

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject (-)		Code 1010331111010348981
Field of study Automatic Control and Robotics	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: 30 Laboratory: - Project/seminars: -		No. of credits 6
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 Technical sciences		ECTS distribution (number and %) 6 100% 6 100%
Responsible for subject / lecturer: dr hab. inż. Paweł Kolwicz email: pawel.kolwicz@put.poznan.pl tel. 61 665 2802 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań		
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 method 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:		

<p>1. Can operate on complex numbers, contain certain types of complex roots of polynomials - [K_U05]</p> <p>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]</p> <p>3. able to recognize the structure of algebraic structures can be used monoidu and groups to describe of semi-automatic and automatic, - [K_U05]</p> <p>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]</p> <p>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]</p>
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 including the theoretic part of the subject		
Classes: ? knowledge test and rewarding than that for the accomplishment undue problems - solving ? assessment of knowledge and skills - tests. the activity during classes causes the upgrade of the classes evaluation		
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:		
<p>1. A. Białynicki-Birula, Algebra, PWN Warszawa 1971 (i późniejsze),</p> <p>2. A. Białynicki-Birula, Algebra liniowa z geometrią, PWN Warszawa 1976 (i późniejsze)</p> <p>3. S. Przybyło, A. Szlachetowski, Algebra i wielowymiarowa geometria analityczna w zadaniach, WNT Warszawa 1992 (i późniejsze),</p>		
Additional bibliography:		
<p>1. M. Grzesiak, Liczby zespolone i algebra liniowa, Wydawnictwo PP, Poznań 1999,</p> <p>2. G. Birkhoff, T.C. Barteel, Modern Applied Algebra, McGraw-Hill Book Company, New York 1970</p>		
Result of average student's workload		
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	
Student's workload		
Source of workload	hours	ECTS
Total workload	140	6
Contact hours	70	3
Practical activities	30	1