Attachment no. 5 to ZW 16/2020
Attachment no. **13** to studies program

FACULTY OF ARCHITECTURE

COURSE SYLLABUS

Course title in Polish: **Wstęp do modelowania matematycznego**
Course title in English: **An Introduction to Mathematical Modelling**
Specialization (if applicable): **Architecture**
Profile (if applicable): **Architecture and Urban Planning**
Level and form of studies: **2nd level, full-time**
Semester: **1**
Course type: **obligatory**
Course code: **MAT001755W**
Group of courses: **NO**

	Lecture	Tutorial	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				
Number of hours of total student workload (CNPS)	**30**				
Form of crediting	**Crediting with grade**				
For group of courses mark (X) final course					
Number of ECTS points	**1**				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact classes or other people conducting classes (BU)	**0,8**				

PREREQUISITES RELATED TO KNOWLEDGE, COMPETENCES AND SOCIAL SKILLS

No prerequisites.

COURSE OBJECTIVES

C1 Presenting the Fibonacci sentence and the principle of mathematical induction.
C2 Presenting the theory of convex sets.
C3 Giving basic knowledge related to tilings of surfaces and to filling spaces.
C4 Passing on basic knowledge related to lattice polygons.
C5 Giving basic understanding of graph theory.
C6 Passing on knowledge related to curves and surfaces.

COURSE LEARNING OUTCOMES

Relating to knowledge:
PEK_W1 The graduate knows the properties of the Fibonacci sequence.
PEK_W2 The graduate has basic knowledge related to convex set.
PEK_W3 The graduate knows solids and tilings.
PEK_W4 The graduate has basic knowledge related to lattice polygons.
PEK_W5 The graduate knows basic classes of graphs.

PEK_W6	The graduate knows basic curves and surfaces.

Relating to competences:

PEK_U1	The graduate s able to apply Euler's formula to investigate polyhedral solids.
PEK_U2	The graduate is able to investigate basic properties of graphs.
PEK_U3	The graduate is able to describe areas in diverse coordinates sets
PEK_U4	The graduate is able to investigate properties of curves on the plane.

Relating to social skills:

PEK_K01	The graduate can, without assistance, search for necessary information in the literature.
PEK_K02	The graduate understands necessity of systematic and individual work on the material of the course.

PROGRAMME CONTENT		
Form of classes - lectures		**Number of hours**
Lec 1	Golden ratio. The Fibonacci sequence. The principle of mathematical induction.	2
Lec 2	Convex and starshaped sets. Helly's and Krasnosel'skii's theorems.	2
Lec 3	Planar tilings. Euler's polyhedral formula. Euler characteristic. Platonic and Archimedean solids.	2
Lec 4	Lattice polygons and Pick's theorem.	2
Lec 5	Elements of graph theory. Eulerian and Hamiltonian graphs. Platonic graphs. Planar graphs and Kuratowski's theorem.	2
Lec 6	Curves on the plane. Conic sections. Parametric curves.	2
Lec 7	Cylindrical and spherical coordinates. Description of regions and surfaces in cylindrical and spherical coordinates.	2
Lec 8	Final test.	1
	Total hours	**15**

TEACHING TOOLS
N1 - Lectures - traditional and using multimedia tools. **N2** - Discussions. **N3** - Tutorial.

ASSESSMENT OF ACHIEVEMENT OF LEARNING OUTCOMES		
Evaluation (F – forming (during semester), C – concluding (at semester end)	Number of learning outcome	Method of assessing the achievement of learning outcome
F1 – Dis	PEK_U1 PEK_U4 PEK_K01	Oral presentations
F2 – Lec	PEK_W1 PEK_W6 PEK_U1 PEK_U4 PEK_K02	Final test
C = rules set by the lecturer		

BASIC AND ADDITIONAL LITERATURE

BASIC LITERATURE:

[1] Webster, R., *Convexity*, Oxford 1994.
[2] Roman, St., *An Introduction to Discrete Mathematics*, Innovative Textbooks, 2004.
[3] Wilson, R. J., *Introduction to Graph Theory*, Prentice Hall 2010.

ADDITIONAL LITERATURE:

[1] Strzelecki, P., *Matematyka współczesna dla myślących laików*, Warszawa 2011.
[2] Tarczewski, R., *Topologia form strukturalnych*, Wrocław 2011.
[3] Gewert, M., Skoczylas, Z., *Elementy analizy wektorowej. Teoria, przykłady zadania*, Wrocław 2012.
[4] Zakrzewski, M., *Markowe Wykłady z Matematyki, Matematyka Dyskretna*, Wrocław 2014.
[5] Gewert, M., Skoczylas, Z., *Analiza matematyczna 2, Definicje, twierdzenia, wzory*, Wrocław 2016.

COURSE SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Wydziałowa Komisja Programowa ds. Kursów Ogólnouczelnianych

mgr Bogusław Merdas
boguslaw.merdas@pwr.edu.pl