

FACULTY OF PURE AND APPLIED MATHEMATICS					
SUBJECT CARD					
Name in Polish: Matematyka, historia, kultura					
Name in English: Mathematics, history, culture					
Main field of study (if applicable):					
Specialization (if applicable):					
Level and form of studies: 3rd level					
Kind of subject: faculty course					
Subject code MAT1316					
Group of courses YES / NO					

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	90				
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	3				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	2				

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. All mathematical courses of the first level

SUBJECT OBJECTIVES

- C1 Overview of the main developments of mathematics
- C2 Understanding of mechanisms of forming mathematical concepts and problems
- C3 Understanding of connections between the development of mathematics and other aspects of civilization
- C4 Training ability to speak on mathematics in non-technical manner

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Knows the main streams of development and the most important moments in the history of mathematics

PEK_W02 Knows the most important figures from the history of mathematics and associates them with proper period and their achievements

relating to skills:

PEK_U01 Can present the main streams of development of mathematics and underline the most important moments of its development

relating to social competences:

PEK_K01 Understands the role of science

PEK_K02 Understands the social role of a scientist

PROGRAMME CONTENT

Form of classes – lecture		Number of hours
Wy 1	Antiquity: Euclid and his <i>Elements</i> . The role of the book in civilization. Archimedes. Volume of a ball and cone. Apollonius and his <i>Conics</i>	2
Wy 2	Algebra and Renaissance mathematics in Italy: Babylonian algebra. Algebraic symbols. Cardano and Tartaglia. Algebraic equations of the third and fourth degree.	2
Wy 3	Algebraic equations of higher degree. Abel and Galois.	2
Wy 4	XVII century: Computational techniques and logarithms. Cartesius, Fermat, Pascal. Analytic geometry. Probability theory.	2
Wy 5 Wy 6	XVII century - continued: Calculus. Newton, Leibniz, the Bernoullis and others. New image of the world and mathematization of physics.	4
Wy 7 Wy 8	XVIII century and Leonhard Euler: Euler, d'Alembert, Lagrange, Laplace. Differential equations. String equation and trigonometrical series.	4
Wy 9	Gauss, Riemann and XIX century: <i>Disquisitiones Arithmeticae</i> . New standards of precision. Non-Euclidean geometries. Prime Numbers Theorem and Riemann zeta function. Set theory.	2
Wy 10	Geometric constructions. Polygons and numbers that can be constructed. Transcendental numbers. Non-rationality of pi.	2
Wy 11	International Congresses of Mathematicians. Fields medal and other prizes. Main Hilbert Problems. Millenium Prize Problems and P-NP problem.	2
Wy 12 Wy 13	Mathematics and Art: Golden ratio, perspective. Visual arts and group theory. Art of M.C. Escher.	4
Wy 14	Polish Mathematical School: Sierpiński, Mazurkiewicz, Janiszewski. <i>Fundamenta Mathematicae</i> and <i>Studia Mathematica</i> . Logic and foundations of mathematics. Banach-Tarski paradox. Kuratowski and topology. Banach, Steinhaus and functional analysis. <i>Monografie Matematyczne</i> . <i>Scottish Book</i> . Polish mathematics against the background of world mathematics.	2
Wy 15	Mathematics and society: the role of mathematics in the development of civilization.	2
	Total hours	30

TEACHING TOOLS USED

N1. Lecture – traditional method
 N2. Discussions

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_W01, PEK_W02,	Discussion
F2	PEK_W01, PEK_W02, PEK_U01, PEK_K01, PEK_K02	Presentation

$P=0,5 \cdot F1 + 0,5 \cdot F2$

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] D. J. Struik, Krótki zarys historii matematyki do końca XIX w., PWN, Warszawa, 1963.
- [2] A. P. Juszkiewicz, Historia Matematyki, I-III, PWN, Warszawa, 1975.
- [3] W. Więśław, Matematyka i jej historia, Wyd. Nowik, Opole, 1997.
- [4] M. Kordos, Wykłady z historii matematyki, Script, Warszawa, 2006.

SECONDARY LITERATURE:

- [5] J. Stillwell, Mathematics and its history, Springer, 2010.
- [6] W. Dunham, Calculus Gallery: Masterpieces from Newton to Lebesgue, Princeton University Press, 2010.
- [7] R. Duda, Lwowska Szkoła Matematyczna, Wyd. Uniw. Wrocław., 2007
- [8] www. MacTutor History of Mathematics

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

dr hab. Tomasz Żak, prof. nadzw. tomasz.zak@pwr.edu.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL
EFFECTS FOR SUBJECT
MATHEMATICS, HISTORY, CULTURE
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
AND SPECIALIZATION

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_W01 (knowledge)	I3_W02, I3_W05	C1, C2, C3	Wy1-Wy15	N1, N2
PEK_W02	I3_W02, I3_W05	C1, C3	Wy1-Wy15	N1, N2
PEK_U01 (skills)	I3_U09	C1, C2, C3, C4	Wy1-Wy15	N1, N2
PEK_K01 (competences)	I3_K04	C1, C2, C3, C3	Wy1-Wy15	N1, N2
PEK_K02	I3_K04	C1, C2, C3, C3	Wy1-Wy15	N1, N2

** - enter symbols for main-field-of-study/specialization educational effects

*** - from table above