COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE PROGRAM		
COURSE CODE		**SEMESTER**	**C**
COURSE TITLE	TOPOLOGY OF METRIC SPACES		
INSTRUCTOR	Kyriakos Keremedis		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
		6	9
COURSE TYPE	General knowledge		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://www.math.aegean.gr/index.php/en/academics/undergraduate-programs		

(2) LEARNING OUTCOMES

Learning outcomes
The aim of the course is to introduce the students to the basic notions of metric spaces such as completeness, compactness, connectedness and continuity. These notions are necessary for other courses of the program, such as Analysis II, Differential Equations, Complex Analysis, Functional Analysis and General Topology.
General Competences
Working independently. Team working. Working in an interdisciplinary environment.

(3) SYLLABUS

1. The real numbers, ordered fields and completeness.
2. Topology of the real numbers produced by the Euclidean metric. Bolzano-Weierstrass theorem, sequences of real numbers, limit points of subsets of the real line, limsup and liminf.
3. Metric spaces, examples of metric spaces, normed spaces.
4. Open and closed sets, topology produced by a metric.
5. Limit points, isolated points, interior points, boundary points. Closure, interior and boundary of a set.
6. Distance of a point from a set, distance of two sets, diameter of a set and bounded sets.
7. Sequences in metric spaces, Cauchy sequences in metric spaces, completeness of metric spaces, completion of a non-complete metric space.
8. Dense sets and the notion of a separable metric space.
9. Baire category theorem.
10. Compactness of metric spaces. Totally bounded metric spaces. Heine-Borel theorem, compact sets in finite dimensional normed spaces.

11. Connected and path connected metric spaces, connected components. 12. Continuity of functions in metric spaces. Continuity of functions via sequences. 13. Continuity and compactness, Continuity and connectedness. 14. Uniform continuity.	
TEACHING MATERIAL DISTRIBUTION	The teaching material of the course is uniformly distributed during the semester.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face lectures
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Communication with students via e-mail
TEACHING METHODS	***Activity*** / ***Semester workload***
	Lectures: 52
	Tutorials: 26
	Independent study: 147
	Course total (25 per ECTS): ***225***
COURSE COMMITMENTS	Attending course and tutorial sessions is not obligatory.
STUDENT PERFORMANCE EVALUATION	Student's evaluation is done in Greek through a written examination which includes short-answers questions and problem solving. For students with disabilities, evaluation takes place via oral exams.

(5) ATTACHED BIBLIOGRAPHY

1. N. L. Carothers, *Real analysis,* Cambridge University Press (2000).
2. W. Rudin, *Principles of Mathematical Analysis,* 3rd. ed., McGraw-Hill, New York, 1976.
3. Π. Τσαμάτος, Τοπολογία, Εκδότης ΤΖΙΟΛΑΣ, 2016.

- Related academic journals:

1. Reed, M. and Simon, B, *Methods of Modem Mathematical Physics, Vol. 1: Functional Analysis,* Academic Press, New York, 1980.