INSTITUTION	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS					
SCHOOL	SCHOOL OF SCIENCE					
DEPARTMENT	INFORMATICS AND TELECOMMUNICATIONS					
COURSE LEVEL	UNDERGRADUATE					
COURSE TITLE	**Mathematics for Computer Science**					
COURSE CODE	**K20α**		**Semester**	**6**	**ECTS**	**6**
TEACHING HOURS per week	**THEORY**	**4**	**SEMINAR.**	**1**	**LABORATORY**	
COURSE TYPE	**Select one of the following and delete the rest** Track Compulsory (EYM) **K**: A **E1**: Y **E2**, **E3**, **E4**, **E5**, **E6**: *Fill the table as in the curriculum:* Track (A-Computer Science, B- Computer Engineering) / Specialization Compulsory (Y) / Core Specialization (B)/ Elective Specialization (E)					
URL	https://eclass.uoa.gr/courses/D36/					
EXPECTED PRIOR KNOWLEDGE/ PREREQUISITES AND PREPARATION:	K09 Discrete Mathematics					
TEACHING AND EXAMINATIONS LANGUAGE:	GREEK					
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO					

COURSE CONTENT
The course covers basic and advanced techniques in Discrete Mathematics that are necessary for the study and analysis of computer models and systems. Proof methods with an emphasis on induction and existence proofs (Pigeonhold principle, Diagonalization). Applications to Fibonacci Sequences and Number Theory. Elements of Ramsey Theory. Countanble and uncountable sets. Graph theory: trees, connectivity, planarity, bipartite matching. Equivalence and partial order relations. Theorems of Sperner and Dilworth. Tools from Probability Theory.

STUDENT LEARNING OBJECTIVES

Teaching-Learning Goals-Expected Learning Outcomes
The goal of the class is for the student to acquire math knowledge that is necessary in computer science and acquaint herself further with symbolic thinking.

Upon successful completion of the course the student will be able to:

- Distinguish between constructive and non-constructive proofs.
- Accurately define the space of feasible solutions of problems.
- Develop mathematical proofs in a coherent and elegant way.
- Model problem inputs using graphs and their properties.
- Analyze partial order and equivalence relations.
- Express in an accurate and concise manner problem requirements.

TEACHING AND LEARNING METHODS - ASSESSMENT	
TEACHING METHOD	In Class (Face to Face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Learning process supported by the e-class platform (Teaching material; Announcements; Task assignments; Outside links etc) Email communication. There exists a possibility of lecture transmission.
TEACHING ORGANIZATION *Describe in detail the way and methods of teaching:* *Enhanced Lectures,* *Online Lectures,* *Seminars,* *Tutorial,* *Laboratory,* *Laboratory Exercise,* *Study & analysis of literature,* *Practice (Positioning),* *Interactive teaching,* *Developing a project,* *Individual / group work* *Telework (reference to tools) etc.* *Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS*	See table below Lectures are supported by transparencies. The board is also used extensively. An emphasis is placed both during the lectures and the seminars on problem solving. Homework assignments are individual or in groups of 2.

Activity	***Student Workload*** *(hours)*
Lectures	52
Seminars	13
Preparation for seminars	15
Study and analysis of the literature	15
Preparation for the next lecture	13
Homework assignments	12
Independent Study	30
Total Course (25 hours of workload per unit of credit)	***150***

ASSESSMENT OF STUDENTS

Description of the assessment process

Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other

Fully defined evaluation criteria are mentioned and if and where they are accessible to students.

Assessment methods	*Number*	*Percentage*
Written examination	1	90%
Homeworks	1	10%

Evaluation by written examination and homework assignments. Grade Feedback is available upon request.

LITERATURE AND STUDY MATERIALS / READING LIST

Basic textbook in Greek: M. Κολουντζάκης, Χ. Παπαχριστόδουλος. Διακριτά Μαθηματικά, ΣΕΑΒ/Κάλλιπος, 2015. Also the greek translation of C. L. Liu “Discrete Mathematics”.

Additionally the students have access to 1) Lecture notes by Emiris and Koutsoupias 2) transparencies by S. Kolliopoulos 3) recommended literature in English (Lazlo Lovasz, Jozsef Pelikan, Katalin Vesztergombi. Discrete Mathematics: elementary and beyond. Springer, 2003. Eric Lehman, Tom Leighton, Albert Meyer. Mathematics for Computer Science, MIT, 2015. Jiri Matousek, Jaroslav Nesetril. Invitation to Discrete Mathematics, 2nd edition. Oxford University Press, 2008.)