

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Mathematics II</b>		Code <b>1010331211010341489</b>
Field of study <b>Automatic Control and Robotics</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>30</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>6</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>6 100%</b>
<b>Responsible for subject / lecturer:</b> dr Jacek Gruszka email: jacek.gruszka@put.poznan.pl tel. 61 665 2320 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Mathematical knowledge from the secondary school
2	<b>Skills</b>	Ability to solve problems and mathematical modeling at the level of secondary school
3	<b>Social competencies</b>	Awareness of the need to broaden their competence, willingness to work together as a team
<b>Assumptions and objectives of the course:</b> 1. Learning algebraic structures and method classical and linear algebra. 2. Learning the methods and applications of analytic geometry.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 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 ]		
<b>Skills:</b> 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]		

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

<b>Assessment methods of study outcomes</b>
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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.

<b>Course description</b>
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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. Szlachetowski, 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. Barteel, Modern Applied Algebra, McGraw-Hill Book Company, New York 1970

<b>Result of average student's workload</b>
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Activity	Time (working hours)
1. Lecture	30
2. Classes	30
3. Exam and consultation	10
4. Preparing to classes	40
5. Preparing to exam	30

<b>Student's workload</b>
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Source of workload	hours	ECTS
Total workload	140	6
Contact hours	70	3
Practical activities	30	1