COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_DI361	**SEMESTER OF STUDIES**	6th
COURSE TITLE	MATHEMATICAL LOGIC		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures and Tutorials	4	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Elective course
PREREQUISITE COURSES:	Recommended prerequisite knowledge: INTRODUCTION TO ALGEBRA AND SET THEORY, ALGEBRA I
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	

2. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning*

and Appendix B

- *Guidelines for writing Learning Outcomes*

The student that successfully completes this course will be in a position to check the tautological validity and equivalence of sentences. (S)he will be in a position to decide whether a set of connectives is adequate, will know which logical gates are adequate and will be able to design a logical circuit. (S)he will know what a Boolean algebra is and will be in a position to check the validity of an equation in such an algebra. (S)he will be in a position to distinguish between logical validity and formal provability and to carry out simple formal proofs. (S)he will know the content and proof of the Completeness Theorem for Propositional Calculus. (S)he will be in a position to handle the syntax of predicate logic, to distinguish between free and bound occurences of variables, as well as between types and senences and will know how the distinction is reflected in natural language. (S)he will be in a position to check the validity of a sentence in a structure, the tautological validity and equivalence of sentences, to form the negation and the prenex form of a sentence. (S)he will know the content and proof of the Compactness Theorem for predicate logic and will be in a position to apply it to mathematical problems.

General Abilities

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*Others…*
Production of new research ideas	

- Respecting different identities and cultures.
- Respecting natural environment.

3. COURSE CONTENT

The language of propositional logic, truth valuations, truth-tables, tautologies, tautological equivalence, the notion of tautological consequence. Adequacy of sets of connectives, normal form and logical circuits. Boolean algebra. Formal proofs, soundness and completeness. The language of predicate logic, formulae, sentences. Valuations of variables, semantics, the concept of truth. Logical validity, rules concerning quantifiers, normal forms. Compactness of predicate logic and mathematical applications.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING ORGANIZATION *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures	26
Tutorials	26
Individual Study	95
Final Exam	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***150***

STUDENT ASSESSEMNT *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	**Assessment Language:** Greek **Assessment Language for Erasmus students:** English **Assessment methods:** Final Course Examination including comprehension questions and problem solving. Minimum passing grade: 5 Μαximum passing grade: 10

5. RECOMMENDED LITERATURE

(*in Greek*)

- Enderton Herbert B. *Μια Μαθηματική Εισαγωγή στη Λογική*. Εκδόσεις ΙΤΕ – Πανεπιστημιακές Εκδόσεις Κρήτης, 2013.
- Τζουβάρας Αθανάσιος. *Στοιχεία Μαθηματικής Λογικής*. Εκδόσεις Ζήτη, 1998.