STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Discrete mathematics		**1010341721010342739**
Field of study: **Mathematics in Technology**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **1 / 2**
Elective path/specialty: **-**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **15** Classes: **15** Laboratory: **15** Project/seminars: **-**		No. of credits: **3**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)

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

Update 2017/2018.

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

Applied methods of education.
Lecture:
1. Interactive lecture with formulationquestions to a group of studentsor to specific students indicated.
2. Theory presented in connection with current knowledge students.
3. The activity of the students is taken into account during the classes when giving a final grade.

Practical lessons:
1. Solving example tasks on the board.
2. Detailed review of task solutions and discussions on comments.
3. Initiate discussion on solutions.

Laboratory:
1. Solving example tasks using computers.
2. Detailed review of task solutions and discussions on comments.
3. Initiate discussion on solutions.

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	90	3
Contact hours	45	2
Practical activities	45	1