

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Linear algebra with analytic geometry		Code 1010341521010342811
Field of study Mathematics	Profile of study (general academic, practical) general academic	Year /Semester 1 / 2
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 Lecture: 2 Classes: 2 Laboratory: - Project/seminars: -		No. of credits 6
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art the sciences Mathematical sciences		ECTS distribution (number and %) 6 100% 6 100%
Responsible for subject / lecturer: Dr hab. inż. Paweł Kolwicz, prof. nadzw. email: pawel.kolwicz@put.poznan.pl tel. 61 665 2239 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge with range of secondary school and of linear algebra and analytic geometry (1 semester)
2	Skills	The skills of applying matrix calculus, solving systems of linear equations, using vector algebra in analytic geometry, applying basic notions of theory of linear spaces and linear operators.
3	Social competencies	He has consciousness of need of broadening his competences, readiness to undertaking of co-operation.
Assumptions and objectives of the course: The conquest the skill of analysis of determinateness square form (bilinear). The recognizing of basic notions for space with the inner product (in particular the notion of orthogonal basis). The recognizing the curves as well as surfaces of second degree. The getting to know of chosen elements of differential geometry of curves.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. explain notions of bilinear (quadratic) form, matrix of form, the notion of inner product, orthogonal basis, curve (surface) of second degree, the osculating circle - [K_W04+++, K_W05+++] 2. understand ideas and proofs of more important theorems - [K_W02+++, K_W04++]		
Skills: 1. find matrices of quadratic (bilinear) forms in chosen basis, study determinateness of quadratic forms, calculate inner product and norm in the respective space - [K_U16+, K_U36+] 2. applying theorems concerning determining curves and surfaces of second degree, finding the equation of osculating circle - [K_U16+]		
Social competencies: 1. can think and behave in good mathematical manner in the area of linear algebra analytical geometry - [K_K01+, K_K02++, K_K06+, K_K07++]		
Assessment methods of study outcomes		

<p>The lecture: -written exam concerning mainly the theoretic part of the subject. Classes : evaluation of written tests and the direct activity during the classes (solving problems and preparing of reports) -continuous evaluation during each meeting - taking into account the activity in discussion and in cooperation concerning practical exercises. Getting extra points related with activity, in particular: -presenting reports concerning applications of theory in different branches or putting the theory in history of mathematics -notes concerning the improvement of basic materials; -active participation in consultations.</p>		
Course description		
Bilinear and quadratic forms. Spaces with inner product. Algebraic curves and surfaces of second degree. Differential geometry of curves.		
Basic bibliography:		
<ol style="list-style-type: none"> 1. A. I. Kostrykin, Wstęp do algebry, cz.1 Podstawy algebry, PWN, Warszawa 2004. 2. A. I. Kostrykin, Wstęp do algebry, cz.2 Algebra liniowa, PWN, Warszawa 2004. 3. A. I. Kostrykin, Zbiór zadań z algebry, PWN, Warszawa 2005. 4. M. Grzesiak, Liczby zespolone i algebra liniowa, Poznań 1999. 5. T. Jurliewicz, Z. Skoczylas, Algebra liniowa 1, Wrocław 2003. 6. T. Jurliewicz, Z. Skoczylas, Algebra liniowa 2, Wrocław 2005. 7. F. Leja, Geometria analityczna, PWN, Warszawa 1954. 		
Additional bibliography:		
1. H. Arodź, K. Rościszowski, Algebra i geometria analityczna w zadaniach, Wydawnictwo Znak, Kraków 2005		
Result of average student's workload		
Activity	Time (working hours)	
1. Active participation in meetings (lectures and classes)	60	
2. Active participation in consultations with posing questions	15	
3. Solving exercises designed for independent work	40	
4. Independent studying theoretical questions (notions, algorithms, theorems, proofs)	35	
Student's workload		
Source of workload	hours	ECTS
Total workload	150	6
Contact hours	75	3
Practical activities	75	3