

Department of Mathematics

Course Profile

Course Number: Math230	Course Title: Probability
Required / Elective: Required	Prerequisite: None
Catalog Description: Basic topics in probability theory; sample space, combinatorics, Bayes theorem and conditional probability. Random variables, marginal, joint and conditional distributions; expectations and conditional expectations; hypergeometric, binomial, geometric distributions; Poisson, exponential, gamma distributions and the Poisson arrival model; moment generating functions, central limit theorem, and the normal distribution; variance, covariance, and correlation.	Textbook / Required Material: A First Course in Probability, Sheldon Ross, Pearson 7 th Ed.
Course Structure / Schedule: (3+1+0) 3 / 5 ECTS	
Extended Description: Principle of counting, permutations, combinations, Axioms of probability, sample spaces, set operations, properties of probability, Joint and conditional probability, independence, Bayes rule, law of total probability, chain rule, Random variables, CDF, PMF, expectation, mean, variance, functions of random variables (discrete), Types of discrete random variables (Bernoulli, Binomial, Poisson, Geometric), Continuous random variables, CDF, PDF, functions of continuous random variables, Expectation, mean, variance, basic probability calculations, Uniform distribution, Normal and standard normal distributions, exponential distribution.	
Design content: None	Computer usage: No particular computer usage required.
<p>Course Outcomes: By the end of the course the students should be able to:</p> <ol style="list-style-type: none"> 1. understand the basic knowledge on fundamental probability concepts, including random variable, probability of an event, additive rules and conditional probability [1, 6, 7], 2. compute probabilities and moments such as the expected value and variance of random variables and combinations/functions of random variables [1, 6, 7], 3. recognize and interpret a variety of deterministic and nondeterministic random processes that occur in engineering [1, 6, 7], 4. solve problems independently [3]. <p>[1] demonstrate the ability of solving problems by using techniques from calculus, linear algebra, differential equations, probability and statistics,</p> <p>[3] demonstrate the ability to apply mathematics to the solutions of problems,</p>	

<p>[6] have a basic knowledge of the main fields of mathematics, including analysis, algebra, differential equations, differential geometry,</p>											
<p>[7] have an ability to function both independently and as a member of a multidisciplinary team.</p>											
<p>Recommended reading: Yates, R. D. and Goodman, D. J., <i>Probability and Stochastic Processes</i>, John Wiley & Sons, 2004</p>											
<p>Teaching methods: Pre-readings, lectures, problem solving (PS), homework.</p>											
<p>Assessment methods: Quizzes, midterms, final exam</p>											
<p>Student workload:</p> <table> <tr> <td>Preparatory reading</td> <td>38 hrs</td> </tr> <tr> <td>Lectures, discussions</td> <td>56 hrs</td> </tr> <tr> <td>Homework</td> <td>28 hrs</td> </tr> <tr> <td>Final Exam</td> <td>3 hrs</td> </tr> <tr> <td>TOTAL</td> <td>125 hrs ... to match 25 x 5 ECTS</td> </tr> </table>		Preparatory reading	38 hrs	Lectures, discussions	56 hrs	Homework	28 hrs	Final Exam	3 hrs	TOTAL	125 hrs ... to match 25 x 5 ECTS
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Prepared by: Ümit Güz	Revision Date: 08.02.2010										