

# The University of Texas at El Paso Department of Civil Engineering Syllabus<sup>1</sup>

## Sections Found

[Infrastructure Engineering - 27193 - CE 6306 - 001](#)

**Associated Term:** Spring 2024

**Registration Dates:** Oct 16, 2023 to Jan 16, 2024

**Levels:** Graduate

**Attributes:** [CR] Campus Location, CAPP (MECH Eng Elective)

**Public Access to Course Information:** [Ruey Long Cheu \(P\)](#)

**Course Fee(s):** None.

[View my Books](#)


Main Campus Campus

Lecture (LECT) Schedule Type

3.000 Credits

[View Catalog Entry](#)

## Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors	Description Text
Class	4:30 pm - 5:50 pm	TR	Classroom Building C301	Jan 16, 2024 - May 02, 2024	Lecture (LECT)	Ruey Long Cheu (P) 	Infrastructure Engineering
Limited ADA Access							

## COURSE INFORMATION

CE6306 Infrastructure Engineering

CRN: 27193

Semester: Spring 2024

Delivery Method: In-person

Meeting Day and Time: Tuesday, Thursday 4:30 pm – 5:50 pm

Location: CRBL 301

## INSTRUCTOR

Kelvin Cheu

[rcheu@utep.edu](mailto:rcheu@utep.edu)

Phone Number: (915)747-5717

Office Location: Engineering A208

Office Hours:

- Face-to-Face: TBD
- Virtual: By appointment. Please make appointment by email.

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<sup>1</sup> This syllabus is customized from the template provided by the Provost Office.

## **COURSE DESCRIPTION**

CE6306 is a required 3-credit core course for all PhD in Civil Engineering students (in the existing degree plan). This course is also an elective for graduate students. CE6306 will introduce to students the concepts and techniques of analyzing infrastructure systems from the systems and network perspectives. We will examine infrastructure systems as networks of nodes and links, and study the issues concerning their planning, design and operations.

Students registered in CE6306 should have graduate or PhD standings. Undergraduate seniors are not allowed to take this course. All student registrations for this course require instructor's approvals.

Students enrolled in CE6306 should have taken a calculus and probability course at the undergraduate level.

## **COURSE OBJECTIVES AND UNIVERSITY LEARNING OUTCOMES**

The objective of this course is to introduce to students the following topics:

- Introduction to infrastructure systems
  - Characteristics of civil infrastructures; the roles of civil engineers; infrastructure report card; new concepts; network representations.
- Analysis of infrastructure service and capacity at facilities:
  - Queues in infrastructure facilities; queuing theory; Markov chain; M/M/1, M/M/m, M/M/1(k), M/M/m(k) models; level of service.
- Delivery of infrastructure services across networks:
  - Transportation models; transshipment models; minimum spanning tree; shortest path algorithm; maximum flow algorithm.
- Location of infrastructure facilities:
  - Linear programming formulations; covering problem; median problem; fixed charge facility location problem.
- Decision analysis applied to infrastructure problems:
  - Decision tree; Bayesian approach; value of experiment/information.
- New methodologies

At the end of this course, students will have a broader view of civil infrastructure systems, how one's research relates to and contributes to the civil infrastructure systems and knowledge of several mathematical methodologies that can be applied to finding engineering solutions.

## SCHEDULE OF CLASS ACTIVITIES\*

### CE6306 Spring 2024 Semester Tentative Schedule

Week #	1	2	3	4	5	6	7	8
<b>Tue</b>	16-Jan	23-Jan	30-Jan	6-Feb	13-Feb	20-Feb	27-Feb	5-Mar
	Course introduction	ASCE report card	Queuing models	Queuing models	Network models	Exam 1: Queuing models	Network models	Linear programming
<b>Thu</b>	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	22-Feb	29-Feb	7-Mar
	What are civil infrastructures	Queuing models	Queuing models	Queuing models	Network models	Network models	Network models	Covering models

Week #	9	10	11	12	13	14	15	16
<b>Tue</b>	12-Mar	19-Mar	26-Mar	2-Apr	9-Apr	16-Apr	23-Apr	30-Apr
	Spring break	Covering models	Exam 2: Network models	Decision Analysis	Decision Analysis	Presentation	Presentation	TBD
<b>Thu</b>	14-Mar	21-Mar	28-Mar	4-Apr	11-Apr	18-Apr	25-Apr	2-May
	Spring break	Covering models	Decision Analysis	Decision Analysis	Decision Analysis	Presentation	Exam 3: Decision analysis	TBD

## REQUIRED MATERIALS

### Calculator

This class follows the NCEES's calculator policy of the FE Exam. Refer to: <https://ncees.org/exams/fe-exam>.

The following figure is the screenshot of NCEES website taken on 8/5/2023.

## CALCULATOR POLICY

To protect the integrity of its exams, NCEES limits the types of calculators examinees may bring to exam sites. The list of approved calculators is reviewed annually.

The following calculator models are the only ones acceptable for use during the 2023 exams:

- **Casio:** All fx-115 and fx-991 models (Any Casio calculator must have "fx-115" or "fx-991" in its model name.)
- **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 have "TI-30X" or "TI-36X" in its model name.)

