STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Selected problems of mathematies**		Code **1010332511010347153**
Field of study **Information Engineering**	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: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	

No. of hours				No. of credits
Lecture: **15**	Classes: **15**	Laboratory: **-**	Project/seminars: **-**	**3**

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 **the sciences** **Mathematical sciences**	ECTS distribution (number and %**)** **3 100%** **3 100%**

Responsible for subject / lecturer: dr hab. inż. Katarzyna Filipiak email: katarzyna.filipiak@put.poznan.pl tel. 61 665 23 49 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań	Responsible for subject / lecturer: dr hab. inż. Katarzyna Filipiak email: katarzyna.filipiak@put.poznan.pl tel. 61 665 23 49 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic course in algebra and matrix algebra
2	**Skills**	Skills to logical thinking, using method of calculus
3	**Social competencies**	Understanding of the own knowledge limits and motivation for further education, an ability to work in a team

Assumptions and objectives of the course:

The aim of this course is to give the opportunity to learn and discuss basic problems of algebra and matrix algebra with a special emphasize on numerical aspects. Presented material should give the opportunity to solve selected practical problems.

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

Knowledge:

1. The student has knowledge about basic algebraic theorems useful in practical problems - [K_W01]

2. The student is able to write algorithms for solving algebraic problems - [K_W05]

Skills:

1. The student can apply basic algebraic theorems in practice - [K_U01]

2. The student can apply some solving procedures - [K_U05]

Social competencies:

1. Understanding of the own knowledge limits and motivation for further education - [K_K01]

Assessment methods of study outcomes

- Practical course (exercises) test

- Small project (presentation) based on the lecture material

Course description

1. Error analysis and floating-points

2. Space of polynomials (polynomial roots, Newton's interpolation, Hermite's interpolation)

3. Linear spaces and linear transformations (vector space, vectors independence, basis and dimension, linear mapping, kernel, image)

3. Vector and matrix norms

4. Systems of linear equations (orthogonalization, QR decomposition, SVD decomposition, LU decomposition)

5. Nonlinear equations and systems of nonlinear equations

6. Matrix functions (exponent, logarithm, trigonometric functions)

Applied methods of education:

- lectures - lecture with multimedia presentation supplemented by examples given on the blackboard

- practical course (exercises) - solving examples on the blackboard, careful reviewing solutions by the lecturer with discussions

Update: 2017

Basic bibliography:

1. Maćkiewicz, A. (2002). Algorytmy Algebry Liniowej. Wydawnictwo PP.

Additional bibliography:

1. Meyer, C.D. (2000). Matrix Analysis and Applied Linear Algebra. SIAM.

2. Hogben, L. (Ed.) (2007). Handbook of Linear Algebra. Chapman & Hall.

3. Higham, N.J. (2008). Functions of Matrices: Theory and Computation. SIAM.

Result of average student's workload

Activity	Time (working hours)
1. Lectures attendance	15
2. Practical course (exercises) attendance	15
3. Consulting	2
4. Preparing to classes	2
5. Practicing to the final tests (2 x 3h)	6

Student's workload

Source of workload	hours	ECTS
Total workload	40	3
Contact hours	32	2
Practical activities	8	1