Course unit title:	Probability and Statistics		
Course unit code:	AMAT300		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor		
Year of study:	2		
Semester when the unit is delivered:	4		
Number of ECTS credits allocated :	5		
Name of lecturer(s):			
Learning outcomes of the course unit:	1. Use descriptive statistics to present data by constructing Bar Charts, Pie Charts, Histograms and Box Plots. 2. Explain and apply *measures of central tendency such as* mean, median and mode, *measures of Dispersion* such as Range, IQR, Variance and standard deviation and the coefficients of Variation and Skewness to different types of data. 3. Describe the notion of sample space for an experiment, describe events as subsets of the sample space and construct events by using set theoretic operations and with the use of Venn diagrams. 4. Construct the probability function on the space of events with its properties, define conditional probability and calculate probabilities of events in simple problems. 5. Describe the concepts of discrete and continuous random variables as functions from the sample space to the set of real numbers and explain and use the probability distribution function and cumulative distribution function to calculate simple probabilities. 6. Calculate the expected number, variance and standard deviation of a random variable and use discrete and continuous distributions in examples to calculate probabilities in real life problems. 7. Calculate point estimators and construct confidence intervals for means and proportions of one and two populations. 8. Test hypothesis for means, proportions and difference of means, apply hypothesis testing to real life problems.		
Mode of delivery:	Face-to-face		
Prerequisites:	AMAT122	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	• **Descriptive Statistics:** Introduction to Statistics, Data Collection, Describing and Summarizing Data, Measures of Central Tendency, Dispersion and Skewness, Tables, Charts, Exploratory Data Analysis. • **Probability:** Sample Spaces and Events. Introduction to set theory and relations in set theory. Definitions of Probability and properties. Conditional probability. • **Discrete Random Variables:** Probability Distribution Function and cumulative distribution function, Mathematical Expectation, Mean and Variance. Probability Distributions: Binomial, Poisson. • **Continuous Random Variables:** Probability density Function and cumulative distribution function, Mathematical Expectation, Mean and Variance. Probability Distributions: Uniform, Normal Distribution. Approximations for Discrete Distributions. • **Estimation:** The central limit theorem. Confidence Internal Estimation for Mean, Proportion, Difference of Means, Difference of Proportions. Sample size determination.		

	• **Hypothesis Testing:** Hypothesis Testing for Mean, Proportion, Difference of Means, Difference of Proportions.
Recommended and/or required reading:	
Textbooks:	Morris H. DeGroot, Mark Schervish, ***Probability and Statistics***, 2001
References:	Paterson, Hennessy, ***Computer Organization and Design: the Hardware/Software Interface***, Morgan Kaufman, 2008 M.L. Beverson, D.M. Levine, and D. Rindskopf, ***Applied Statistics, A first course,*** Prentice-Hall Int. Editions J. T. McClave, T. Sincich, W. Mendenhall, ***Statistics,*** 11th Ed., Prentice Hall, 2007 R.V. Hogg and E.A. Tavis, ***Probability and Statistical Inference***, Macmillan Publishing Co., Inc. New York
Planned learning activities and teaching methods:	The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the web for students to use in combination with the textbooks. Several examples and exercises are solved in class to practice the theory and methodology taught. Students are then asked to work on their own during class hours on examples and practice problems. Extra assignments are given to students to tackle at home.
Assessment methods and criteria:	• Tests: 40% • Final Exam 60%
Language of instruction:	English
Work placement(s):	No