University of Texas at Tyler - Department of Civil Engineering
CENG 4351/5351 Traffic Engineering: Operations and Control
Fall 2021

Instructor: Dr. Mena Souliman
RBS 1008

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Office Hours:
Monday and Wednesday: 12:30PM-2:00PM (please email me to RSVP)

Lectures:
Monday/Wednesday: 11:15 AM-12:10PM: RBS 1031 as well as Zoom synchronous and/or asynchronous sessions.

Laboratory:
Wednesday: 2:30 PM-5:15 PM, RBS 1031

Course Website:
Canvas will be used to manage the course material for the semester. There you will find homework assignments, solutions, handouts and other material pertaining to the class. **PLEASE CHECK THERE REGULARLY.**

Catalog Description:
Introduction to traffic systems, flow characteristics, data collection, control of urban streets and freeways, operations of arterial streets, freeway, and networks, optimal signal timing design, capacity analysis using computer simulation. Additionally, the course will cover a detailed Evaluation of stresses in flexible pavements, materials characterization, and design of flexible pavements for highways and airports.

Learning Objectives:
1. Develop an organized approach to solving traffic engineering analysis and design problems.
2. Explain traffic stream characteristics, volume studies, speed, travel time, delay, accident, intersection design and parking studies.
3. Explain traffic congestion from the supply and demand perspective and classify many intelligent transportation system solutions.
4. Explain uniform traffic control devices including traffic signs, markings, signal, and warrants.
5. Analyze freeway and highway capacity including the unsignalized and signalized intersection capacity, arterial planning and design, identify operational problems and carry out traffic engineering studies.

6. Explain signal components, control and operations, signal timing and systems coordination and evaluate alternative signal timing solutions.
7. Familiarize the students with the procedures used to design pavements.
8. Develop a fundamental understanding of the analysis of pavemnt structures (develop necessary analytical skills to analyze stresses and strains in pavement system).
9. Understand the concepts and theory behind the materials and drainage characterization requirements for input in pavement structural design and performance.

Prerequisites:
CENG 3351: Transportation Engineering Systems.

Required Texts:
Traffic Engineering, Roger P. Roess, William R. McShane, and Elena S. Prassas, 4th Edition (or newer), Prentice Hall, 2010. ISBN: 0136135730. ISBN-13: 9780136135739. Available at the bookstore and web outlets.

Supplemental Textbooks/References:

- Pavement Analysis and Design, Y. H. Huang, 2nd Edition, Prentice Hall, 2004. ISBN-10: 0131424734. ISBN-13: 978-0131424739. Available at the bookstore and web outlets.
- HCM2010: Highway Capacity Manual 2010 (with U.S. Units). Copies/handouts of some chapters will be provided
- MUTCD: Manual on Uniform Traffic Control Devices 2009 Edition dated December 2009 (in both html and pdf formats, as well as a list of known errors included) http://mutcd.fhwa.dot.gov/kno_2009.htm (which is the most recent version for the MUTCD). MUTCD's & Traffic Control Devices Information currently used in Texas adopt this national manual and some supplements are added specifically for the State of Texas. Detailed information can be found in this website: http://www.txdot.gov/government/enforcement/signage/tmutcd.html
- Additional handouts/references for the use of traffic software will be provided in due course.

Schedule (Tentative and Subject to Change):

