

School of Engineering and Natural Sciences / Industrial Engineering (English)

2023 - 2024 Academic Year

PROBABILITY and RANDOM VARIABLES

Syllabus

Course Description						
Name	Code	Semester	T+A Hour	Credit	ECTS	
PROBABILITY and RANDOM VARIABLES		IND2149080	Fall Semester	3+0	3	6
Prerequisites Courses	MATEMATİK II					
Recommended Elective Courses						
Language of Instruction	English					
Course Level	First Cycle (Bachelor's Degree)					
Course Type	Required					
Course Coordinator	Prof.Dr. Afgan ASLAN					
Name of Lecturer(s)	Prof.Dr. Afgan ASLAN					
Assistant(s)						
Aim	This is a second year undergraduate course (third year for CoE) on introduction to probability and random variables. The course introduces fundamental differences between statistics and probability and then introduces basic topics of probability. Probability axioms, probability density functions, joint pdfs, and random variables with related topics are covered throughout the course.					
Course Content	This course contains; Class Info, Introduction to Statistics and Probability,Basic probability,Conditional probability,Discrete random variables,Discrete distributions and their statistics. ,Continuous Random Variables and their statistics,Continuous Random Variables (Cont.),Midterm overview,Continuous Distributions,Multiple Discrete Random Variables,Multiple Continuous Random Variables,Conditional Probability Mass Functions,Conditional Probability Density Functions,Conditional Probability Density Functions.					
Course Learning Outcomes			Teaching Methods	Assessment Methods		
Model simple probabilistic phenomena mathematically.			12, 16, 21, 9	A, E		
Calculate probabilities of events in a known event space, expected values, variances of random variables, and conditional probability.			12, 16, 21, 9	A, E		
Develops mathematical tools for discrete and continuous random variables			12, 16, 21, 9	A, E		
Determines the common probability distributions and the understanding of where to use them.			12, 16, 21, 9	A, E		
Work with multiple random variables, their joint distributions, their conditional distributions, and their one and two dimensional transformations.			12, 16, 21, 9	A, E		
Teaching Methods	12: Problem Solving Method, 16: Question - Answer Technique, 21: Simulation Technique, 9: Lecture Method					
Assessment Methods	A: Traditional Written Exam, E: Homework					
Lecture Schedule						
Sequence	Topics	Preliminary Preparation				
1	Class Info, Introduction to Statistics and Probability	Syllabus, Text 1-Chap. 1, Text 2-Chap. 1 &2				
2	Basic probability	Text 1-Chap. 2, Text 2-Chap 3				
3	Conditional probability	Text 1-Chap. 2, Text 2-Chap 4				
4	Discrete random variables	Text 1-Chap. 3, Text 2-Chap 5				
5	Discrete distributions and their statistics.	Text 1-Chap. 3, Text 2-Chap 6				
6	Continuous Random Variables and their statistics	Text 1-Chap. 4, Text 2-Chap 10				
7	Continuous Random Variables (Cont.)	Text 1-Chap. 4, Text 2-Chap 10				
8	Midterm overview	All Lectures till Week 8				
9	Continuous Distributions	Text 1-Chap. 4, Text 2-Chap 11				
10	Multiple Discrete Random Variables	Text 1-Chap. 5, Text 2-Chap 7				
11	Multiple Continuous Random Variables	Text 1-Chap. 5, Text 2-Chap 12				
12	Conditional Probability Mass Functions	Text 1-Chap. 5, Text 2-Chap 8				
13	Conditional Probability Density Functions	Text 1-Chap. 5, Text 2-Chap 13				
14	Conditional Probability Density Functions	Text 1-Chap. 5, Text 2-Chap 13				
Evaluation Methods		Weight(%)				
Midterm Exam		30				
General Exam		70				

Resources
1. Applied Statistics and Probability for Engineers, Sixth Edition, Douglas C. Montgomery and George C. Runger, ISBN : 13 9781118539712
2. Intuitive Probability and Random Processes Using MatLab - Steven M. Kay, 2016, ISBN-13: 978-0-387-24157-91) A. Papoulis, Probability, Random Variables, and Stochastic Processes, Mc Graw Hill, 1984.
2) Alberto Leon-Garcia, Probability, Statistics, and Random Processes For Electrical Engineering, Prentice Hall, Third Edition, 2008.
3) A. Papoulis, Probability, Random Variables and Stochastic Processes, McGraw-Hill , Third Edition,1991