



COURSE DESCRIPTION CARD - SYLLABUS

Course name

MATHEMATICS

Course

Field of study

MECHANICAL ENGINEERING

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

32

Projects/seminars

Number of credit points

8

Lecturers

Responsible for the course/lecturer:

Andrzej Drozdowicz, Ph.D.

Responsible for the course/lecturer:

Institute of Mathematics

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Prerequisites

1. Student has knowledge of mathematics in the field covered by teaching in the first course with the basics of high school.
2. Student has the ability to think logically, associate facts, analyze problems and apply the right conclusions.
3. Students seriously treat the process of studying.

Course objective

Getting comprehensive skills in the use of advanced mathematical apparatus and classical calculation methods in practical applications, with emphasis on the close relationship between mathematics and



various branches of technical sciences, and showing its wide range of applications, also by mechanical engineers.

Course-related learning outcomes

Knowledge

After completing the first degree studies, the graduate has expanded and in-depth knowledge of various branches of higher mathematics and detailed knowledge on the application of mathematical methods and tools in engineering and mechanical sciences - K_W2.

Skills

After completing the first degree studies, the graduate:

- can use knowledge of higher mathematics; can build and analyse simple mathematical models; can use mathematical tools and methods, including numerical ones, to solve engineering problems - K_U13,
- is able to plan and implement self-education independently in order to raise and update their competences - K_U24.

Social competences

After completing the first degree studies, the graduate:

- is aware of the deepening and expansion of knowledge to solve newly created technical problems - K_K1.
- understands and appreciates the importance of intellectual honesty in own and other people's actions; is ready to demonstrate reliability, impartiality, professionalism and an ethical attitude - K_K1.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written exam during session,

Tutorials: long test + short tests (10 minutes).

Programme content

1. The definite integral. Interpretation of definition and calculus methods. Applications of the definite integral. Improper integrals.
2. Ordinary differential equations of first and second order. Solving methods and applications.
3. Differential calculus of functions of many variables. Partial derivatives, extrema of functions of two variables, total differential and applications.
4. Integral calculus of functions of many variables. Double integral over a rectangle and a normal area. Double integral in polar coordinates. Triple integral. Applications of double and triple integrals.

Teaching methods



Lecture: multimedial presentation + blackboard,

Tutorials: solving of problems; discussion about obtained results.

Bibliography

Basic

1. I.Foltyńska, Z.Ratajczak, Z.Szafrański, Matematyka dla studentów uczelni technicznych, Wydawnictwo PP, t.2 i 3, Poznań 2000
2. W.Krysicki, L.Włodarski, Analiza matematyczna w zadaniach, t.2, PWN 1994
3. W.Stankiewicz, Zadania z matematyki dla wyższych uczelni technicznych, t.2, PWN 1995

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	122	8,0
Classes requiring direct contact with the teacher	72	4,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	50	4,0

¹ delete or add other activities as appropriate