SYLLABUS FOR 2023/2024 ENROLMENT
FORM OF STUDY: FULL-TIME PROGRAMME

GENERAL INFORMATION

1. **Course** Mathematics

2. **Field of study** Computer Science

3. **Level of acquired education** first-cycle programme

4. **Number of ECTScredits 5**

5. **Number of hours per semester**

semester	lecture	classes	laboratory/foreign language course	project/practical classes	self-study	internship
II	30	30				

6. **Language of instruction: English**

7. **Lecturer** dr hab. Józef Waniurski, prof. ABNS, mgr Magda Konieczna

DETAILED INFORMATION

8. **Preliminary requirements**

1. Knowledge of mathematics within high school curriculum and the material discussed in semester 1 in mathematics for computer scientists

9. **Course objectives**

C1 Master the problems of linear algebra.

C2 Master the concepts of discrete mathematics useful in computer science.

10. **Field-specific learning outcomes in terms of knowledge, skills and socialcompetences**

A student who completed the course:	reference to field-specific learning outcomes
KNOWLEDGE	
EU01 Knows and understands selected issues of linear algebra and analytic geometry, useful for formulating and solving simple tasks related to the subject matter.	K_W01
EU02 Knows and understands methods, techniques and tools used in solving typical tasks related to the subject matter.	K_W01
SKILLS	
EU03 Is able to use studied methods to model and solve tasks	K_U04
EU04 Is able to interpret the results obtained and draw correct conclusions	K_U04
SOCIAL COMPETENCES	
EU05 Is ready for continuous learning - improving own competences.	K_K01

11. **Course content**

Course delivery method – lectures/classes/laboratories/practical classes

Lecture:
1) The method of mathematical induction
2) Complex numbers, definition, operations, properties.
3) Vectors in R3 space. Operations on vectors, scalar product, vector product, mixed product.
4) Line and plane in R3. Equations of a line, general, segmental, parametric form. Equations of a plane, general equation, segmental equation, parametric equation. Reciprocal positions of a line and a plane.

5) Strings of natural numbers, rate of increase, O notation.
6) Prime numbers, Euclid's algorithm, prime tests.
7) Diophantine equations, congruences, modular arithmetic.
8) Application of number theory in information coding.
9) Recursive definitions and relations, Linear identities. Fibonacci sequence, recursive definition and explicit formula. Principle of bijection, binary sequences.
10) Basic laws of counting, addition and multiplication. Counting of subsets and functions. Dirichlet's drawer principle. Classical probability.
11) Undirected graphs and directed graphs, matrix representation.
12) Euler and Hamilton graphs, Graph coloring theorems.

Classes:
1) Tasks for the application of mathematical induction.
2) Operations on complex numbers.
3) Tasks illustrating the properties of vectors in R3.
4) Equations of a plane and a line in R3.
5) Tasks to study the mutual position of the line and the plane.
6) Number sequences, growth rate, O notation.
7) Prime numbers. The sieve of Eratosthenes.
8) Euclid's algorithm for determining NWD.
9) Modular arithmetic, solving congruences.
10) Encoding of information.
11) Solving recursive relations.
12) Investigation of Fibonacci sequence properties.
13) Counting subsets and functions.
14) Investigating properties of graphs.

12. Teaching tools and methods
1. Lecture in the form of a presentation
2. Board, chalk, projector, computer
3.Explanation and a multimedia presentation

13. Assessment method(component, final)
1. Test
2. Activity during classes
3. Examination

14. Student workload	
Form of activity	Number of hours
1. Classes with direct participation of the teacher and office hours	70
2.Student workload	5
sum	75
number of ECTS credits	5

15. Reference books
Primary:
1) A. Kostrikin, Wstęp do algebry, PWN, Warszawa 2004 lub nowsza
2) T. Jurlewicz, Z. Skoczylas, Algebra liniowa, GIS, Wrocław 2002 lub nowsza
3) K. A. Ross, Ch. R. B. Wright, Matematyka dyskretna, PWN, Warszawa 1996 lub nowsze
Secondary:
1) R. L. Graham, D. E. Knuth, O. Patashnik, Matematyka konkretna, PWN, Warszawa 1996 lub

	nowsza
	2) T. Jurlewicz, Z. Skoczylas, Algebra liniowa, przykłady i zadania, GIS Wrocław 2002 lub nowsza

16. Assessment form - details

Conditions for obtaining course credit: classes ends with a written exam

Classes

Three written tests checking student's knowledge and skills

Duration 45 minutes

The condition to obtain a positive grade from each test is obtain at least 50% of points.

Scoring:

0 - 49% - insufficient (2,0)

50%-59% satisfactory (3.0)

60%-69% sufficient (3.5)

70% - 79% good (4.0)

80% - 89% very good (4.5)

90%-100% excellent (5.0)

Students will receive a graded credit if they receive at least a satisfactory grade from each test and show 85% attendance in class. The student may receive a higher mark if he/she actively participates in classes.

Written examination

Time 90 minutes

4-5 tasks to be solved

Marking as above

17. Other details concerning thecourse

1. Direct information about the issues of classes and a program content is provided by the teacher during classes and during office hours.

2. Classes will be held at AB in Biała Podlaska

3. Classes will be held in accordance with the current schedule

4. Office hours will be held in accordance with the applicable schedule