TED UNIVERSITY

MATH 240
INTRODUCTION TO PROBABILITY & STATISTICS FOR ENGINEERS

SYLLABUS – FALL 2023

Course Information

Required or Elective	☑ Required ☐ Elective	**Date**	October 2023
Semester	Fall 2023	**Class Hours and Classrooms**	**Section 01 (ANG)** Mon. 12:00 – 13:00 (D032) Tue. 13:00 – 15:00 (D030) **Section 02 (CA)** Mon. 12:00 – 13:00 (DB20) Tue. 13:00 – 15:00 (DB14)
Course/ECTS Credit Hours	(3+0+0) 3 / 6	**Pre-requisite / Co-requisite**	MATH 101 – Calculus of One Variable
Level of Course	Sophomore	**Language of Instruction**	☑ English ☐ Turkish
Instructors and Office Hours	Dr. Aslı Numanoğlu Genç (asli.genc@tedu.edu.tr) (Office D301) Dr. Cem Akgüner (cem.akguner@tedu.edu.tr) (Office D312) You can contact us by e-mail for appointments.		
Teaching Assistant(s)	None		
Textbook	There is not a single textbook for this class. Recommended books for study and further exercise are given below. Hand-outs will be distributed and posted on Moodle as necessary.		
Supplementary Textbooks (not in order)	1) Probability and Statistics for Engineers and Scientists by R. E. Walpole, R. H. Myers, S. L. Myers, and K. Ye 2) Probability and Statistics for Engineering & the Sciences by J. L. Devore 3) Introduction to Probability Models by S. M. Ross 4) Applied Statistics and Probability for Engineers by D. C. Montgomery and G. C. Runger		

Course Description

Basic concepts of probability, Discrete and continuous random variables, their probability distributions, expected value, variance. Discrete probability distributions. Jointly distributed and independent Random Variables. Covariance and correlation. Sampling, estimation. Hypothesis Testing, Regression.

Course Learning Outcomes

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

1. Compute probabilities by modeling sample spaces
2. Construct the probability distribution of discrete and continuous random variables
3. Calculate expected values and variances of random variables
4. Apply statistical descriptors to a sample
5. Apply hypothesis testing to form engineering judgement
6. Interpret regression results

Course Assignments

A. ***Homework (12%):*** There will be multiple homework (tentatively 7) given during the semester administered through **TEDU WebWork** that will be graded. Students will have a limited number of attempts to complete the homework.
B. ***Attendance (3%):*** Attendance will be recorded through the Moodle. You are expected to attend at least 70% of the lectures to get credit for attendance.
C. ***Two In-Term Exams (40%):*** There will be two exams given during the semester.
D. ***Application Project (15%):*** There will be an application project as part of course assessment. The intent of the project is for students to apply what they learn in class to their life/surroundings. Skills that will be sought and enhanced will include: statistical experiment setup; data collection and recording; statistical analysis; and formally reporting conclusions as a brief (2-3 page, about 1000 words) report.
E. ***Final Exam (30%):*** There will be a comprehensive final during the final exam weeks. The exact date of the final will be announced by the University towards the end of the semester.

Course Assessments & Learning Outcomes Matrix

Assessment Methods	Course Learning Outcomes
Homework	All
Midterm Exams	All
Application Project	All
Final Exam	All

Relationship to Program Outcomes

This course contributes to fulfillment of the following program outcomes (2 count / 2 weights):
PO1: Comprehend science and advanced mathematics subjects fundamental to engineering (1)
PO6: Design and conduct experiments; analyze and interpret data (1)

Teaching Methods & Learning Activities

☑ Telling/Explaining
☑ Discussions/Debates
☑ Questioning
☑ Reading
☐ Peer Teaching
☐ Scaffolding/Coaching
☐ Demonstrating
☑ Problem Solving
☐ Inquiry
☐ Collaborating
☐ Think-Pair-Share
☐ Predict-Observe-Explain
☐ Microteaching
☑ Case Study/Scenario Analysis
☐ Simulations & Games
☐ Video Presentations
☐ Oral Presentations/Reports
☐ Concept Mapping
☐ Brainstorming
☐ Drama/Role Playing
☐ Seminars
☐ Field Trips
☐ Guest Speakers
☐ Hands-on Activities

☐ Service Learning
☐ Web Searching
☐ Experiments
☐ Other(s):

