TED UNIVERSITY

MATH 503
Uncertainty and Decision Making

SYLLABUS/Fall 2021

Course Information

Required or Elective	☑Required ☐Elective	**Date Prepared**	September 2021
Semester	Fall 2021	**Class Hours and Classrooms**	Wed. 18:00 – 20:50, D032
Course Credit Hours/ ECTS credits	(3+0+0) 3 / 7.5	**Pre-requisite/ Co-requisite**	-
Level of Course	Graduate (MS)	**Language of Instruction**	☑ English ☐ Turkish
Instructors and their office hours	Assoc. Prof. Dr. Rıza Secer Orkun Keskin, E-mail: secer.keskin@tedu.edu.tr; Room: D313 Office Hour: Tue 16:00-17:00 (to be held via Zoom) (Please get an appointment by e-mail to meet me at another time.)		
Teaching Assistant(s)	-		
Textbook	Lecture Notes		
Recommended Readings	1) Engineering Decision Making and Risk Management, J.W. Herrman, Wiley, 2015. 2) Probability, Statistics, and Decision for Civil Engineers, C.A. Cornell, J.R. Benjamin, Dover Publications, 2014.		
Course Web Pages	We have already added all of you to the course web page on Moodle http://moodle.tedu.edu.tr. Please follow this course web page regularly to have access to the posted course materials and announcements.		

Course Description

Fundamentals of decision theory: Decision trees, value of information, utility theory. Uncertainty modeling: linear models, extreme value models, first and second-order approximations, random fields and processes, Monte Carlo simulation. Data analysis: Bayesian decision framework, analytical methods, approximate methods. Practical risk evaluation, formulation of risk-based design criteria, risk benefit trade-offs and optimal decisions.

Course Objective

The objective of this course is to equip students with tools to address uncertainty and support decision making towards civil engineering problems.

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. apply uncertainty modeling to different types of engineering problems,
2. analyze data using analytical and approximation methods,
3. evaluate risk-based design criteria.

Course Assignments

A. ***Presentation (15%):*** Each student will pick a journal paper about a topic covered in this course and make a presentation about the paper.
B. ***Midterm Exams (50%):*** Two midterm exams will be given. One of them may be given in the form of a take-home exam or a term project.
C. ***Final Exam (35%):*** A cumulative final exam will be given.

Course Assessments & Learning Outcomes Matrix

Assessment Methods	Course Learning Outcomes
Presentation	All
Midterm Exams	All
Final Exam	All

Tentative Course Outline

A tentative course outline for the lectures is given below. Any changes and updates will be announced on the Moodle web page for the course.

Week	Topics
1	Introduction, Elements of Probability Theory
2	Elements of Probability Theory
3	Fundamentals of Decision Theory
4	Fundamentals of Decision Theory
5	Fundamentals of Decision Theory
6	Uncertainty Modeling
7	Uncertainty Modeling
8	Midterm Exam I
9	Data Analysis
10	Data Analysis
11	Risk Evaluation
12	Midterm Exam II

13	Risk Evaluation
14	Presentations

Course Policies and Some Remarks

Attendance

In order to be admitted to the final examination, a student must take midterm exams and make the presentation. Students not fulfilling these conditions will not be permitted to take the final examination. Students not given the permission to take the final examination will automatically receive the grade FX at the end of the semester.

Calculator Policy

You may use a calculator during exams.

Make Up Exams

Make-up exams for midterm exams will NOT be offered. The only exceptions are illness or emergency (e.g., death in family, a traffic accident, etc.). In case of an illness or emergency you need to supply a documentation that supports your claim.

Also please read the document given in the link http://www.tedu.edu.tr/tr/main/yonetmelikler-ve-yonergeler

Plagiarism

Collaboration on non-collected homework and in studying is strongly encouraged; however, the work you hand in must be solely your own. Sharing written work before it is turned in to be graded is academic dishonesty. For more information on TEDU policy on intellectual integrity see the TEDU student handbook (https://student.tedu.edu.tr/en/student/principles-of-academic-integrity).

Specialized Support and Students with Disabilities

Students who may require specialized support due to a disability affecting mobility, vision, hearing, learning, mental or physical health should consult with Specialized Support and Disability Coordinator, Asst. Prof. Emrah Keser E-mail: emrah.keser@tedu.edu.tr, or visit the website at https://www.tedu.edu.tr/tr/main/engelsiz-tedu

Student Counseling Centre

The Student Counseling Centre is a service mandated with providing crisis intervention and supportive listening services to the campus community. A major part of fulfilling that mandate is raising awareness of our service so that students know they are never alone in dealing with problems. For further information and/or questions, you can contact Sıla Deniz Beyarslan, sdeniz.beyarslan@tedu.edu.tr, Office 165, or visit SCC website at http://csc.tedu.edu.tr

TEDU COPeS

TED University Coronavirus Psychosocial Support Team was established in order to facilitate coping with the psychological, social, familial, academic, and professional difficulties that may arise due to adverse conditions associated with COVID-19 pandemic for TEDU students and employees. TEDU COPeS aims to provide psychosocial support for TED University students and employees during the coronavirus outbreak. To this end, the team aims to provide support at the early stages of a possible crisis, activate and strengthen your coping strategies, and provide information on support resources. For further information and/or questions, visit their website at https://copes.tedu.edu.tr