Examples of approved calculators are:

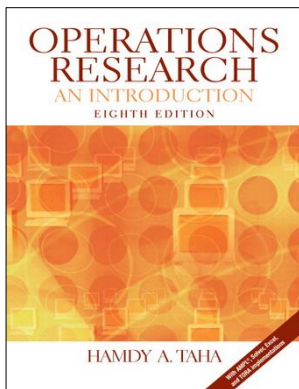


See also the CALCULATOR POLICY SECTION.

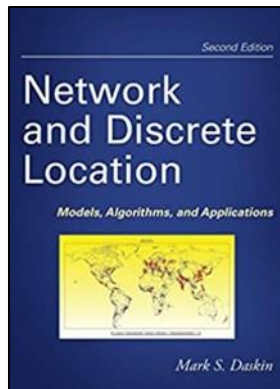
### Textbook

There is no assigned textbook. Materials will be provided in Blackboard. Students are expected to copy class notes.

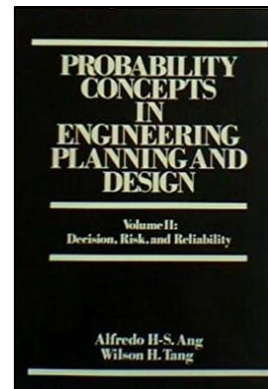
### Reference book (not mandatory)



Any edition.  
Covers chapters 2, 5, 6, 15, 17.



Any edition.  
Covers chapters 1 to 7.



1984 edition. Vol. 2.  
Covers chapters 2.

### TECHNOLOGY REQUIREMENTS

Course notes and homework assignments will be delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You must have access to a computer/laptop. You will need to download or update the following software: Microsoft Office, Adobe Acrobat Reader, Windows Media Player,

QuickTime, and Java. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

If you do not have word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about [Microsoft Office 365](#) and follow the instructions.

**IMPORTANT:** If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP [Help Desk](#) as they are trained specifically in assisting with technological needs of students. Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you!

## COURSE COMMUNICATION

Here are the ways we can keep the communication channels open:

- Office Hours: I will have office hours for your questions and comments about the course. My office hours are in-person, however, you can request a virtual meeting and I will send you a Teams link.
- Email: UTEP e-mail is the best way to contact me outside the class meeting times and office hours. I will make every attempt to respond to your e-mail within 24 hours of receipt (not sent) **if you follow the following email requirement.** Be sure to send your email from your UTEP student account (@miners.utep.edu) and please put the course number (CE6306) in the **subject** line. In the body of your e-mail, start with a polite salutation (a simple "Dr Cheu" will suffice, no "Hi" or "Hello", then clearly state your question. At the end of your e-mail, be sure to put your first and last name, and your university identification number.

Example:

Send	To	<a href="#">Cheu, Ruey L (Kelvin);</a>
	Cc	
	Subject	CE4340 Exam 1
Dr Cheu		
I am your student in the CE4340 Transportation Engineering course. I am not able to take Exam 1 during class time on September 1. The reason is I am selected as the captain of the UTEP soccer team. On September 1 we will be going to Guadalajara to play a pre-season match against Leones Negros. Please tell me how I can take Exam 1. Attached is the official letter from Coach Maradona. Thank you.		
Guillermo Ochoa 800011966		

- Announcements: Check the Blackboard announcements daily for any updates, deadlines, or other important messages.
- Emails for the entire class will be sent via Blackboard. Be sure to modify your email setting not to filter emails sent by Blackboard to the junk mail folder.
- I strongly recommend you to install the Blackboard app in your smartphone, so that you will receive a notification whenever something is posted in Blackboard.

## **ATTENDANCE**

Attendance will be taken in every class meeting, either by signing your signature in an attendance form, or calling your name to return graded homework. Your signatures will be checked for consistency throughout the semester. Inconsistent signature, missing signature, or failure to pick up graded homework during class time or failure to respond when your name is called will be marked as absent. For class meetings in Microsoft Teams, the sign-in and sign-out records will be used as an additional way of taking attendance.

## **ILLNESS PRECAUTIONS**

Please stay home if you have symptoms of a communicable illness, especially COVID. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations.

## **HOMEWORK POLICY**

- Six (6) homework have been tentatively planned for this course.
- Each homework consists of several questions. The solutions require you to work out by hand or with the help of a computer and Microsoft Excel., not AI.
- You are expected to submit the solutions to all the questions. All questions will be graded.
- Homework is usually due 1 week after given. Lengthy and difficult questions will be explained in the class, some even with in-class practices. Because I have given you plenty of time to complete the homework, no late submission will be accepted, unless you have an emergency or special situation.
- The submission format (hard copy or electronic upload) and expectation will be announced in the homework instructions. Not following the submission instructions/format/presentation style will lead to marks being deducted.
- Unless you are given permission prior to the original submission deadline, a homework assignment that is received (not submitted) after the deadline by less than 24 hours will earn 50% of the marks. No mark will be awarded after that.

