STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mathematics II**		Code **1010331111010341489**

Field of study **Control Engineering and Robotics**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**

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				No. of credits **6**
Lecture: **2**	Classes: **2**	Laboratory: **-**	Project/seminars: **-**	

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 **technical sciences**	ECTS distribution (number and %**)** **6 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Mathematical knowledge from the secondary school
2	**Skills**	Ability to solve problems and mathematical modeling at the level of secondary school
3	**Social competencies**	Awareness of the need to broaden their competence, willingness to work together as a team

Assumptions and objectives of the course:

1.   Learning algebraic structures and m etod classical and linear algebra.
2.   Learning the methods and applications of analytic geometry.

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

Knowledge:

1. has knowledge of complex numbers, operations with complex numbers, complex numbers form and their applications - [K_W01]

2. has knowledge of the roots of polynomials, also in the set of complex numbers - [K_W01]

3. account has knowledge of the matrix, operations on matrices, determinants of matrices, inverse matrix calculation, the use of matrix to solve systems of linear equations - [K_W01]

4. have knowledge of basic algebraic structures - monoidów, groups, rings and fields - [K_W01]

5. has knowledge of n-dimensional vector space, database space, database changes, eigenvalues of matrix - [K_W01]

6. has knowledge of the operations on vectors in three-dimensional space, the basic geometric creations - a line, planes, quadrics - [K_W01]

Skills:

1. Can operate on complex numbers, contain certain types of complex roots of polynomials - [K_U05]

2. It can perform operations with matrices, inverse matrix method set of elementary operations, calculate the determinant of a matrix, solve the system of linear equations using Gaussian method of elimination - [K_U05]

3. able to recognize the structure of algebraic structures can be used monoidu and groups to describe of semi-automatic and automatic, - [K_U05]

4. It can determine the dimension of space and linear subspace, is able to do to change the database space, can solve the matrix eigenvalue problem. - [K_U05]

5. It can perform operations on vectors in three-dimensional space and apply the methods of vector calculus to describe lines and planes. It can classify surfaces of the second degree (quadrics). - [K_U05]

Social competencies:
1. He can think and act strictly in the area of process description in technical sciences - [K_K04]

Assessment methods of study outcomes
Lecture ?   assess the knowledge and skills listed on the written exam of a problematic Classes: ?   knowledge test and rewarding than that for the accomplishment undue problems - solving ?   assessment of knowledge and skills - tests.

Course description
Relationships. Complex numbers and their applications, calculus matrix and its application in solving systems of linear equations, algebraic structures: monoidy, infinite and finite groups, rings, fields. Vector spaces of n-dimensional linear space, linear transformations, analytical geometry 3-dimensional space: plane, straight surfaces.

Basic bibliography:

1. A.Białynicki-Birula, Algebra, PWN Warszawa 1971 (i późniejsze),

2. A.Białynicki-Birula, Algebra liniowa z geometrią, PWN Warszawa 1976 (i późniejsze)

3. S. Przybyło, A. Szlachtowski, Algebra i wielowymiarowa geometria analityczna w zadaniach, WNT Warszawa 1992 (i późniejsze),

Additional bibliography:

1. M. Grzesiak, Liczby zespolone i algebra liniowa, Wydawnictwo PP, Poznań 1999,

2. G. Birkhoff, T.C. Bartee, Modern Applied Algebra, McGraw-Hill Book Company, New York 1970

Result of average student's workload	
Activity	**Time (working hours)**
1. Wykład	30
2. Ćwicznia	30
3. Egzamin i konsultacje	10
4. Przygotowanie do ćwiczeń	40
5. Przygotowanie do egzaminu/zalicznie wykładu	30

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	140	6
Contact hours	70	3
Practical activities	30	0