Course Title	Quantitative Methods				
Course Code	ACSC124				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	3 / Fall				
Teacher's Name	Dr Petroula Mavrikiou				
ECTS	6	Lectures / week	3	Laboratories / week	
Course Purpose	The purpose of this course is to introduce students to the basic knowledge of the theory of probability and statistics and provide them with adequate knowledge to apply statistical techniques in the Computer science field. During the course students develop the ability to apply statistical techniques, and how to use them in order to take decisions for solving problems. Students are expected that by the end of the course they will be able to identify and use their knowledge in statistical analysis as an adequate tool in the Computer science environment, and be able to present, analyse and structure a problem and design a solution given their knowledge in statistics.				
Learning Outcomes	• Recognize the kinds of data (discrete and continuous, ordinal and nominal) and the kinds of variables (discrete and continuous). • Construct and present frequency tables, cumulative distributions and graphs (histograms, bar charts, pie charts). • Answer questions on the frequency distribution tables. • Understand and be able to explain the shape of various data distributions (skewed, and symmetric) • Identify and summarizing quantitative data. • Be able to calculate and critically interpret the measures of location (mean, mode, and median). • Be able to calculate and interpret the measures of dispersion (variance, standard deviation, range). • Separate the difference between measures of location and measures of dispersion and apply in Computer science problems. • Identify extreme values and outliers and explain their significance • Understand and explain the idea of probability. • Understand the idea of experiments, events, outcomes and sample space. • Construct the sample space given an experiment. • Calculate probabilities and basic relationships of probability (union of events, complement of event, intersection of events, conditional probability). • Distinct the difference between mutually exclusive, mutually				

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<tr><td></td><td colspan="3">exhaustive and independent events. Apply these in problems.
• Recognize and construct probability distribution tables.
• Recognize, use, apply and explain the theory and their applications in Computer science problems concerning the discrete probability distributions: Binomial, Poisson.
• Recognize, use, apply and explain the theory and their applications in Computer science problems concerning the continuous probability distributions: Normal distribution.
• Recognize the difference between normal and standard normal distribution.
• Use the tables of the standard normal distribution for solving problems and interpret correct the answers.
• Identify the differences between continuous and discrete probability distributions.</td></tr>
<tr><td>Prerequisites</td><td>None</td><td>Corequisites</td><td>None</td></tr>
<tr><td>Course Content</td><td colspan="3">• Tabular and graphical methods
Statistics in practice. The various kinds of data (discrete and continuous, ordinal and nominal). Different kinds of variables (discrete and continuous).
Frequency tables, cumulative distribution tables and graphs (histograms, bar charts, pie charts etc). Shape of various data distributions (skewed, and symmetric).
• Descriptive statistics: Numerical methods
Summarizing quantitative data. Measures of location (mean, mode, and median). Measures of dispersion (variance, standard deviation, range). Difference between measures of location and measures of dispersion and their significance. Extreme values; outliers and their importance.
• Introduction to Probability
The idea of probability. Experiments, events, outcomes and sample space. Relative frequencies. Calculation of probabilities and basic relationships of probability (union of events, complement of event, intersection of events). Mutually exclusive, mutually exhaustive and independent events. Conditional probability and multiplication law.
• Discrete Probability Distributions
Probability distribution tables. Theory and their applications in Computer science problems concerning the discrete probability distributions: Binomial, Poisson.
• Continuous Probability Distributions
Theory and their applications in Computer science problems concerning the continuous probability distributions: Normal distribution. Standard normal distribution and tables of the standard normal distribution.</td></tr>
<tr><td>Teaching Methodology</td><td colspan="3">The course is structured around lectures and tutorials on topics related to probability theory and statistics. During the lectures, students are encouraged to participate in discussions and class work. At the same time, students are given problems and exercises to solve at home. Lecture notes and other course material are available to students through the e-learning</td></tr>
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	platform.
Bibliography	(a) Textbooks • Anderson D.R., Sweeny D.J., Williams T.A., Statistics for Business and Economics, South Western 2016, 13th Edition (Latest Edition) • S. Christian Albright, Wayne L. Winston, Business Analytics: Data Analysis & Decision Making, Cengage Learning 2013, 5th Edition (Latest Edition) • Grimm L.G., Statistical Applications for the Behavioral Sciences, Wiley, 2018, 2nd Edition (Latest Edition) (b) References • Newbold, P., Carlson, W., Thorne, B., Statistics for Business and Economics, Prentice Hall 2003. • Milton, S., Arnold, J., Introduction to Probability and Statistics, McGraw-Hill, 2003 • Mann P.S., Introductory Statistics, John Wiley, 2001 • Johnson R.A., Bhattacharyya G.K., Statistics, Principles and Methods, Wiley Series, 2001 • Mavrikiou M. Petroula, Understanding, Essential Probability and Statistics: Some theory and applications, 2012
Assessment	Students are assessed with the Coursework which is consisted of two Mid-term exams that carries 40% weight, and a Final exam which carries 60% weight.
Language	English