Course Schedule - Subject to Revision			
Date	Lesson #	Material Covered	Lesson Material
23-Aug	1	Introduction to Traffic Engineering	Ch. 1
25-Aug	2	Traffic stream	Ch. 5
25-Aug	Lab 1: Introduction		
30-Aug	3	Traffic stream	Ch. 5
1-Sep	4	Volume studies	Ch. 9
1-Sep	Lab 2: Turning Movement Counts		
6-Sep	LABOR DAY: NO CLASS		
8-Sep	5	Volume studies	Ch. 9
8-Sep	Lab 3: Turning Movement Counts and Intro. to Synchro		
13-Sep	6	Speed, travel time, delay	Ch. 10
15-Sep	7	Speed, travel time, delay	Ch. 10
15-Sep	Lab 4: Speed Studies		
20-Sep	8	Accident/safety studies	Ch. 11
22-Sep	9	Accident/safety studies	Ch. 11
22-Sep	Lab 5: Accident Study		
27-Sep	10	Parking Studies	Ch. 12
29-Sep	11	Parking Studies	Ch. 12
29-Sep	Lab 6: Parking Study		
4-Oct	Exam 1		
6-Oct	12	Introduction of traffic control devices	Ch. 4
6-Oct	Lab 7: 3D-Move		
11-Oct	13	Introduction of traffic control devices	Ch. 4
13-Oct	14	MUTCD signing and marking	Ch. 17
13-Oct	Lab 8: 3D-Move		
18-Oct	15	MUTCD signing and marking	Ch. 17
20-Oct	16	Hierarchy of Intersection Control	Ch. 18
20-Oct	Lab 9: PaveXpress		
25-Oct	17	Hierarchy of Intersection Control	Ch. 18
27-Oct	18	Hierarchy of Intersection Control	Ch. 18
27-Oct	Lab 10: Introduction to pavement engineering		
1-Nov	19	Signals	Ch. 20
3-Nov	20	Signals	Ch. 20
3-Nov	Lab 11: Introduction to pavement engineering		
8-Nov	Exam 2		
10-Nov	21	Signals	Ch. 20
10-Nov	Lab 12: Rotational Viscometer		
15-Nov	22	Introduction to pavement engineering	PPT
17-Nov	23	How Do Asphalt Pavements Fail?	PPT
17-Nov	Lab 13: Penetration Test		
22-Nov	Thanksgiving Holiday: NO classes		
24-Nov			
24-Nov			
29-Nov	24	Pavement Design methods	PPT
1-Dec	25	Material characterization	PPT
1-Dec	Lab 14: Final Review Session		
6-Dec	Study Day		

Exams:
There will be 2 midterm examinations and one final examination. The exams are **TENITATIVELY** scheduled for:

Exam 1: October 4th
Exam 2: November 8th
Final Exam: TBD

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 **NOT** be posted however, key answers will be demonstrated at class. 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 in the exam.

Homework:
Homework will be assigned on regular basis. **Homework is due on the date assigned at the beginning of lecture**. No late homework will be accepted except when arrangements are made with the instructor ahead of time. Solutions will be posted on Canvas. **5% Extra credit will be given for each fully computer-typed homework assignments**.

Term paper (for 5351 students):
Term paper topic will be assigned by the mid of September.

Laboratory:
There will be a series of labs completed during the semester. We will meet for lab on Wednesday's from 2:30pm-5:15pm in RBS 1031.

Be sure to review the handout and complete all required work prior to coming to lab. This will help to prepare you the experiment and help to make the sessions run smoother. If necessary a quiz will be given at the beginning of the lab which covers the experiment for the day.

You will work in groups to complete each lab. The instructor will assign the groups. Each group will be required to turn in one report for the entire group. However, there may be some lab assignments which are done individually. The format for the report is provided with the syllabus. You are encouraged to visit the writing center as they can provide excellent feedback and help you with your writing.

Grades (For 4351):
Homework/Quizzes = 20%
Professional Practice = 10%
Midterm Exams (2) = 30%
Final Exam = 20%
Labs= 20%

Grade Scale:
A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: <60

Grades (For 5351):
Homework/Quizzes = 10%
Professional Practice = 5%
Midterm Exams (2) = 30%
Final Exam = 20%
Labs= 20%
Term Paper = 15%

Grade Scale:
A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: <60

****NOTE:** There will be no makeup work or extra credit allowed/granted at the end of 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.

Calculator Policy:

Only NCEES approved calculators will be permitted during tests and your test will be collected and your grade will be a zero if you are using a non-approved calculator.

The approved calculators include the following: (Please check the NCEES website for a complete listing, www.ncees.org/exams/calculator-policy/. Examples include but are not limited to:

- Hewlett Packard – HP 33s, HP 35s, and no others
- Casio – All FX 115 models
- Texas Instruments – All TI 30X or TI-36X models.
- If you are unsure about your calculator, it is your responsibility to check with the instructor for approval.

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.

-Laptops/PDAs/MP3 players/Cell Phones or other electronic devices:

The use of any electronic device, except an approved calculator, is not permitted during exams. Your exam will be collected and your grade will be a zero if you are caught using a non-approved electronic device/calculators. Any instances of a calculator inappropriately used during an exam will be the basis of alleging Academic Misconduct and may result in Failing (F) of the course at the determination of the course's instructor or the basis for a recommendation for expulsion from the

University. Any Calculator used during an exam in this course must meet the requirements stated within the policy below.

Professional Practice:
Your professional practice grade will be computed based upon your attendance and the number of assignments you turn in that are completed in a professional manner.

Final day to withdraw:
The final day to withdraw from the course without penalty is **November 1st.**

Census dates:
The university requires that instructors to report the attendance to the register at various points in the semester. Therefore, on **September 3rd** I will be taking attendance. Please make sure you are there for class on that date or notify ahead if you will not be there.

