

FACULTY OF ARCHITECTURE

SUBJECT CARD

English name	AN INTRODUCTION TO MATHEMATICAL MODELLING
Polish name	WSTĘP DO MODELOWANIA MATEMATYCZNEGO
Main field of study (if applicable)	<i>Architecture</i>
Specialization (if applicable)	
Level and form of studies	I level, full time
Kind of subject	obligatory
Subject code	MAT001679
Group of courses	NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)					
Form of crediting	crediting with grade				
In case of a group of courses, mark the final course (X)					
Number of ECTS points	2				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes					

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCIES

Knowledge of vector calculus. Knowledge of differential and integral calculus of functions of one and two variables.

SUBJECT 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.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge a student

- PEK_W1 knows the properties of the Fibonacci sequence.
- PEK_W2 has basic knowledge related to convex set,
- PEK_W3 knows solids and tilings,
- PEK_W4 has basic knowledge related to lattice polygons,
- PEK_W5 knows basic classes of graphs,
- PEK_W6 knows basic curves and surfaces,

Relating to skills a student

- PEK_U1 is able to apply Euler's formula to investigate polyhedral solids,
- PEK_U2 is able to investigate basic properties of graphs,

PEK_U3 is able to describe areas in diverse coordinates sets,
 PEK_U4 is able to investigate properties of curves on the plane.

PROGRAMME CONTENT		
Form of classes - lectures		Hours
Lec1	Golden ratio. The Fibonacci sequence. The principle of mathematical induction.	2
Lec2	Convex and starshaped sets. Helly's and Krasnosel'skii's theorems.	2
Lec3	Planar tilings. Euler's polyhedral formula. Euler characteristic. Platonic and Archimedean solids.	2
Lec4	Lattice polygons and Pick's theorem.	2
Lec5	Elements of graph theory. Eulerian and Hamiltonian graphs. Platonic graphs. Planar graphs and Kuratowski's theorem.	2
Lec6	Curves on the plane. Conic sections. Parametric curves.	2
Lec7	Cylindrical and spherical coordinates. Description of regions and surfaces in cylindrical and spherical coordinates.	2
Lec8	Final test.	2
Total hours		30

TEACHING TOOLS USED
N1 Lectures – traditional and using multimedia tools. N2 Discussions. N3 Tutorial.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation: F – forming (during the semester), P – concluding (at the end of the semester)	Educational effect number	Way of evaluating educational effect achievement
F – Dis	PEK_U1-PEK_U4	oral presentations
F – Lec	PEK_W1-PEK_W6 PEK_U1-PEK_U4	final test
P – rules set by the lecturer		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE

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

ADDITIONAL LITERATURE

- [4] P. Strzelecki, Matematyka współczesna dla myślących laików, Wydawnictwa Uniwersytetu Warszawskiego, Warszawa, 2011.
- [5] R. Tarczewski, Topologia form strukturalnych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2011
- [6] M. Gewert, Z. Skoczylas, Elementy analizy wektorowej. Teoria, przykłady zadania. Oficyna Wydawnicza GiS, Wrocław, 2012.
- [7] M. Zakrzewski, Markowe Wykłady z Matematyki, Matematyka Dyskretna, Oficyna Wydawnicza GiS, Wrocław, 2014.
- [8] M. Gewert, Z. Skoczylas, Analiza matematyczna 2, Definicje, twierdzenia, wzory. Oficyna Wydawnicza GiS, Wrocław, 2016.

SUBJECT SUPERVISOR (NAME AND E-MAIL)

Wydziałowa Komisja Programowa ds. Kursów Ogólnouczeniowych
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**MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
AN INTRODUCTION TO MATHEMATICAL MODELLING MAT001679
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY *Architecture***

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W1	K2A_W01	C1	Lec1	N1-N3
PEK_W2	K2A_W01	C2	Lec2	N1-N3
PEK_W3	K2A_W01	C3	Lec3	N1-N3
PEK_W4	K2A_W01	C4	Lec4	N1-N3
PEK_W5	K2A_W01	C5	Lec5	N1-N3
PEK_W6	K2A_W01	C6	Lec6	N1-N3
PEK_U1	K2A_U01	C3	Lec3	N1-N3
PEK_U2	K2A_U01	C5	Lec5	N1-N3
PEK_U3	K2A_U01	C6	Lec7	N1-N3
PEK_U4	K2A_U01	C6	Lec6	N1-N3