



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematics [S1IZarz1>MAT1]

### Course

Field of study

Engineering Management

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

dr Grzegorz Grzegorzczuk

grzegorz.grzegorzczuk@put.poznan.pl

### Lecturers

dr Grzegorz Grzegorzczuk

grzegorz.grzegorzczuk@put.poznan.pl

dr Adam Marlewski

adam.marlewski@put.poznan.pl

mgr inż. Robert Salamon

robert.salamon@put.poznan.pl

### Prerequisites

The basic knowledge obtained in high school. The ability to think logically. The ability to mathematical description of simple problems. The ability to work in groups.

### Course objective

The acquisition and consolidation of examples of basic mathematical concepts and acquire the ability to use the mathematical apparatus

### Course-related learning outcomes

Knowledge:

1.The student defines matrices and determinants [P6S\_WG\_08].

2.The student describes systems of linear equations and lists methods for solving them [P6S\_WG\_08].

3. The student characterizes the concepts of vectors, scalar and vector products [P6S\_WG\_08].
4. The student names elements of a plane and line in space [P6S\_WG\_08].
5. The student explains the graphs of elementary and rational functions [P6S\_WG\_08].
6. The student recognizes the limits of functions [P6S\_WG\_08].
7. The student identifies inverse functions [P6S\_WG\_08].
8. The student classifies research methodologies in the context of management sciences [P6S\_WG\_11].

#### Skills:

1. The student plans and conducts experiments, including measurements and computer simulations [P6S\_UW\_09].
2. The student interprets the results of experiments and calculates their significance [P6S\_UW\_09].
3. The student formulates engineering tasks and solves them using analytical, simulation, and experimental methods [P6S\_UW\_10].
4. The student identifies and solves simple design tasks related to the construction and operation of machines [P6S\_UW\_14].
5. The student applies problem-solving methods in the field of construction and operation of machines [P6S\_UW\_15].

#### Social competences:

1. The student prepares and implements business ventures related to mathematics and engineering [P6S\_KO\_03].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Knowledge acquired during the lecture is verified during one test on the last lecture. The final grade consists of a test grade (80%) and a grade for activity during classes (20%). Passing threshold: 50% of the points.

Tutorials: The knowledge acquired during the tutorials is verified during one test at the end of the semester. During the classes, students receive points for activity, 80% of the final grade is the result of the test, and 20% of points for activity. Passing threshold: 50% of the points.

### Programme content

Elements of linear algebra.

Functions of one variable:

Differential calculus of one-variable functions.

Tutorials: practical tasks.

### Course topics

Elements of linear algebra:

- matrices and determinants,
- systems of linear equations,
- vectors, scalar and vector product,
- surface and straight line in space.

Functions of one variable:

- graphs of elementary and rational functions,
- function limits,
- inverse functions.

Differential calculus of one-variable functions.

Tutorials: practical tasks.

### Teaching methods

Lecture: oral presentation with examples and formulas, which are presented using a visualizer.

Tutorials: presentation of exemplary tasks on the blackboard and individual solving of similar examples by students - practical exercises.

### Bibliography

Basic:

Foltyńska, Z. Ratajczak, Z. Szafrński, Matematyka dla studentów uczelni technicznych, cz. I, Wydawnictwo Politechniki Poznańskiej, Poznań, 2000

Additional:

W. Krywicki, L. Włodarski, Analiza matematyczna w zadaniach, PWN, Warszawa, 1999

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00