UNIVERSITY POLICIES AND ADDITIONAL INFORMATION

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: http://www.uttyler.edu/wellness/rightsresponsibilities.php

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 http://www.uttyler.edu/about/campus-carry/index.php

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 www.uttyler.edu/tobacco-free.

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. (For Fall, the Census Date is Sept. 12.) Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. 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 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.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.

- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid State-Mandated Course Drop Policy

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.

Student Accessibility and Resources
In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University offers accommodations to students with learning, physical and/or psychiatric disabilities. If you have a disability, including non-visible disabilities such as chronic diseases, learning disabilities, head injury, PTSD or ADHD, or you have a history of modifications or accommodations in a previous educational environment you are encouraged to contact the Student Accessibility and Resources (SAR) office and schedule an interview with the Accessibility Case Manager/ADA Coordinator, Cynthia Lowery Staples. If you are unsure if the above criteria applies to you, but have questions or concerns please contact the SAR office. For more information or to set up an appointment please visit the SAR office located in the University Center, Room 3150 or call 903.566.7079. You may also send an email to cstaples@uttyler.edu

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
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.

i. "Cheating" includes, but is not limited to:
   - copying from another student's test paper;
   - using, during a test, materials not authorized by the person giving the test;
   - failure to comply with instructions given by the person administering the test;
   - 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;
   - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
   - collaborating with or seeking aid from another student during a test or other assignment without authority;
   - discussing the contents of an examination with another student who will take the examination;
   - 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;
   - substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
   - 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;
   - falsifying research data, laboratory reports, and/or other academic work offered for credit;
   - 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
   - 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.

ii. "Plagiarism" 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.
iii. "Collusion" 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.
iv. All written work that is submitted will be subject to review by SafeAssignTM, available on Blackboard.

UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- 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.

UT Tyler Counseling Center (903.566.7254)

Recording of Class Sessions

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.

Mena Souliman Ph.D.

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CENG 4351/5351 General Requirements for Laboratory Reports

Lab Time: Wednesday: 2:30 PM-5:15 PM, RBS 1031

A laboratory report is required for each experiment performed. Only one lab report is required per group for most labs. There may however be certain labs that require each person to submit their own work. Due dates for each lab will be posted. The report should be in the following format.

- **Cover Page:** Laboratory Title, Course Number (CENG 4351), Your Names and Group Number. Each person in the group sign the cover page indicting that they have read the report and approve of the contents contained within.
- **Objective:** Purpose of the experiment should be explained in a few sentences.
- **Procedure:** Include a summarized procedure of the steps you took to complete this lab. Numbered list is preferred.
- **Results and Discussion**: Present tabulated raw data (data sheets are provided with the standard laboratory procedure), relevant calculations, and required plots. **BE SURE TO USE CAPTIONS FOR FIGURES, TABLES AND GRAPHS! Refer to the figures, graphs and tables by number in the text of the discussion.** Partial credit can only be assigned if you present your work in a logical manner. Neatly show your work and attach a page of sample calculations.

  Try to have a good understanding of each experiment. Analyze your results. Identify probable sources of error that may have occurred while you performed the laboratory, and explain that how these errors might affect your results (final value will increase or decrease). DISCUSS!! For example, what trends do you notice in the data? Do the results make sense? Are they what you expected? If so why? If not, why not? Some labs will have more data than others to discuss. Be sure to give a thorough discussion of your results.
- **Conclusions:** Summarize your results. Relate what you have learned from class about soil mechanics to what you have learned from performing this lab. Explain that how this experiment is useful to solve the practical civil engineering problems.
- **Team Contributions:** The contributions of each team member should be stated in this section. List what portions of the report each person contributed towards and how much time each person spent. It is okay to have multiple people working on any part.

GRADING

Participation in Lab and Cleanup	20 %
Report	
• Objective	5 %
• Procedure	10%
• Results and Discussion	40 %
• Conclusions	25 %

THINGS TO REMEMBER

- After finishing the experiments, clean the instruments and the work area.
- Data sheets should be typed in Excel
- Sample calculations can be typed or written neatly on engineering paper and placed as an appendix of the report. The remainder of the report should be typewritten.
- When writing your reports, avoid using first person like “I” or “we”.
- **USE CAPTIONS FOR FIGURES AND TABLES! REFER TO THESE FIGURES AND TABLES SPECIFICALLY IN THE TEXT USING THE FIGURE/TABLE NUMBER!**