



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematics [S1TOZ1>MAT2]

### Course

Field of study

Circular System Technologies

Year/Semester

1/2

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

0

Tutorials

30

Projects/seminars

0

### Number of credit points

6,00

### Coordinators

dr Wiesława Nowakowska

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### Lecturers

### Prerequisites

Student should have basic knowledge on the high school level.

### Course objective

The aim of the subject is presentation of a basic knowledge of calculus, linear algebra, ordinary differential equations and selected topics in vector analysis and approximation theory. The scope of material is closely connected with other specialized courses and is going to allow student to comprehend analysed problems.

### Course-related learning outcomes

Knowledge:

1. has general knowledge concerning basic ideas, rules and mathematical theories - k\_w02.
2. general knowledge concerning higher maths techniques necessary to describe simple problems appearing in scientific and engineering problems - k\_w02.

Skills:

1. ability to analyse problem as well as to find their solutions based on known theorems and methods - k\_u13.

Social competences:

1. being conscious of self-learning need for whole life - k\_k01.
2. being conscious of developing both, professional and personal competences - k\_k01.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

Written exam from lecture part. Written tests within the term.

### Programme content

The subject program includes the following topics:

1. Calculus:
  - multivariable functions
  - differential calculus of functions of many variables
  - curvilinear systems of coordinates
  - differential operators
  - double integrals
  - triple integrals
2. Topics in approximation theory:
3. Ordinary differential equations:

### Course topics

The subject program includes the following topics:

1. Calculus:
  - multivariable functions, second degree surfaces and their equations,
  - differential calculus of functions of many variables: partial derivatives and extreme points of two variable functions,
  - double integrals (cartesian and polar system of coordinates),
2. Ordinary differential equations:
  - an idea of ODE"s and their applications in modelling of physical and chemical processes,
  - chosen methods for solving the first and second order ODE"s,

### Teaching methods

Lecture: traditional form given on the blackboard with discussion.

Lab classes: solving problems and exercises.

### Bibliography

Basic

1. M. Lassak, Matematyka dla studiów technicznych, Wyd. Supremum, Warszawa 2014
2. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach cz. 1 i 2, PWN, Warszawa 2005
3. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne, GiS, Wrocław 2016
4. M. Gewert, Z. Skoczylas, Analiza matematyczna 1, GiS, Wrocław 2020
5. M. Gewert, Z. Skoczylas, Algebra i geometria analityczna, GiS, Wrocław 2020

Additional

1. E. Majchrzak, B. Mochnacki, Metody numeryczne, Wyd. Politechniki Śląskiej, Gliwice 2004
2. M. Gewert, Z. Skoczylas, Elementy analizy wektorowej, GiS, Wrocław 2004
3. E. Kasperska, A. Kasperski, B. Piątek, Przewodnik do ćwiczeń z algebry z elementami logiki matematycznej i teorii mnogości, Wyd. Politechniki Śląskiej, Gliwice 2016

### Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,00
Classes requiring direct contact with the teacher	75	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	3,00