STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Discrete mathematics and mathematical basics of computer	**1010342611010347256**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mathematics	**general academic**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **15** Classes: **15** Laboratory: **-** Project/seminars: **-**	**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
other	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
the sciences	**4 100%**
Mathematical sciences	**4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of mathematical logic, abstract algebra and mathematical analysis
2	**Skills**	Array bill knows, knows how to develop a role in a number of the infinite, knows the concept of group
3	**Social competencies**	He sees the need to acquire new skills

Assumptions and objectives of the course:

The aim of the course is to familiarize students with the basic concepts and methods of discrete mathematics and its applications

Study outcomes and reference to the educational results for a field of study

Knowledge:

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]

Skills:

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]

Social competencies:

1. Able to critically assess their level of understanding of a given problem and the lack of elements of reasoning - [K_K01]

Assessment methods of study outcomes

One test (problematic issues, students can use their notes)
Written exam

Course description

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.

Additional bibliography:

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.

Result of average student's workload

Activity		Time (working hours)
Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	100	4
Contact hours	30	4
Practical activities	30	1