POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Discrete mathematics [S1Bioinf1>MATD]

Course

Field of study	Year/Semester
Bioinformatics	1/1
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	0	0
Tutorials	Projects/seminars	
30	0	

Number of credit points

5,00

Coordinators

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Lecturers

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Prerequisites

The student starting this course should have basic knowledge and skills in the area of mathematics and computer science adequate to admission requirements. Moreover, the student should present such attitudes as: honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

The course provides students with basic knowledge in the field of discrete mathematics concerning mainly basics of logic and set theory, relations and functions, combinatorics, graph theory, theory of transversals, induction and recursion. It develops students" skills in applying concepts and methods of discrete mathematics for solving computer science and bioinformatics problems. Moreover, the course develops students" logical reasoning skills and ability to express their concepts and ideas in a clear and understandable way.

Course-related learning outcomes

Knowledge:
1. The student knows and understands issues in the field of discrete mathematics useful for formulating and solving simple bioinformatics problems.

Skills:
1. The student is able to obtain information from literature, databases and other properly selected sources, also in English.
2. The student is able to integrate and interpret the obtained information, as well as draw conclusions and formulate and justify his/her opinions.

Social competences:
1. The student is ready to learn throughout the whole life and improve his/her competences.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
In terms of lectures on the basis of a written exam in the form of a multiple-choice test.
In terms of tutorials on the basis of tests conducted during the semester and the current assessment of students" work.

Programme content

The lectures covers the following topics:
1. Fundamentals of logic.
2. Fundamentals of set theory.
3. Relations and functions.
4. Counting combinatorial objects.
5. Basic concepts of graph theory.
6. Induction.
7. Recursion.
8. Basic concepts of graph theory.
9. Properties of integers.
10. Advanced principles of counting.
11. Generating functions.
12. Latin squares.
13. Rook polynomials.
14. Labeled graphs.
As part of the tutorials students solve exercises related to the issues discussed in the lectures.

Teaching methods

Lecture: multimedia presentation supplemented with examples given on the blackboard.
Tutorials: solving exercises on the blackboard concerning the material presented in lectures, discussion with students on possible ways of solving the exercises.

Bibliography

Basic
1. V. Bryant, Aspekty kombinatoryki, WNT, Warszawa, 2007.
2. R. L. Graham, D. E. Knuth, O. Patashnik, Matematyka konkretna, PWN, Warszawa, 2012.

3. R. P. Grimaldi, Discrete and combinatorial mathematics. An applied introduction, Addison Wesley Publishing Company, New York, 1999.
4. K. A. Ross, Ch. R. B. Wright, Matematyka dyskretna, PWN, Warszawa, 2012.
Additional
1. G. Decewicz, W. Żakowski, Matematyka, t. I, WNT, Warszawa, 2005.
2. T. H. Cormen, Ch. E. Leiserson, R. L. Rivest, Wprowadzenie do algorytmow, PWN, Warszawa, 2012.
3. W. Lipski, Kombinatoryka dla programistow, WNT, Warszawa, 2007.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50