

The University of Texas at El Paso  
Department of Civil Engineering

**CE4340 Transportation Engineering (CRN 11919)**

**Course Syllabus (Fall 2016)**

**Date: Aug. 16, 2016. This version supersedes all earlier versions.**

Time & venue	Class times: MW, 12:00 p.m.-1:20 a.m., BUS301
Instructor	Dr. Ruey (Kelvin) Cheu Office: Engineering Annex Room A208 Email: <a href="mailto:rcheu@utep.edu">rcheu@utep.edu</a> Phone: (915)747-5717 Office hours: MTWR 1:30 p.m. to 2:50 p.m.
Teaching assistant	Name: Email: Office hours: Meeting Venue: CE TA Room A220
Course website	See UTEP's Blackboard
Course objective	In UTEP course catalog: "Study of planning, economics, finance, location, design and administration of transportation systems."  More specifically: "To introduce to students the fundamental concepts of highway transportation and the design principles of selected highway facilities. Topics covered include traffic models, capacity and level of service analysis, traffic signal design, geometric design and pavement design."
Prerequisite/Co-requisite	1. CE3313 Engineering Measurements; 2. CE3373 Engineering Probability & Statistics; 3. A calculator approved by NCEES to be used in the FE exam
Required text	F. L. Mannering and S. S. Washburn (2013). Principles of Highway Engineering and Traffic Analysis, 5 <sup>th</sup> Edition, John Wiley.  This course covers chapters 1, 3, 5, 6, 7 & 8 in the textbook. Homework problems are from the textbook.
Grading	Contributions towards final mark (out of 100%) 15% Attendance 2% Orientation exam

	<p>10% Exam 1  15% Exam 2  30% Final examination  20% Homework  6% Project  2% Portfolio</p> <p>In grading the homework, assignments, tests, exams and etc, no credit will be given to methods <b>not</b> covered in this class, although these methods, tables, formula may appear in the textbook. Error or outdated material in the textbook should not be the reason for claiming full credit on work done.</p> <p>Letter grades will be assigned based on the final course marks:</p> <p>A 90 and above  B 80 to 89.99  C 70 to 79.99  D 60 to 69.99  F below 60</p> <p>No letter grade will be released until it is official in Goldmine.</p> <p>In consistent with the Civil Engineering Department’s policy, a student who does not score 50% or more of the total marks allocated to the <b>Final Examination</b> will automatically receive an <b>F</b> grade.</p>
Attendance	<p>Attendance will be taken and/or signatures validated for every class activity.</p> <p>For the purpose of attendance taking and validation, signature template (not simple pattern that can be copied easily) will be taken from every student during the 2<sup>nd</sup> week. You must sign on the attendance sheet exactly the same signature as it appears in the template. The TA will verify the signatures after every class meeting. Signature that does not appear to match the template will be counted as absent.</p> <p>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 works will be marked absent (although they may have signed on the attendance sheet earlier).</p> <p>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 or TA during class or office hours. Graded</p>

