



**HASAN KALYONCU UNIVERSITY**  
**Faculty of Engineering**  
**Course Description Form**

<b>COURSE:</b> Probability and Statistics				
<b>CODE:</b> MATH213		<b>SEMESTER:</b> FALL		
<b>LANGUAGE:</b> ENGLISH		<b>TYPE:</b> COMPULSORY		
<b>PRE-REQUISITES:-</b> <b>CO-REQUISITES:-</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>CREDIT</b>	<b>ECTS</b>
<b>WEEKLY HOURS:3</b>	3	0	3	5

**CONTENT OF THE COURSE:**

Introduction to probability, permutation, combination, relative frequency concept, axioms of probability, set theory, conditional probability, Bayes theorem, independence, mutually exclusive events, discrete random variables, probability mass and distribution functions, expected value, variance, Bernoulli, Binomial, and Poisson random variables, continuous random variables, their probability density and distribution functions, expected value and variance of continuous random variables, uniform, Gauss (normal), and exponential random variables, density function of a function of a random variable, jointly distributed random variables, density function of functions of independent random variables, introduction to random processes.

**OBJECTIVE OF THE COURSE:**

Objective of this course is to cover basic principles of the theory of probability, and its applications. This course aims to give the basic principles and infrastructure of probability theory needed in applications such as signal analysis, analog and digital communications, speech processing and data modeling. A student is expected to solve basic probabilistic problems and systems analytically after taking the course.

**WEEKLY SCHEDULE**

<b>Week</b>	<b>Topics</b>
1	Introduction to Statistical and Descriptive Statistics
2	Axioms of probability, set theory
3	Conditional probability, Bayes theorem
4	Statistical independency, mutually exclusive events
5	Discrete random variables, their probability mass and distribution functions
6	Expected value of random variables
7	Variance and covariance of random variables
8	MIDTERM
9	Bernoulli, Binomial random variables and their applications
10	Negative binomial, Geometric and Poisson random variables and their applications
11	Introduction to continuous random variables
12	Uniform, exponential random variables, density function of a random variable
13	Gauss (normal) random variables
14	Applications and review

**TEXTBOOK:** Probability and Statistics for Engineers&Scientists, Walpole, Myers,Myers, Ye, 9th Edition, Pearson



PO: Program Outcomes   LO: Learning Outcomes Values: 0: None   1: Low   2: Medium   3: High
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<b>LEARNING OUTCOMES OF THE COURSE:</b>	<b>PROGRAM OUTCOMES:</b>
<p><b>LO1:</b> Students shall learn the basic techniques and principles of the probability theory</p> <p><b>LO2:</b> be able to theoretically analyze and solve probability problems</p> <p><b>LO3:</b> Students will understand and solve basic probabilistic problems, which are encountered in engineering applications</p> <p><b>LO4:</b> Students will use probability models for some random experiments</p> <p><b>LO5:</b> Students will understand the basic principles of probability calculus.</p>	<p><b>PO1:</b> Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.</p> <p><b>PO2:</b> Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.</p> <p><b>PO3:</b> Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.</p> <p><b>PO4:</b> Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively.</p> <p><b>PO5:</b> Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.</p> <p><b>PO6:</b> Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.</p> <p><b>PO7:</b> Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language; ability to write effective reports and comprehend written reports, prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.</p> <p><b>PO8:</b> Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.</p> <p><b>PO9:</b> Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.</p> <p><b>PO10:</b> Knowledge about business life practices such as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development.</p> <p><b>PO11:</b> Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.</p>