

# University of Texas at Tyler - Department of Civil Engineering CENG 4351 Traffic Engineering: Operations and Control

Fall 2019

**Instructor:**

Vanesha Nicholson

Office Hours:

RBS 1008      Monday and Wednesday: 4:00PM- 5:20PM

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## Lectures:

Monday/Wednesday: 4:00 AM-5:20PM, RBS 1031

## Laboratory:

Saturday: 12:00 PM-2:50 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
2. Explain traffic stream characteristics, volume studies, speed, travel time, delay, accident, intersection design and parking
3. Explain traffic congestion from the supply and demand perspective and classify many intelligent transportation system
4. Explain uniform traffic control devices including traffic signs, markings, signal, and
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
6. Explain signal components, control and operations, signal timing and systems coordination and evaluate alternative signal timing
  
7. Familiarize the students with the procedures used to design
8. Develop a fundamental understanding of the analysis of pavement 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

# Prerequisites:

[CENG 3351](#): Transportation Engineering Systems, [CENG 2336](#): Geomatics.

# Required Texts:

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

## **Supplemental Textbooks/References:**

- Pavement Analysis and Design, 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](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

## **Schedule (Tentative and Subject to Change):**

## **Exams:**

There will be 2 midterm examinations and one final examination. The exams are

**TENITATIVELY** scheduled for:

Exam 1:        October 7th

Exam 2:                    November 11th 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.**

## **Laboratory:**

There will be a series of labs completed during the semester. We will meet for lab on Saturday's from 12:00pm-2:50pm 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 of 2 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:**

### **Grade Scale:**

Homework/Quizzes = 20%	A:	90-100
Professional Practice = 10%	B:	80-89
Midterm Exams (2) = 30%	C:	70-79
Final Exam = 20%	D:	60-69
Labs= 20%	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/](http://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
- If you are unsure about your calculator, it is your responsibility to check with the instructor for

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 5th**.

# Census dates:

The university requires that instructors to report the attendance to the register at various points in the semester. Therefore, on **September 10th** 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](http://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 (Sept. 12th)** 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
- Receiving 100% refunds for partial (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.

## **Disability/Accessibility Services**

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 Cynthia Lowery, Assistant Director Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.utt Tyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

## **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.

1. "Cheating" includes, but is not limited to:
  - o 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
1. “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
- “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
1. All written work that is submitted will be subject to review by SafeAssign™, available on

# UT Tyler Resources for Students

- [UT Tyler Writing Center](mailto:writingcenter@uttyler.edu) (903.565.5995), [writingcenter@uttyler.edu](mailto:writingcenter@uttyler.edu)
- [UT Tyler Tutoring Center](mailto:tutoring@uttyler.edu) (903.565.5964), [tutoring@uttyler.edu](mailto: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
- [UT Tyler Counseling Center](mailto:903.566.7254) (903.566.7254)

Vanesha Nicholson, MBA [vnicholson@uttyler.edu](mailto:vnicholson@uttyler.edu)

**CENG 4351 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  
Each person in the group sign the cover page indicating 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  
Numbered list is preferred.
- **Results and Discussion:** Present tabulated raw data (data sheets are provided with the standard laboratory procedure), relevant calculations, and required **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 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 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
- 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 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!**