COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_PM332	**SEMESTER OF STUDIES**	6th
COURSE TITLE	GENERAL TOPOLOGY		

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*	Compulsory course for the specialization *Pure Mathematics* Elective course for each of the other specializations
PREREQUISITE COURSES:	Recommended prerequisite knowledge: REAL ANALYSIS II
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	https://eclass.upatras.gr/courses/MATH917/

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*

After the successful completion of the course, the students will be able:

- To understand basic notions of General Topology such as the definition of topological space, of subspace, of base and of subbase of topology.
- To hold with ease various types of sets of a topological space such as the open, the closed, the dense and the nowhere dense sets.
- To define topologies on a set using different ways and to classify and evaluate them based on the separation axioms.
- To handle with ease functions of topological spaces such as continuous functions, open and closed functions and homomorphisms.
- To realize the meaning of the Moore-Smith sequences and the necessity to generalize the notion of sequence in topological spaces.
- To understand the product of topological spaces and the important notion of universality in a class of topological spaces.
- To realize the notions of compactness, of locally compactness, of compactification, of connectness, of locally connectness and of path connectness.
- To realize the breadth and the usefulness of Topology in various fields of mathematics.

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	

- Search, analysis and synthesis of facts and information using the necessary technologies.
- Decision making.
- Adaptation to new situations.
- Working in an interdisciplinary environment.
- Autonomous work.
- Teamwork.
- Production of new research ideas.
- Promotion of the free, creative and inductive thinking.

3. COURSE CONTENT

Metric spaces: Definition of metric space. Examples. Basic notions of metric spaces (Open sets, Closed sets, Boundary of a set).
Topological spaces: Definition of topology and examples of topological spaces. Various methods to appoint topology. Basic notions of topological spaces (closure, interior, derivative, boundary). Subspace, Base and subbase of topology.
Separation axioms: T_0, T_1, Hausdorff, Regular, Completely regular and Normal spaces.
Functions and Moore-Smith sequences: Continuous functions, Homomorphisms and examples. Moore-Smith Convergence.
Product of topological spaces: Product of finite and infinite family of topological spaces. Properties of product of topological spaces. Universal spaces.
Compact spaces: Compact spaces. Continuous functions of compact spaces. Examples of compact spaces. Locally compact spaces. Compactification.
Connected spaces: Connected spaces. Continuous functions of connected spaces. Examples of connected spaces. Connected components. Locally connected spaces. Path connected spaces.

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*	Supporting learning through the online platform *eClass* University of Patras.
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	52
Solving suggested exercises	30
Hours for private study of the student.	65
Final examination	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:** Written Final Course Examination (100%) including ✓ Theory ✓ Exercises Minimum passing grade: 5 Maximum passing grade: 10

5. RECOMMENDED LITERATURE

(*in Greek*)

- Γεωργίου Δημήτριος και Ηλιάδης Σταύρος. *Γενική Τοπολογία*. 2η Έκδοση, Εκδόσεις Τζιόλα, 2017.
- Νεγρεπόντης Στυλιανός, Ζαχαριάδης Θεοδόσιος, Καλαμίδας Νικόλαος και Φαρμάκη Βασιλική. *Γενική Τοπολογία και Συναρτησιακή Ανάλυση*. Εκδόσεις Συμμετρία, 1997.