

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Discrete mathematics and mathematical basics of computer</b>		Code <b>1010342611010347256</b>
Field of study <b>Mathematics</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>15</b> Classes: <b>15</b> Laboratory: <b>15</b> Project/seminars: <b>-</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>the sciences</b> <b>Mathematical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b>  dr Jacek Gruszka email: jacek.gruszka@put.poznan.pl tel. 61 665 33 20 Electrical Engineering ul. Piotrowo 3A, 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge of mathematical logic, abstract algebra and mathematical analysis
2	<b>Skills</b>	Array bill knows, knows how to develop a role in a number of the infinite, knows the concept of group
3	<b>Social competencies</b>	He sees the need to acquire new skills
<b>Assumptions and objectives of the course:</b> The aim of the course is to familiarize students with the basic concepts and methods of discrete mathematics and its applications		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. He knows and understands the basic concepts, theorems and methods of discrete mathematics - [K_W01, K_W04]		
2. Able to assess the difficulty of the problems in the field of discrete mathematics, and select a method to solve them - [K_W11, K_W03]		
3. He knows some of the types of practical problems using combinatorial models - [K_W04, K_W06]		
<b>Skills:</b>		
1. Can understanding the present known zag adnienia and their applications - [K_U02]		
2. .Can independently carry out strict reasoning with knowledge - [K_U13, K_U01]		
3. Able to use knowledge of the elements of discrete mathematics - [K_U15]		
<b>Social competencies:</b>		
1. Able to critically assess their level of understanding of a given problem and the lack of elements of reasoning - [K_K01]		
<b>Assessment methods of study outcomes</b>		
One test (problematic issues, students can use their notes)		
Written exam		

### Course description

Update 2017

Applied methods of education: lectures and practical lessons.

Interactive lectures with problems and questions for students. The activity of students is taken into account in valuation of them. Discussion during lectures is expected. Connections with others mathematical subjects are indicated.

Mathematical Induction

Recursion:

- Recursive definitions
- Recursive dependencies
- Fibonacci numbers
- generating functions
- Catalan numbers

Counting sets and functions:

- Counting of subsets
- Dirichlet drawer principle
- On-off rule

Group of permutations:

- distribution of permutations into cycles
- Burnside's lemma

Generating functions:

- development of rational functions
- generating functions in solving of recursive dependencies
- Catalan numbers
- Stirling numbers first and second kind

Number theory:

- divisibility, GCD, LCM, primes numbers
- Euclid's algorithm

Modular arithmetic:

- Fermat theorem
- Euler's theorem
- Chinese theorem of rests
- solving equations of modular arithmetic

Graphs:

- basic concepts
- trees, cycles, tournaments
- Euler and Hamilton cycles
- bipartite graphs, associations and claim Hall
- planarity and Kuratowski theorem

Algebraic methods in graph theory:

- neighborhood matrix
- incidence matrix

#### Basic bibliography:

1. K.A.Ross, Ch.R.B.Wright, *Matematyka Dyskretna*, Państwowe Wydawnictwo Naukowe, Warszawa 1996.
2. W.Lipski, W.Marek, *Analiza kombinatoryczna*, Państwowe Wydawnictwo Naukowe, Warszawa 1986.
3. R.J.Wilson, *Wprowadzenie do teorii grafów*, Państwowe Wydawnictwo Naukowe, Warszawa 1985.

<b>Additional bibliography:</b>		
1. V.Bryant, Aspekty kombinatoryki, Wydawnictwa Naukowo-Techniczne 1977.		
2. R.L.Graham, D.E.Knuth, O.Patashnik, Matematyka Konkretna, Państwowe Wydawnictwo Naukowe, Warszawa 1996.		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. 1. Taking part in lectures	15	
2. 2. Taking part in practical lessons	15	
3. 3. Preparing for practical lessons	15	
4. 4.Preparing for laboratory	25	
5. 5. Preparing for tests	15	
6. 6.Preparing for the exam and taking part in it	15	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	100	4
Contact hours	30	4
Practical activities	30	1