

CE 5317: Statistical Methods for Civil Engineers (ONLINE SYNCHRONOUS)

CRN: 28032

Spring 2021

Professor Kelvin Cheu

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Office Hours: Online via Microsoft Teams, MW 1-3pm

Course Information: What this class is about and what we will do

COURSE DESCRIPTION

Applications of statistical analysis to civil engineering problems. Topics covers include point and interval estimations, confident intervals, non-parametric test, linear and non-linear regressions and analysis of variance. Prerequisite: Department Approval

COURSE OBJECTIVES OR EXPECTED LEARNING OUTCOMES

CE5317 is a 3-credit elective course in the civil engineering graduate/PhD programs. This course is the advanced version of CE3373 Engineering Probability & Statistical Models. However, graduate and PhD students who have not taken any statistics course at the undergraduate level should still be able to fully benefit from the course.

The course will teach the essential statistical methods all the civil engineering graduate/PhD students should know. Students will learn to appreciate the randomness of nature and how it affects civil engineering decisions. More importantly, students will learn the correct statistical concepts and use the appropriate methods to assist in making civil engineering decisions.

Students will learn the following concepts and procedures:

- Statistics and civil engineering.
- Probability: probability theory, sampling, independence, mutually exclusive, Bayes theorem, random variables.
- Discrete probability distributions: uniform, binomial, geometric, Poisson distributions.
- Continuous probability distributions: uniform, normal, log-normal, exponential, gamma distributions.
- Descriptive statistics.
- Point estimation: sampling distribution, central limit theorem, method of maximum likelihood.
- Interval estimation – single sample: mean with variance known and unknown, t-distribution.
- Hypothesis test – single sample: mean with variance known and unknown, Chi-square distribution, goodness- of-fit test.
- Statistical inference – two samples: difference between two means, variance known and unknown, confidence intervals, paired t-test, variance of two distributions, F distribution.
- Simple linear regression: least-square method, hypothesis tests, confidence intervals.
- Multiple linear regression: least square method, matrix form, hypothesis tests, confidence intervals, model adequacy, stepwise regression approach.

- Non-linear regressions.
- Non-parametric tests: sign test, Wilcoxon signed-rank test, Wilcoxon rank test.
- Analysis of variance: design of experiments.

LEARNING MODULES

The learning and assessment activities are arranged by weeks:

- Every week: 2 synchronous online live lectures. Attendance will be taken.
- Every 1 or 2 weeks: 1 homework.
- 2 synchronous computer lab sessions will be held during the scheduled class time.

The tentative weekly lesson and assessment plans are as follows:

CE5317 Tentative Spring 2021 Semester Schedule

Week #	1	2	3	4	5	6	7	8	SpgBrk	9	10	11	12	13	14	15	16
Mon		25-Jan	1-Feb	8-Feb	15-Feb	22-Feb	1-Mar	8-Mar	15-Mar	22-Mar	29-Mar	5-Apr	12-Apr	19-Apr	26-Apr	3-May	
Wed	20-Jan	27-Jan	3-Feb	10-Feb	17-Feb	24-Feb	3-Mar	10-Mar	17-Mar	24-Mar	31-Mar	7-Apr	14-Apr	21-Apr	28-Apr	5-May	12-May
Mon Lecture		Probability	Discrete prob dist	Dist & cont prob dist	Continuous prob dist	Sampling dist	Exam 1	Single sample: CI		Double sample: CI	Double sample: HT	Exam 2	SLR	MLR	DOE	Exam 3	
Tue																	
Wed Lecture	Syllabus	Probability	Discrete prob dist	Continuous prob dist	Descriptive stats	Lab 1 @RISK	Point estimate	Single sample:		Double sample:	ANOVA	SLR	MLR	Nonpara methods	Lab 2 MINITAB		
Thu																	
Fri																	
Sat																	
Sun			HW1 due	HW2 due	HW3 due			HW4 due		HW5 due	HW6 due	HW7 due		HW8 due	HW9 due		

REQUIRED MATERIALS

Calculator

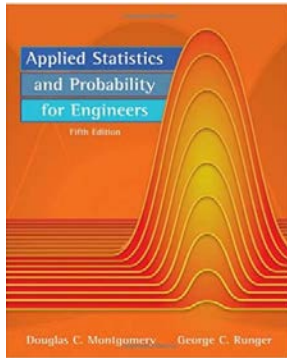
A NCEES approved calculator for use in FE Exam (refer to <https://ncees.org/exams/calculator/>).

