ABDULLAH GÜL UNIVERSITY
GRADUATE SCHOOL OF ENGINNERING & SCIENCE
INDUSTRIAL ENGINEERING DEPARTMENT
COURSE DESCRIPTION AND APPLICATION INFORMATION

Course Name	Code	Semester	T+P (Hour)	Credit	ECTS
Probability Theory	IE 521	Fall - Spring	3 + 0	3	10

Prerequisites	It is recommended that at least one programming language be known at a useful level (C, C++, C#, Java, MATLAB, Python, vs.)

Course Type	Compulsory courses
Course Language	English
Course Coordinator	Assistant Professor Muhammed Sütçü
Course Instructor	Assistant Professor Muhammed Sütçü
Course Assistant	-
Course Objective	Introducing the basics of probabilistic theory to mathematical measurement theory and engineering students who have just begun to work on their graduate studies; Gaining a basic stochastic process infrastructure at the entry level covering the Gaussian, Bernoulli, Poisson and Markov chains
Course Learning Outcomes	A student who successfully completes this course, 1. Defines the concepts of random variable and measurable function and explains the relation between two concepts 2. Use Lebesgue integral, expresses expected values and probabilities of random variables with this integral and calculates 3. Define and use the cumulative distribution function, probability mass and density functions in calculations 4. Define and use the laws of large numbers and central limit theorem 5. Compare exponential function and Poisson processes, use it in calculations 6. Use discrete and continuous Markov chains in modeling and solve the established model
Course Content	• Probability axioms, basic measurement theory • Random variables and distributions • Expected value and other moments • Transformation of random variables, calculation of transform distribution • Basic random processes • Discrete and Continuous Distribution Functions

WEEKLY SUBJECTS AND RELATED PRELIMINARY PREPARATION PAGES

Week	Subjects	Preliminary
1	Probability measurements	
2	Conditioning and independence	
3	Random variables	
4	Discrete random variables	
5	Continuous random variables	
6	Functions of random variables and their distributions	
7	Midterm Exam -1	
8	Convergence of random variables, central limit theorem and applications	
9	Bernoulli Process, Poisson Process	
10	Poisson, inhomogeneous Poisson and unified Poisson processes	
11	Midterm Exam -2	
12	Discrete Markov chains	
13	Discrete Markov chains	
14	Continuous Markov chains	
15	Birth and death processes and queuing model applications	

16	Final Exam	

SOURCES	
Lecture Notes	Lecture notes and slides of the course will be shared with students during the semester via CANVAS system.
Other Sources	**Textbook:** Introduction to Probability Models" by Sheldon M. Ross **Supplementary Textbooks:** A First Course in Probability" by Sheldon M. Ross

MATERIAL SHARING	
Documents	will be shared with students during the semester via CANVAS system.
Homework	will be shared with students during the semester via CANVAS system.
Exams	1 (one) midterm exam and 1 (one) final exam. 2 exams in total

EVALUATION SYSTEM		
ACTIVITIES	**QUANTITY**	**WEIGHT**
Midterm Exam	2	%30
Quiz	6	%15
Homework	6	%15
Project	0	0
Final Exam	1	%40
TOTAL		%100
Midterm Activities Percentage		%60
Final Exam Percentage		%40
TOTAL		%100

Course Category	
Natural Sciences and Mathematics	%90
Engineering Sciences	%10
Social Sciences	%0

LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS RELATIONSHIP							
No	Program Qualification	Contribution Level					
		1	2	3	4	5	
1	PQ1.				X		
2	PQ2.			X			
3	PQ3.		X				
4	PQ4.			X			
5	PQ5.			X			
6	PQ6.		X				

*Increasing from 1 to 5.

ECTS / WORK LOAD TABLE			
Activities	Activity	Duration (Hour)	Total Work Load
Course Duration (including exam week: 16x total course hours)		3	48
Out-of-class Study Time (Pre-study, practice)		5	80
Reading		2	32
Internet browsing, library work		2	32
Project		-	-
Report Preperation		-	-

Presentation Preperation		-	-
Presentation		-	-
Homework		4	24
Quiz		1	6
Midterm		2	40
Final Exam		1	40
Total Work Load			302
Total Work Load / 30			10.07
Course ECTS CREDİT			10