	homework, assignments and exams not collected after the final exam week will be disposed according to UTEP policy.
Orientation Exam	Students will be required to take an Orientation Exam in Blackboard by the end of the 2 <sup>nd</sup> week of the semester. This is a multiple choice exam which covers course policy and Introduction to Transportation Engineering. No extension of the deadline or rescheduling of this exam will be made.
Exams 1 & 2	Exams are given during the class times. The dates of Exam 1 & Exam 2 will be announced at least 1 week advance in class.
Final Exam	<b>Final Exam is on Tuesday 12/8, 1.00 p.m.-3.45 p.m.</b> All the materials covered in the course will be tested.
General Exam Rules & Cheat Sheet	<p>All exams are closed book. You are only allowed to bring your writing instruments, erasers, NCEES approved calculators and a cheat sheet.</p> <p>Topics to be tested will be announced in the class and Blackboard one week prior to the exam.</p> <p>Exam solutions will be posted in Blackboard after the exam has been graded. The solutions will also be discussed in the class after the exam.</p> <p>The instructor will set questions from materials taught in the class. The meaning of “taught in the class” includes verbal instructions or written notes on the chalk board, white board and Blackboard, 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 in 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> <p>The purpose of cheat sheet is to help students to review the materials and prepare for the exam. The cheat sheet should be a letter size (8.5”x11”) paper. You may write on both sides of the paper.</p>
Calculators	In line with the Civil Engineering Department’s policy, only calculators permitted by NCEES for use in the <u>current semester’s FE exam</u> are permitted to be used in the CE4340 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 CE4340 exams. Please check <a href="http://www.ncees.org">www.ncees.org</a> 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 student's calculator is allowed during exam.
Field trip	To be announced/decided.
Project	<p>The project involves the use of SYNCHRO (standard software used by TxDOT and City of El Paso) to design signal timing plans. You will be assigned into groups. Each group is to bring a laptop to ETC to have the software installed. At the end of the semester you group must bring the laptop to ETC to have SYNCHRO uninstalled. Otherwise your group will not get the credit for the project.</p> <p>Graduate student taking this course for graduate credit must do this as individual project. Each graduate student will be given a network with more intersections and more features to model. The project report should be more in depth.</p>
Portfolio	The portfolio will be graded during the Final Examination. The portfolio should be submitted in a ring binder with dividers. You are expected to include all the syllabus, class notes, homework, assignments, project works, revision notes and other materials related to this course. You will get 0%, 0.5%, 1%, 1.5% or 2% credit for your portfolio.
Homework	<p>About 39 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. Only selected homework problems will be graded. All homework solutions <b>must</b> be submitted in engineering papers (you can buy them in the ASCE student chapter office), stapled at the top-left corner. Homework solutions not submitted in engineering papers 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. No having any of the above will lead to marks being deducted.</p> <p>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.</p>

<p>Late homework/ assignment policy</p>	<p>Late homework is normally accepted and graded with the following penalties:          Late by <math>\leq 24</math> hours: 70% credit          Late by <math>&gt; 24</math> hours but <math>\leq 48</math> hours: 50% credit          Late by <math>&gt; 48</math> hours: 0% credit.          Homework solution is usually posted in Blackboard 2 days after the due date. Once posted, no submission will be accepted.</p> <p>Late homework must be submitted to my office, under my office door (recommended) or in the letter box outside the office. The time that determines 70%, 50% or 0% credit is based on the time <b>received by me in person</b>, not the time submitted. Alternatively, you can submit the work to the Civil Engineering office but make sure you ask the work study to “post-mark” it with date and time of submission.</p>
<p>Re-schedule of examination</p>	<p>There is no make-up or rescheduling of the Final Examination.</p> <p>Make-up for Exam 1 or 2 will only be arranged if you inform the instructor <b>prior</b> to or on the day <b>before</b> the exam, with a strong valid reason. Examples of strong valid reasons are official UTEP travel, accident, illness, child birth, passing of an immediate family member, jury duty and 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 bridge delay, wedding, driving test, sending car for service, clash with other course schedule, etc. Job interview 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.</p> <p>Each student is only allowed one (1) make-up exam. That is, he/she can only have make-up for Exam 1 or Exam 2 but not both.</p> <p>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.</p> <p>Student who fails to show up for the make-up or final exam with an invalid reason will be given 0 mark 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</p>

	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	<p>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 UTEP catalog policy.</p> <p>Special note: Two students were caught cheating in a CE4195 exam in Spring 2010 and were suspended for 1 year (cannot take any course and delay graduation for a year). They were also not considered for any scholarship or assistantship. Another 2 students were found copying CE4340 exam in Fall 2013. They were given 0 mark for the exam after investigation by the Dean of Students. The led to their final grades being downgraded by 2 grades (e.g., B became D, and C became F).</p>
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 Center for Accommodation and Support Services, or at the request of Department, College or University for teaching evaluation.
Phone/iPod/iPad, laptop etc	<p>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 “Hello” or “Hola” outside the class door. You are not allowed to answer any phone call during the examination.</p> <p>Use of iPad and laptop to read class notes is allowed as long as they do not distract other students. No such device is allowed in the exams.</p>
Disability	If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to <a href="mailto:cass@utep.edu">cass@utep.edu</a> , or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at <a href="http://www.sa.utep.edu/cass">www.sa.utep.edu/cass</a> .

