STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Linear algebra with analytic geometry	**1010341511010342811**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mathematics	**general academic**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **2** Classes: **2** Laboratory: **-** Project/seminars: **-**	**9**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
other	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
the sciences	**9 100%**
Mathematical sciences	**9 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge with range of secondary school
2	**Skills**	The skill of efficient executing of algebraical operations, acquaintance of number sets as well as fundamental operations.
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 getting to know of matrix analysis and applying it to solving systems of linear equations. The capture of bases of theory of linear spaces and linear operators, purchase skills of solving the eigenvalue problem. The using of algebra vector calculus to analysis of straight line and the plane in space. The capture of bases of complex number calculus.

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

Knowledge:

1. explain basic notions of matrix calculus, theory of linear spaces and linear operators, understand proofs (or their ideas) of more important theorems, explain operations on complex numbers - [K_W01+, K_W02++, K_W04+++, K_W05++]

2. explain basic notions of vector algebra, distinguish equations of straight line and plane in the space - [K_W04+++, K_W05++]

Skills:

1. calculate determinants and rank of matrix, apply matrix calculus to solving systems of linear equations, distinguish linear subspaces, solve of eigenvalue problem of linear operator - [K_U01++ K_U16+++ K_U17+ K_U18+++ K_U19+++ K_U20+]

2. determine of the straight line equation and plane equation in the space by applying vector algebra, use basic calculus of complex numbers - [K_U01++, K_U36++]

Social competencies:

1. can think and behave in good mathematical manner in the area of linear algebra analitical geometry - [K_K01+, K_K02++, K_K06+, K_K07++]

Assessment methods of study outcomes

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 partucular:

-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.

Course description

Scalar fields (complex numbers. Linear spaces, basis, dimension. Linear operators, eigenvalues and eigenvectors of linear operators. Matrix, determinants, systems of linear equations. Vector algebra (scalar and vector product), straight line and plane in the space.

Basic bibliography:

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. Jurlewicz, Z. Skoczylas, Algebra liniowa 1, Wrocław 2003.
6. T. Jurlewicz, Z. Skoczylas, Algebra liniowa 2, Wrocław 2005.

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	50
3. Solving exercises designed for independent work	50
4. Independent studying theoretical questions (notions, algorithms, theorems, proofs)	40

Student's workload

Source of workload	hours	ECTS
Total workload	200	9
Contact hours	110	5
Practical activities	90	4