- **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:

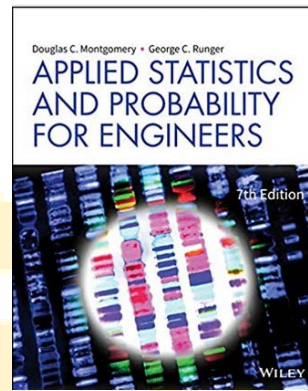
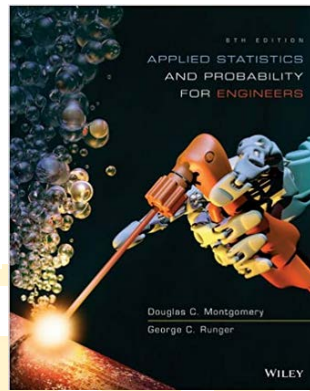
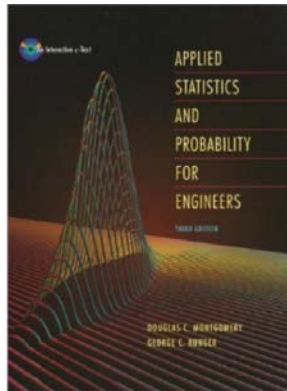


Textbook



Required textbook:

- Applied Statistics and Probability for Engineers by Douglas Montgomery and George Runger.
- Any edition will do.
- Lectures follow the textbook but class notes will be brief.



GRADING

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%)

15%	Attendance
20%	Exam 1
20%	Exam 2
20%	Exam 3
25%	Homework and lab reports

TECHNOLOGY REQUIREMENTS

PowerPoint slides, homework, examinations, announcements, grades will be available in Blackboard.

Lectures, office hours (consultations) and discussions will be in Microsoft Teams.

Lab sessions will make use of software @RISK and MINITAB. Both are available in MyApps in College of Engineering ETC.

You will need to have access to a computer/laptop, **scanner** (to submit homework and exams), a webcam, and a microphone.

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: How we will stay in contact with each other

- **Office Hours:** We will not be able to meet on campus, but I will still have office hours (see page 1) in Microsoft Teams.
- **Email:** UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 24 hours of receipt **if you follow my email guidelines**. When e-mailing me, be sure to email **from your UTEP student account** and please put the **course number** in the subject line. In the body of your e-mail, start with a polite salutation, 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:

The screenshot shows an email composition window. On the left is a 'Send' button with a paper plane icon. The 'To' field is populated with 'Cheu, Ruey Long (Kelvin)'. The 'Cc' and 'Bcc' fields are empty. The 'Subject' field contains 'CE5317: Excuse from Class'. The email body text is as follows:

Dr Cheu

I would like to request for valid excuse for not attending the class on March 1, 2021 because I have been given an appointment for the COVID vaccination. Attached please see my email notice from UTEP.

Thank you.

Rafael Marquez
800000004

- **Discussions:** Discussion will be in Microsoft Teams.
- **Announcements:** Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

NETIQUETTE

As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep these netiquette (network etiquette) guidelines in mind. **Failure to observe them may result in disciplinary action.**

- Always consider audience. This is a college-level course; therefore, all communication should reflect polite consideration of other's ideas.

- Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.

Course Policies: What do you need to do to be successful in the course

HOMEWORK POLICY

- There are 2 types of homework: written homework and lab reports.
- Questions will be released 5 days before the due date.
- All homework and lab reports are due on Sunday at 11:59 p.m.
- 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.
- Marks and solutions will be posted in Blackboard.

EXAMINATION POLICY

- Number and format of examinations:
 - Three exams, on 3/1, 4/5, 5/3 on Monday, synchronous during class time.
 - 3 to 5 questions per exam. Each question may have multiple parts. Follow the instructions by answering questions online by typing in text boxes; and/or submitting scanned handwritten solutions to Blackboard.
 - If you are late by more than 15-minutes, you are not allowed to take the exam. The only alternative is for you to request for a make-up exam.
- All exams are closed book, in Blackboard, using the Respondus Lock Down Browser and Respondus Monitor.
- To discourage students from focusing narrowly in only a few questions, no practice exam will be given. There are enough self-practice problems in the textbook and the internet.
- Rescheduling of exams 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. 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. Job interview and medical visits will be considered on a case by case basis. If an emergency happens during the exam day, you should contact the me or the TA at the earliest possible time.
- Request for a different exam time due to time zone/difference when you are not physically in El Paso will not be accommodated.
- A student who fails to show up for the make-up 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 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.

- Marks and solutions will be posted in Blackboard after each exam.

