
7	9/13	Signs and Markings	12		
8	9/15	Traffic Signals: Concepts	17	HW 4	HW 3
9	9/20	Traffic Signals: Timing Plan Calculations	18		
10	9/22	Traffic Signals: Advanced Topics	19	HW 5	HW 4
11	9/27	Exam I Review			
	<b>9/29</b>	<b>Exam I</b>			
12	10/4	Parking	20		
13	10/6	Transportation Software (Synchro)		Project	HW 5
14	10/11	Overview of Transportation Planning	21		
15	10/13	Overview of Transportation Planning	21	HW 6	
16	10/18	Trip Generation	21		
17	10/20	Trip Distribution	21	HW 7	HW 6
18	10/25	Mode Choice	21		
19	10/27	Traffic Assignment	21	HW 8	HW 7
20	11/1	Traffic Safety	16		
21	11/3	On-Demand Urban Public Transportation	23	HW 9	HW 8
22	11/8	Exam II Review			
	<b>11/10</b>	<b>Exam II</b>			
23	11/15	Intelligent Transportation Systems	24		
24	11/17	Connected and Automated Vehicles	25	HW 10	HW 9
	11/22	No Class (Thanksgiving)			
	11/24	No Class (Thanksgiving)			
25	11/29	Final Exam Review			HW 10
26	12/1	Project Presentations			Project
	<b>12/6</b>	<b>Final Exam</b>			