

**Course Syllabus****I. General Information**

Course name	Linear algebra
Programme	Informatics
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BA
Form of studies (full-time, part-time)	full-time,
Discipline	Informatics
Language of instruction	english

Course coordinator	Dr Grzegorz Dymek
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Type of class ( <i>use only the types mentioned below</i> )	Number of teaching hours	Semester	ECTS Points
lecture	15	I	5
tutorial			
classes			
laboratory classes	30	I	
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	1. Ability to do arithmetical calculations on real numbers. 2. Knowledge of basic formulas and functions.
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**II. Course Objectives**

1. Gaining knowledge of fundamental notions of linear algebra and mathematical methods used in it.
2. Gaining skills of formulate various problems in the language of linear algebra.
3. Preparing to further study of computer science.

**III. Course learning outcomes with reference to programme learning outcomes**

Symbol	Description of course learning outcome	Reference to programme learning outcome
<b>KNOWLEDGE</b>		
W_01	Student knows fundamental notions and theorems of linear algebra (for example, determinant, rank of a matrix, Cramer's formulas)	K_W02
W_02	Student knows typical problems which can be described and solved by methods of linear algebra	K_W02
W_03	Student knows basic examples illustrating listed notions	K_W02
<b>SKILLS</b>		
U_01	Student presents correct mathematical reasoning, formulate theorems and definitions	K_U21
U_02	Student has ability to find own methods of solving various problems (fundamentals of matrix calculus, determinants, systems of linear equations)	K_U21
<b>SOCIAL COMPETENCIES</b>		
K_01	Student is able to evaluate his/her knowledge from linear algebra	K_K01

**IV. Course Content**

<ol style="list-style-type: none"> <li>1. Complex numbers.</li> <li>2. Matrices and determinants.</li> <li>3. Systems of linear equations.</li> <li>4. Polynomials.</li> </ol>
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**V. Didactic methods used and forms of assessment of learning outcomes**

Symbol	Didactic methods <i>(choose from the list)</i>	Forms of assessment <i>(choose from the list)</i>	Documentation type <i>(choose from the list)</i>
<b>KNOWLEDGE</b>			
W_01	conventional lecture, discussion, practical classes	test, oral exam	evaluated test, protocol
W_02	conventional lecture, discussion, practical classes	test, oral exam	evaluated test, protocol
W_03	conventional lecture, discussion, practical classes	test, oral exam	evaluated test, protocol
<b>SKILLS</b>			
U_01	conventional lecture, discussion, practical classes	test, oral exam	evaluated test, protocol
U_02	conventional lecture, discussion, practical classes	test, oral exam	evaluated test, protocol
<b>SOCIAL COMPETENCIES</b>			
K_01	conventional lecture, discussion, practical classes	test, oral exam	evaluated test, protocol

## VI. Grading criteria, weighting factors.....

91% – 100% excellent (5.0)

81% – 90% very good (4.5)

71% – 80% good (4.0)

61% – 70% satisfactory (3.5)

50% – 60% sufficient (3.0)

less than 50% fail (2.0)

### Grade insufficient

(W) - student does not know fundamental notions discussed on classes;

(U) - student cannot solve basic problems from linear algebra;

(K) - student is unconscientious, does not participate in classes, does not do notes.

### Grade sufficient

(W) - student knows fundamental notions discussed on classes. He/She knows examples illustrating these notions;

(U) - student can solve basic problems from linear algebra. He/She can apply basic techniques of solving such problems;

(K) - student participates in classes, does notes.

### Grade good

(W) - student knows well fundamental notions discussed on classes. He/She has a knowledge of basic properties of these notions and their proofs. He/She knows how use these properties to solve basic problems;

(U) - student can solve basic problems from linear algebra. He/She can apply more advanced techniques of solving such problems. He/She can use basic properties of notions;

(K) - student is prepared to classes. He/She has a knowledge of basic properties of these notions and their proofs.

### Grade very good

(W) - student knows well fundamental notions discussed on classes. He/She has a knowledge of more advanced properties of these notions and their proofs. He/She knows how use these properties to solve more advanced problems. He/She knows more important techniques of proofs;

(U) - student can solve more advanced problems from linear algebra. He/She can apply more advanced techniques of solving such problems. He/She can use more advanced properties of notions. He/She can perform simple proofs;

(K) - student participates actively in classes, asks questions, proposes solutions.

**VII. Student workload**

Form of activity	Number of hours
Number of contact hours (with the teacher)	Lecture: 15 hrs. Classes: 30 hrs. Individual consultations: 30 hrs. In total: 75 hrs.
Number of hours of individual student work	Preparation for classes: 30 hrs. Studying books: 15 hrs. Preparation for tests and exams: 30 hrs In total: 75 hrs.

**VIII. Literature**

Basic literature
1. S. I Grossman, Elementary linear algebra, Saunders College Publishing, Philadelphia, 1991. 2. O. Bretscher, Linear algebra with applications, Prentice Hall, New Jersey, 1997.
Additional literature
1. W. Ledermann, Complex Numbers, Library of Mathematics, Routledge and Kegan Paul, London, 1962.