COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematics [N1ZiIP1>MAT1]

Course

Field of study
Management and Production Engineering

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
26

Laboratory classes
0

Other (e.g. online)
0

Tutorials
24

Projects/seminars
0

Number of credit points

7,00

Coordinators

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Lecturers

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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:
Has knowledge of selected problems of higher mathematics.
Knows the application of higher mathematics to solve technical problems.

Skills:

Can use the basic knowledge of higher mathematics as a tool in management.
Can use mathematical apparatus in studies.

Social competences:
Understands and uses a formalized mathematical apparatus in management.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lectures: knowledge is verifited on the basis of written exam. The exam consists of 10 shorts tasks and 2 calculation tasks.
Passing threshold: 50%
Tutorials: knowledge is verified on the basis of 4, 30-minutes test. Passing threshold: 50%

Programme content

COMPLEX NUMBERS. NUMERICAL SEQUENCES. DIFFERENTIAL CALCULUS OF ONE VARIABLE FUNCTION. MATRIX ALGEBRA. DIFFERENTIAL CALCULUS OF MULTIPLE VARIABLES FUNCTIONS.

Course topics

LECTURE:
COMPLEX NUMBERS: Gaussian form, trigonometric form, Euler form, exponentiation and square root, polynomials.
NUMERICAL SEQUENCES: limitation, monotonicity, sequences boundaries, definition of the number e and its application.
DIFFERENTIAL CALCULUS OF ONE VARIABLE FUNCTION: derivative of function, extrema of differentiable function, monotonicity intervals, second derivative - convexity, concavity, inflection points, derivatives of higher orders, de L"Hospital rule.
MATRIX ALGEBRA: operations on matrices, concept of inverse matrix - calculation, matrix determinant - properties and methods of determination, systems of linear equations, Kronecker-Capell theorem, solving systems of linear equations by Gauss elimination method.
DIFFERENTIAL CALCULUS OF MULTIPLE VARIABLES FUNCTIONS: partial derivative, extremum of functions of two variables.
EXERCISES:
COMPLEX NUMBERS: Gaussian form, trigonometric form, Euler form, exponentiation and square root, polynomials.
NUMERIC SEQUENCES: monotonicity, string boundaries.
DIFFERENTIAL CALCULUS OF FUNCTIONS OF ONE VARIABLE: derivative of a function, extrema of a differentiable function, monotonicity intervals, second derivative - convexity, concavity, inflection points, derivatives of higher orders, de L"Hospital rule.
MATRIX ALGEBRA: operations on matrices, calculating the determinant of a matrix, searching for an inverse matrix, solving systems of linear equations using the Gaussian elimination method.
DIFFERENTIAL CALCULUS OF MULTIPLE VARIABLES FUNCTIONS: partial derivative, extremum of functions of two variables.

Teaching methods

Lecture: oral presentation with examples and formulas, which are presented using a visualizer.
Tutorials: presentation of sample tasks on the board followed by independent solving of similar examples by students.

Bibliography

Basic
1. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, T. 1-2, PWN, Warszawa 2011.
2. I. Foltyńska, Z. Ratajczak, Z. Szafrański, Matematyka dla studentów uczelni technicznych, T. 1-3, Wydawnictwo Politechniki Poznańskiej, Poznań 2004.
3. M. Gewert, Z. Skoczylas, Analiza matematyczna 1/Definicje, twierdzenia, wzory/ Oficyna Wydawnicza GiS, Wrocław 2011.

4. M. Gewert, Z. Skoczylas, Analiza matematyczna 1/Przykłady i zadania/ Oficyna Wydawnicza GiS, Wrocław 2011.
5. F. Leja, Rachunek różniczkowy i całkowy, PWN, Warszawa 2008.
6. G. M. Fichtenholz, Rachunek różniczkowy i całkowy, PWN, Warszawa, 1986.
7. H. Jurlewicz, Z. Skoczylas, Algebra liniowa 1, Oficyna Wydawnicza GiS, Wrocław 2006.
Additional
1. W. Żakowski, Matematyka, T. 1-2, WNT, Warszawa 2003.
2. W. Stankiewicz, J. Wojtowicz, Zadania z matematyki dla wyższych uczelni technicznych, T. 1-2, PWN, Warszawa 2003.
3. M. Lassek, Matematyka dla studentów technicznych, T. 1-2, Wydawnictwo Wspierania procesu edukacji, Warszawa 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	175	7,00
Classes requiring direct contact with the teacher	50	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	125	5,00