Student Workload

☑ Lectures	**42** hrs	☐ Research Review	hrs
☑ Course Readings	**14** hrs	☐ Report on a Topic	hrs
☐ Workshop	hrs	☐ Case Study Analysis	hrs
☐ Online Discussion	hrs	☐ Oral Presentation	hrs
☐ Debate	hrs	☐ Poster Presentation	hrs
☐ Work Placement	hrs	☐ Demonstration	hrs
☐ Field Trips/Visits	hrs	☐ Web Designs	hrs
☐ Observation	hrs	☐ Mock Designs	hrs
☐ Lab Applications	hrs	☐ Team Meetings	hrs
☐ Hands-on Work	hrs	☑ Other: Homework/Term Projects	**55** hrs
☑ Exams/Quizzes	**63** hrs	**TOTAL**	**174** hrs
☐ Resource Review	hrs		

Assessment Methods

☑ Test/Exam
☐ Quiz
☐ Oral Questioning
☐ Performance Project
☐ Written ☐Oral
☐ Observation
☐ Self-evaluation
☐ Peer Evaluation
☐ Portfolio
☐ Presentation (Oral, Poster)
☑ Other(s): Homework and term projects

Tentative Course Outline

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

Week	Topic
1	Interpreting Probabilities, Sample Spaces and Events, Permutations and Combinations
2	Axioms of Probability, Conditional Probability
3	Independence, Bayes' Theorem
4	Random Variables, Discrete and Continuous Probability Distributions, Expectation and Variance
5	Binomial Distribution, Poisson Distribution – **Mid-Term 1**
6	Uniform, Exponential Distributions, Applications in Component and System Reliability
7	Normal Distribution
8	Applications of Normal Distributions
9	Sample Statistics
10	Central Limit Theorem
11	Hypothesis Testing
12	Hypothesis Testing, p-value – **Mid-Term 2**
13	Hypothesis testing, confidence interval
14	Simple Linear Regression

Course Policies and Some Remarks

General

1. Date for the final exam will be announced at the end of the semester by the University. The final exam will cover all topics.
2. Cell phones should be turned off and kept out of sight during classes. You are also not allowed to use your computers/ tablets etc. at the classroom.
3. If you are more than 10 minutes late, please do not enter the class.
4. You are not allowed to use cell phones during the exams.

Attendance

Attendance is strongly encouraged for student success. Students who do not take the final examination will automatically receive the grade **FX** at the end of the semester.

Make Up Exams

Make-ups for midterm exams will NOT be offered generally. If you have a legitimate reason for missing an exam, then you must arrange to make up the exam BEFORE the scheduled time of the exam. The only exceptions are illness or emergency. In case of an illness or emergency you need to supply documentation that supports your claim. Also please read the document given in the link: http://www.tedu.edu.tr/tr/main/yonetmelikler-ve-yonergeler

Calculator Policy

You may use a calculator during exams.

Plagiarism

All the following are considered plagiarism:

- "Turning in someone else's work as your own
- Copying words or ideas from someone else without giving credit
- Failing to put a quotation in quotation marks
- Giving incorrect information about the source of a quotation
- Changing words but copying the sentence structure of a source without giving credit
- Copying so many words or ideas from a source that it makes up most of your work, whether you give credit or not" (www.plagiarism.org)

Plagiarism is a very serious offense and will be penalized accordingly by the university disciplinary committee. The best way to avoid accidentally plagiarizing is to work on your own before you ask for the help of other resources. Collaboration on non-collected homework and in studying is strongly encouraged; however, the work you hand in must be solely your own. For more information on TEDU policy on intellectual integrity see the "Student Handbook" in the following link: https://student.tedu.edu.tr/tr/student

Cheating

Cheating has a very broad description which can be summarized as "acting dishonestly". Some of the things that can be considered as cheating are the following: copying answers on exams, homework and lab works, using prohibited material on exams, lying to gain any type of advantage in class, providing false, modified or forged data in a report, plagiarizing, modifying graded material to be re-graded, causing harm to colleagues by distributing false information about an exam, homework or lab. Cheating is a very serious offense and will be penalized accordingly by the university disciplinary committee. For more information on TEDU policy on intellectual integrity, see the "Student Handbook" in the following link: https://student.tedu.edu.tr/tr/student.

Disability Support

If you have a disabling condition which may interfere with your ability to successfully complete this module, please see Handbook for Registered Students.