CALCULATOR POLICY

- 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 CE5317 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 CE5317 exams. Please check <https://ncees.org/exams/calculator/> for the latest permitted calculator models.
- Models allowed by another professors in his/her exam is not an excuse. This is CE5317 and you should follow CE5317 course policy.
- If an unapproved calculator is found during any exam, it will be treated as "cheating – bringing unauthorized materials into the exam".

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; or
- Fail to submit more than 4 assignments (homework and lab reports); or
- Fail to submit more than 1 exam; or
- You are at risk of receiving an "F" for the course.

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

EXTRA CREDIT POLICY

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

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 check all your submitted work, and save all your work (answers to discussion points, quizzes, exams, and essays) in a separate Word document as a back-up. Better still, save a screen shot of your submission screen. This way, you will have evidence that you completed the work and will not lose 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.

ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#).

COVID-19 ACCOMMODATIONS

Students are not permitted on campus when they have a positive COVID-19 test, exposure or symptoms. If you are not permitted on campus, you should contact me as soon as possible so we can arrange necessary and appropriate accommodations.

(classes with on-campus meetings) Students who are considered high risk according to CDC guidelines and/or those who live with individuals who are considered high risk may contact [Center for Accommodations and Support Services](#) (CASS) to discuss temporary accommodations for on-campus courses and activities.

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](#).

CLASS RECORDINGS

The use of recordings will enable you to have access to class lectures, group discussions, and so on in the event you miss a synchronous or in-person class meeting due to illness or other extenuating circumstance. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. Your instructor will not share the recordings of your class activities outside of course participants, which include your fellow students, teaching assistants, or graduate assistants, and any guest faculty or community-based learning partners with whom we may engage during a class session. **You may not share recordings outside of this course.** Doing so may result in disciplinary action.

A student should not record any class activity without the explicit permission given by the instructor.

TEST PROCTORING SOFTWARE

The exams will make use of Respondus Lock Down Browser and Respondus Monitor inside of Blackboard to promote academic integrity. You are encouraged to learn more about how to use these programs prior to the first test.

Please review the following guidelines:

- The assessments will only be available at the times identified on the course calendar
- A reliable Internet connection is essential to completing the exam. If you must go to a location to take the exam (such as the library), be sure to follow their health and safety requirements.
- Respondus Lockdown Browser will require that all internet tabs are closed prior to the start of the test.
- Respondus Monitor requires a webcam and microphone.
- You will be required to show the webcam your **student ID and calculator** prior to the start of the test.
- Your face should be completely visible during the test. Blocking the camera will disable the test.
- No notes or textbook materials are permitted during the test. Respondus Monitor requires you to take a video of your surrounding area (desk, chair, walls, etc.)
- You should not have conversations with other people and/or leave and return to the area during the test.

PLAGIARISM DETECTING SOFTWARE

Some of your course work and assessments may be 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.

COPYRIGHT STATEMENT FOR COURSE MATERIALS

All materials 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. Doing so may result in disciplinary action.

COVID-19 PRECAUTIONS

You must **STAY AT HOME** and **REPORT** if you (1) have been diagnosed with COVID-19, (2) are experiencing COVID-19 symptoms, or (3) have had recent contact with a person who has received a positive coronavirus test. Reports should be made at screening.utep.edu. If you know of anyone who should report any of these three criteria, you should encourage them to report. If the individual cannot report, you can report on their behalf by sending an email to COVIDaction@utep.edu.

For each day that you attend campus—for any reason—you must complete the questions on the UTEP screening website (screening.utep.edu) prior to arriving on campus. The website will verify if you are permitted to come to campus. Under no circumstances should anyone come to

class when feeling ill or exhibiting any of the known COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, and alternative instruction will be provided. Students are advised to minimize the number of encounters with others to avoid infection.

Wear face coverings when in common areas of campus or when others are present. You must wear a face covering over your nose and mouth at all times in this class. If you choose not to wear a face covering, you may not enter the classroom. If you remove your face covering, you will be asked to put it on or leave the classroom. Students who refuse to wear a face covering and follow preventive COVID-19 guidelines will be dismissed from the class and will be subject to disciplinary action according to Section 1.2.3 *Health and Safety* and Section 1.2.2.5 *Disruptions* in the UTEP Handbook of Operating Procedures.

Course Resources: Where you can go for assistance

UTEP provides a variety of student services and support:

Technology Resources

- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources

- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [History Tutoring Center \(HTC\)](#): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

Individual Resources

- [Military Student Success Center](#): Assists personnel in any branch of service to reach their educational goals.
- [Center for Accommodations and Support Services](#): Assists students with ADA-related accommodations for coursework, housing, and internships.
- [Counseling and Psychological Services](#): Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.