## Tentative Weekly Schedule

Wk	Date	Topic
1	8/22, 8/24	Class introduction Traffic measurement
2	8/29, 8/31	Traffic measurement <b>Orientation Exam closed on Friday at 11:59 p.m.</b>
3	9/5, 9/7	Traffic models
4	9/12, 9/14	Traffic models
5	9/19, 9/21	Traffic signals
6	9/26, 9/28	Traffic signals
7	10/3, 10/5	<b>May be Exam 1</b> Level of service analysis
8	10/10, 10/12	Level of service analysis
9	10/17, 10/19	Geometric design
10	10/24, 10/26	Geometric design <b>May be Exam 2</b>
11	10/31, 11/2	Geometric design
12	11/7, 11/9	Lab week (SYNCHRO Project)
13	11/14, 11/16	Transportation planning
14	11/21, 11/23	Transportation planning
15	11/28, 11/30	<b>12/2: Dead day</b>
16	12/9 Friday	<b>Final exam: 1:00 p.m. to 3:45 p.m.</b>

## Desired Learning Outcomes

In this course, you will learn:

1. Different modes of transportation, their characteristics and responsible federal, state and local agencies
2. Vehicle classification; quantitative description of traffic (volume, headways, space mean speed, time mean speed, density, travel time); qualitative description of traffic (level of service)
3. Traffic measurement devices: loop detectors, image processing, etc
4. Travel time survey methods: license plate survey and floating car method
5. Analytical traffic models and their applications: headway and volume distributions; queuing models; traffic stream models; car-following models
6. Warrant for traffic signals, how traffic signals work, system hardware and controllers, modes of operation, NEMA 8-phase diagram
7. Signal design concept: saturation flow, lost time, effective green, cycle time, split, etc; selection of phases, analysis of flow rate, calculation of critical flow ratio, cycle lengths, green split, adjustment for pedestrians
8. Concept of level of service; basic freeway segment: level of service analysis and design applications
9. Analysis of level of service for multilane highways
10. Analysis of level of service for signalized intersections
11. Objective and considerations for highway geometric design
12. Highway alignment design: horizontal alignment, vertical alignment, design control criteria
13. Sight distance, design of horizontal alignment for safety
14. Design of vertical curve for safety
15. Cross section design
16. Intersection alignment design: at grade intersections
17. Intersection alignment design: grade separation intersections, types of interchanges
18. Functions of highway pavement; types of pavements
19. Design of flexible pavement: design objective, stress and deflection equations; pavement serviceability index, equivalent single axle load; structure number, AASHTO design method;
20. Design of rigid pavement: stress and deflection equation; AASHTO design procedure
21. The transportation planning process





## Calculator policy

To protect the integrity of its exams, NCEES limits the types of calculators you may bring to the exams. The only calculator models acceptable for use during the 2015 exams are as follows.

**Casio:** All fx-115 models. Any Casio calculator must contain fx-115 in its model name. Examples of acceptable Casio fx-115 models include (but are not limited to):

- fx-115 MS
- fx-115 MS Plus
- fx-115 MS SR
- fx-115 ES
- fx-115 ES Plus

**Hewlett Packard:** The HP 33s and HP 35s models, but no others.

**Texas Instruments:** All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name. Examples of acceptable TI-30X and TI-36X models include (but are not limited to):

- TI-30Xa
- TI-30Xa SOLAR
- TI-30Xa SE
- TI-30XS Multiview
- TI-30X IIB
- TI-30X IIS
- TI-36X II
- TI-36X SOLAR
- TI-36X Pro