Attachment No. 5 to Rector's ordinance No. 22/2020

DESCRIPTION OF THE COURSE OF STUDY

Course code	0541.6.MAT2.D.GPB	
Name of the course in	Polish	**Geometria przestrzeni Banacha**
	English	**Geometry of Banach spaces**

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	dr Joanna Garbulińska-Węgrzyn
1.6. Contact	jgarbulinska@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 IV, Functional Analysis

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		Graded credit (lectures, classes)
3.4. Teaching methods		Lectures – information lecture Classes - discussions, solving problems
3.5. Bibliography	**Required reading**	Musielak J. Wstęp do analizy funkcjonalnej. PWN Warszawa 1989. Lindestrauss J., Tzafriri L., Classical Banach spaces. I,II, Springer-Verlag 1977, 1979. Wojtaszczyk P., Banach spaces for analysts, Cambridge University Press, Cambridge, 1991.
	Further reading	Fabian M., Habala P,Hajek P., Montesinos V., Pelant J., Zizler V., Functional analysis and infinite-dimensional geometry, Springer-Verlag, New York, 2001.

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1. Course objectives *(including form of classes)*

Lecture:

C1. Introduction the distinguished points in some chosen Banach spaces.
C2. Presentation the "global" properties of Banach spaces.

Classes:
C1. Acquire basic skills in the study of distinguished points in some chosen Banach spaces.
C2. Identifying facts from the theory of geometric properties of Banach spaces and applying them to other branches of mathematics, such as approximation theory.
C3. Formation of attitudes for proper student self-evaluation.

4.2. Detailed syllabus *(including form of classes)*

Lectures

1. Extreme points, smooth points and points of strict convexity of unit spheres in some chosen Banach spaces.
2. "Global" properties of Banach spaces such as strict convexity, locally unitary convexity, unitary convexity and smoothness.
3. Renormalization theorems.
4. Applications of the above introduced concepts mainly in approximation theory.

Classes

1. Extreme points, smooth points and points of strict convexity of unit spheres in some chosen Banach spaces.
2. "Global" properties of Banach spaces such as strict convexity, locally unitary convexity, unitary convexity and smoothness.
3. Renormalization theorems.
4. Applications of the above introduced concepts mainly in approximation theory.

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 Banach spaces	MAT2A_W01 MAT2A_W02
W02	Presents the main theorem (of renormalization) and "global" properties of Banach spaces	MAT2A_W01 MAT2A_W02
W03	Explains the proofs of the main theorems of the geometric properties of Banach spaces	MAT2A_W01
within the scope of **ABILITIES:**		
U01	Adapts the language and methods of Banach space theory in problems of approximation theory	MAT2A_U11
U02	Determines distinguished points in some chosen Banach spaces	MAT2A_U11
U03	Proves properties of some chosen Banach spaces	MAT2A_U11
within the scope of **SOCIAL COMPETENCE:**		
K01	Precisely formulates questions, serving to deepen one's own understanding of the essence of the subject area	MAT2A_K01

4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes *(code)*	**Method of assessment (+/-)**																					
	Exam oral/written*			**Test***			**Project***			**Effort in class***			**Self-study***			**Group work***			**Others* e.g. standardized test used in e-learning**		
	Form of classes			***Form of classes***			***Form of classes***			***Form of classes***			***Form of classes***			***Form of classes***			***Form of classes***		
	L	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*	*L*	*C*	*...*
W01				+						+	+		+	+							
W02				+						+	+		+	+							
W03				+						+	+		+	+							
U01					+					+	+		+	+							
U02					+					+	+		+	+							
U03					+					+	+		+	+							
K01					+					+	+		+	+							

****delete as appropriate***

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	**Extramural studies**
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/	**47**	
*Participation in lectures**	15	
*Participation in classes, seminars, laboratories**	30	
*Preparation in the exam/ final test**	2	
*Others (please specify e.g. e-learning)**		
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	**53**	

*Preparation for the lecture**	10	
*Preparation for the classes, seminars, laboratories**	20	
*Preparation for the exam/test**	23	
*Gathering materials for the project/Internet query**		
Preparation of multimedia presentation		
*Others **		
TOTAL NUMBER OF HOURS	**100**	
ECTS credits for the course of study	**4**	

delete as appropriate

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

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