## **ALTERNATIVE MEANS OF SUBMITTING WORK IN CASE OF TECHNICAL ISSUES**

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save, scan or make copies of all your work (answers to discussion points, quizzes, exams, and essays) in a separate Word document as a back-up. This way, you will have evidence that you completed the work and will not lose all the credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a last resort to claim credits.

## **MAKE-UP WORK**

Make-up work will be given *only* in the case of a *documented* emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

## **EXAMINATION POLICY**

- Examinations are conducted in-persons during class time.
- The date, time and format of examinations will be announced one week in advance.
- To discourage students from focusing narrowly on only a few questions, no practice exam will be given.
- Rescheduling of an exam is possible if you inform me ASAP before the exam, with a valid reason. Examples of valid reasons are official UTEP travel, accident, medical, family emergency, jury duty, court appearance, military service, isolation/quarantine, job interview. These are not expected and cannot be rescheduled. You may need to show documentary evidence (e.g., doctor's letter, police report, court letter). Events that can be pre-scheduled or rescheduled are not valid reasons. Examples of non-valid reasons are vacation, wedding, driving test, sending car for service, etc. If an emergency happens during the exam day, you should contact me or the TA at the earliest possible time.

## **CALCULATOR POLICY DURING EXAMINATIONS**

- 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 examinations.
- No other make and 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 CE6306 exams. Please check <https://ncees.org/exams/calculator/> for the latest permitted calculator models.
- This calculator policy may not be enforced by some professors but will be enforced in CE6306. Models allowed by another professor in his/her exam are not an excuse. This is CE6306 and you should follow CE6306 course policy.
- If a student is found using an unapproved calculator is found during any exam, for the first time he/she will be given a warning. If this is repeated for the second time it will be reported as “cheating – bringing unauthorized materials into the exam” to the Office of Student Conduct and Conflict Resolution (OSCCR).according to the UTEP Handbook of Operating Procedures.

## **PRESENTATION POLICY**

8% of the total course marks are allocated to topical presentation, in which each student selects an emerging topic in infrastructure engineering, learn it and make a 20-minute presentation to the class. The purpose of these presentations are for students to learn some new topics and share new findings in the field. The possible topics are:

- Sustainable infrastructure
- Climate change and infrastructure
- Transportation energy infrastructure
- Infrastructure resilience
- Infrastructure equity
- Artificial intelligence and infrastructure (may narrow down the scope)
- Digital twins and infrastructure
- Infrastructure security

Other topics are possible. Students should discuss and finalize the presentation topics with the instructor before the Spring break.

## **COURSE DROP POLICY**

If you feel that you are unable to complete the course successfully, please let me know and then contact the [Registrar's Office](#) to initiate the drop process. If you do not, you are at risk of receiving an “F” for the course.

I may drop you from the course if you:

- Fail to attend more than 8 class meetings (in the attendance records); or
- Fail to submit more than 3 homework combined; or
- Fail to submit more than 1 exam.

I will not drop you from the course if you are being investigated for cheating.



## **GRADE POLICY**

Letter grades will be assigned based on the final course marks (out of 100):

A	90 and above
B	80 to 89.99
C	70 to 79.99
D	60 to 69.99
F	below 60

Contributions towards final mark (out of 100%)

10%	Attendance
20%	Exam 1
20%	Exam 2
20%	Exam 3
20%	Homework
8%	Presentation
2%	Class participation
1%	Course evaluation (extra credit)

## **INCOMPLETE GRADE POLICY**

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

## **EXTRA CREDIT POLICY**

I will not give extra credit to an individual – this is considered a form of preferential treatment/discrimination. If an opportunity to earn extra credit arise, all students in the course will have equal opportunity.

## **PHOTOGRAPH, VOICE AND VIDEO RECORDINGS**

Taking photograph, recording voice or video of the conduct of the course must have the permission of the instructor.

## **COPYRIGHT POLICY**

All materials (textbook, homework questions and solutions, exam questions and solutions) used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated, such as posting in the Internet or social media. Doing so may result in disciplinary action.

## ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations to students with documented disabilities. Students who become pregnant may also request reasonable accommodations, in accordance with state and federal laws and regulations and University policy. Accommodations that constitute undue hardship are not reasonable. To make a request, please register with the UTEP Center for Accommodations and Support Services (CASS). Contact CASS at 915-747-5148, email them at [cass@utep.edu](mailto:cass@utep.edu), or apply for accommodations online via the CASS portal.

## SCHOLASTIC INTEGRITY

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

## GUIDANCE ON ARTIFICIAL INTELLIGENCE

Use of AI technologies or automated tools, particularly generative AI such as [ChatGPT](#) or [DALL-E](#), is **not allowed** for assignments in this class. Each student is expected to use critical and creative thinking skills to complete tasks and not rely on computer-generated ideas. Any direct use of AI-generated materials submitted as your own work will be treated as plagiarism and reported to the Office of Student Conduct and Conflict Resolution (OSCCR).

## PLAGIARISM DETECTING SOFTWARE

Some of your course work and assessments may submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment/submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

## COURSE RESOURCES

UTEP provides a variety of student services and support. Please refer to the QR code below for a listing of campus resources.

