Course unit title:	Discrete Structures
Course unit code:	CSC120
Type of course unit: **(Compulsory/optional)**	Compulsory
Level of course unit: **(First, second or third cycle)**	Bachelor (1st cycle)
Year of study:	1
Semester when the unit is delivered:	2
Number of ECTS credits allocated:	6
Name of lecturer(s):	TBA

Learning outcomes of the course unit:

Upon successful completion of this course students should be able to:

- Apply formal methods of propositional and predicate logic.
- Recall the basic terminology of functions, relations, and sets and use it to solve problems associated with these.
- Recognize the different proof techniques and implement these for a given problem.
- Calculate permutations and combinations of a set and discuss the meaning for the specific problem.

Mode of delivery:	Face- to- face
Prerequisites and co-requisites:	CSC131, MAT101 or BUS111 for MIS students
Recommended optional program components:	None

Course Contents:

Objective:
Provide students with the necessary mathematical foundations for their subsequent computer science courses. This will extend students' mathematical maturity and ability to deal with abstraction.

Description:
Fundamentals of Logic:
Basic connectives and Truth Tables. Logical Equivalence and logical implication. Predicate logic. Modus ponens and modus tollens. The use of quantifiers.

Relations and functions:
Cartesian product and relations. Partial orders and equivalence relations.
Functions: plain, one-to-one and onto. Composition and inverse function.

Set Theory:
Sets, subset and set operations. Laws of set theory. Venn diagrams. Cartesian product. Power sets.

Proofs:
The structure of mathematical proofs; Direct proofs; Proof by counterexample; Proof by contradiction; Mathematical induction; Strong induction; Recursive mathematical definitions; Well orderings.

Counting:
General counting methods for arrangements and selections. Permutations and combinations with or without repetition. Binomial theorem; Pascal's identity. Inclusion-exclusion principle. The Pigeonhole principle.

If time permits, one can make an introduction to recurrence relations or trees. Recent developments and contemporary issues pertaining to the subject matter of the course.

Recommended or required reading:	Richard Johnsonbaugh, DISCRETE MATHEMATICS Pearson-Prentice Hall Ralph P. Grimaldi, DISCRETE AND COMBINATORIAL MATHEMATICS, Addison-Wesley Steven Roman, AN INTRODUCTION TO DISCRETE MATHEMATICS, Harcourt Brace Jovanovich Alan Tucker, APPLIED COMBINATORICS, John Wiley & Sons
Planned learning activities and teaching methods:	Class Instruction: 42 Hours Consultation: 15 Hours
Assessment methods and criteria:	Examinations: 80% Assignments/Quizzes: 15% Class participation: 5% 100%
Language of instruction:	English
Work placement(s):	No
Place of Teaching:	Regular Classroom European University Cyprus, Nicosia