

## Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
IND211	Probability	4	3	0	0	3	4

Prerequisites	
Admission Requirements	

Language of Instruction	Turkish
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	<p>This course as a compulsory course will help the students to comprehend fundamental concepts of probability theory and gain the ability to use methods of this discipline (probabilities of events, rules for random variables and moment concept, transformations of random variables, Gauss' theorem). In this context, the aim of this course is determined as:</p> <ul style="list-style-type: none"><li>• introducing the students the probability theory, especially random variables related to uncertain events.</li><li>• ensuring that the student master the different probability distributions.</li><li>• helping the students to use probability theory to analyze problems encountered in business domain especially problems including uncertainty.</li></ul>
Content	<ol style="list-style-type: none"><li>1. week : Introduction to probability</li><li>2. week : Axioms of probability, conditional probability, Bayes theorem</li><li>3. week : Random variables and probability distributions</li><li>4. week : Probability distribution functions, probability mass functions, probability density functions</li><li>5. week : Expected value and moments</li><li>6. week : Central moments, variance, and standard deviation</li><li>7. week : Discrete random variables: probability distribution functions, probability mass functions</li><li>8. week : Bernoulli trials, binom distribution, geometric distribution, negative binom distribution, poisson distribution</li><li>9. week : Mid term</li><li>10. week : Continuous random variables: probability distribution functions, probability density functions</li><li>11. week : Uniform distribution, Normal distribution, Central limit theory, Lognormal distribution, Gamma and related distributions</li><li>12. week : Exponential distribution, Erlang distribution, Weibull distribution, Chi-square distribution, Beta and related distributions</li><li>13. week : Function of random variables</li><li>14. week : Marginal probability distributions, moment generating function</li></ol>
References	<ul style="list-style-type: none"><li>• Soong, T.T., Fundamentals of Probability and Statistics for Engineers, John Wiley &amp; Sons, 2004.</li><li>• Akdeniz, F., Olasılık ve İstatistik, Baki Kitapevi, Eylül 1998.</li><li>• Sheldon M., Ross, M., Introduction to probability models, Academic Press, 2003, 8th Ed.</li><li>• Course notes</li></ul>

## Theory Topics

Week	Weekly Contents
1	Introduction to probability
2	Axioms of probability, conditional probability, Bayes theorem
3	Random variables and probability distributions
4	Probability distribution functions, probability mass functions, probability density functions
5	Expected value and moments
6	Central moments, variance, and standard deviation
7	Discrete random variables: probability distribution functions, probability mass functions
8	Bernoulli trials, binom distribution, geometric distribution, negative binom distribution, poisson distribution
9	Mid term
10	Continuous random variables: probability distribution functions, probability density functions
11	Uniform distribution, Normal distribution, Central limit theory, Lognormal distribution, Gamma and related distributions
12	Exponential distribution, Erlang distribution, Weibull distribution, Chi-square distributiin, Beta and related distributions
13	Functions of random variables
14	Marginal probability distributions, moment generating function