



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematics [N1Mech1>MAT1]

### Course

Field of study  
Mechatronics

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  
part-time

Requirements  
compulsory

### Number of hours

Lecture  
30

Laboratory classes  
0

Other (e.g. online)  
0

Tutorials  
30

Projects/seminars  
0

### Number of credit points

8,00

### Coordinators

### Lecturers

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### Prerequisites

Basic knowledge of mathematics (high school level). Logical thinking, learning with understanding.

### Course objective

The aim is: - to acquaint with concepts of linear algebra and differential calculus of one variable functions; - to teach how to use those concepts, to make proper transformations and to use appropriate mathematical methods and tools to solve typical engineering tasks.

### Course-related learning outcomes

none

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written exam to check theoretical knowledge and the ability of its practical use. Exam is passed if student gains 50% of all points.

Tutorials: 2 written tests during the semester and activity during tutorials. Students have an opportunity to gain additional points (10% from the total) for their activity (e.g. giving correct answers to teacher's or colleagues' questions).

Range of grades:

60% - 3,0

68% - 3,5

76% - 4,0

84% - 4,5

92% - 5,0

## Programme content

### LECTURES AND TUTORIALS

COMPLEX NUMBERS - trigonometric, algebraic and polar form, operations, Euler's Formula, polynomials.

MATRICES AND DETERMINANTS - operations, properties, determinants ( expansion by minors), methods for solving systems of linear equations ( Cramer's Rule, Gaussian elimination method).

VECTORS IN THREE DIMENSIONS - operations - their properties and applications.

SINGLE VARIABLE FUNCTIONS - sequences (monotonocity and limit, Euler's number), limit and continuity of functions, differential calculus ( evaluation of derivative, differential and its applications, Mean Value Theorems with applications - monotonicity, maxima, minima, concavity, convexity and the points of inflection, L'Hopital's Rule).

## Course topics

none

## Teaching methods

1. Interactive lecture with questions to the group of students which is supported by solving examples on board.
2. Classes during which students solve tasks on board. Teacher's detailed assessment of students' solutions followed by discussion and comments.

## Bibliography

Basic

1. G. Decewicz, W. Żakowski, Matematyka t. I. WNT, Warszawa 2003.
2. F. Leja, Rachunek różniczkowy i całkowy. PWN, Warszawa 2008.
3. I. Fołtyńska, Z. Ratajczak, Z. Szafranski, Matematyka cz. I i II, Wydawnictwo Politechniki Poznańskiej, Poznań 2001.

Additional

1. M. Gewert, Z. Skoczylas, Analiza matematyczna 1, Oficyna Wydawnicza GiS, Wrocław 2012.
2. H. Jurlewicz, Z. Skoczylas, Algebra liniowa 1, Oficyna Wydawnicza GiS, Wrocław 2006.
3. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, t. I, PWN, Warszawa 2006.
4. W. Stankiewicz, Zadania z matematyki dla wyższych uczelni technicznych, PWN, Warszawa 2003.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	0	0,00
Classes requiring direct contact with the teacher	0	0,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	0	0,00