

DESCRIPTION OF THE COURSE OF STUDY

Course code	0541.6.MAT2.C.TOP2	
Name of the course in	Polish	Topologia II
	English	Topology II

1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

1.1. Field of study	mathematics
1.2. Mode of study	full-time studies
1.3. Level of study	Graduate (Master)
1.4. Profile of study*	general academic profile of studies
1.5. Person/s preparing the course description	Taras Banakh, Michal Zakrzewski
1.6. Contact	t.o.banakh@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Language of instruction	Polish and English
2.2. Prerequisites*	Topology I, Mathematical Analysis II

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	lectures and classes
3.2. Place of classes	classes in the UJK teaching room
3.3. Form of assessment	Exam (lecture) , graded credit (classes)
3.4. Teaching methods	Lectures, discussions Classes – discussions, solving problems
3.5. Bibliography	Required reading
	Further reading

Janich K. Topologia. PWN Warszawa 1991,
Hatcher A. Algebraic topology. Cambridge University Press (2009)
(available at: <https://pi.math.cornell.edu/~hatcher/AT/ATpage.html>),
Novikov, Dubrovin, Fomenko, Modern Geometry — Methods and Applications.
(tomy II i III). Springer; 2nd edition (November 11, 1991).
Mioduszewski J. Wykłady z topologii. Wyd. UŚ Katowice 1994.
W.S. Massey, A basic Course in Algebraic Topology, Springer-Verlag 1991.

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

<p>4.1. Course objectives (including form of classes)</p> <p>Lectures C1 – learning fundamental notions of geometric and algebraic topology</p> <p>Seminar C1- acquiring skills in reasoning characteristic for algebraic topology C2 - mastering the skills in the above-mentioned reasoning for their use in the study of geometric objects C3 - shaping attitudes aimed at proper self-evaluation of the student</p> <p>4.2. Detailed syllabus (including form of classes)</p> <p>Lectures Simplex and its properties. Complexes, simple mappings. Groups, modules, categories. Fundamental groups. Van Kampen Theorem. Coverings. Homotopies, homologies, and their applications: Brouwer theorem, Borsuk-Ulam theorem. Information on homotopy groups of spheres and the classification of manifolds.</p> <p>Seminars: Homotopies, contractible spaces, homotopy type of a space. Paths and loops, fundamental group, simple-connected spaces. Fundamental group of the circle. Coverings and their applications to calculating fundamental groups. The fundamental group as a functor. Homologies and co-homologies as functors.. Cell complexes. Calculation of homology groups of cell complexes.</p>

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	defines the basic concepts of algebraic topology, in particular, homotopy and homology groups.	MAT2A_W02
W02	explains the main theorems of geometric topology such as: Brouwer's theorem, Borsuk's theorem and variants equivalent to these theorems.	MAT2A_W02 MAT2A_W03
W03	explains the relationships between theorems of geometric and algebraic topology.	MAT2A_W02 MAT2A_W03
within the scope of ABILITIES:		

U01	identifies topological structures in various mathematical objects; is able to use the topological properties of spaces and maps	MAT2A_U03
U02	is able to applying algebraic methods in topological problems	MAT2A_U03
U03	is able to undersatnd topological proofs that exploit algebraic and combinatorial tools.	MAT2A_U01
within the scope of SOCIAL COMPETENCE:		
K01	formulates precise questions deeping own understanding of the subject.	MAT2A_K04

4.4. Methods of assessment of the intended learning outcomes												
Teaching outcomes (code)	Method of assessment (+/-)											
	Exam oral/written			Test			Effort in class			Self-study		
	Form of classes			Form of classes			Form of classes			Form of classes		
	L	C	...	L	C	..	L	C	...	L	C	...
W01	+				+		+	+		+	+	
W02	+				+		+	+		+	+	
W03	+				+		+	+		+	+	
U01					+		+	+		+	+	
U02					+		+	+		+	+	
U03					+		+	+		+	+	
K01	+				+		+	+		+	+	

4.5. Criteria of assessment of the intended learning outcomes		
Form of classes	Grade	Criterion of assessment
lecture (L) (including e-learning)	3	at least 50% and no more than 60% of the total number of points possible
	3,5	more than 60% and no more than 70% of the total number of points possible
	4	more than 70% and no more than 80% of the total number of points possible
	4,5	more than 80% and no more than 90% of the total number of points possible
	5	more than 90% of the total number of points possible
classes (C) (including e-learning)	3	at least 50% and no more than 60% of the total number of points possible
	3,5	more than 60% and no more than 70% of the total number of points possible
	4	more than 70% and no more than 80% of the total number of points possible
	4,5	more than 80% and no more than 90% of the total number of points possible
	5	more than 90% of the total number of points possible

5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

Category	Student's workload
	Full-time studies
<i>NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/</i>	62
<i>Participation in lectures*</i>	30
<i>Participation in classes, seminars, laboratories*</i>	30
<i>Preparation in the exam/final test*</i>	2
<i>INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/</i>	38
<i>Preparation for the lecture*</i>	10
<i>Preparation for the classes, seminars, laboratories*</i>	18
<i>Preparation for the exam/test*</i>	10
TOTAL NUMBER OF HOURS	100
ECTS credits for the course of study	4

Accepted for execution (date and legible signatures of the teachers running the course in the given academic year)

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