COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematics [N1IZarz1>MAT2]

Course

Field of study
Engineering Management

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
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
0

Other (e.g. online)
0

Tutorials
10

Projects/seminars
0

Number of credit points

5,00

Coordinators

dr inż. Mariola Skorupka
mariola.skorupka@put.poznan.pl

Lecturers

dr inż. Mariola Skorupka
mariola.skorupka@put.poznan.pl

Prerequisites

The student should have knowledge of sequences, matrix calculus and its application, differential calculus of functions of one and many variables.

Course objective

Acquainting with problems of integral calculus of functions of one and many variables and ordinary differential equations. Developing students' skills to solve simple mathematical problems by using different types of equations.

Course-related learning outcomes

Knowledge:
The student names and describes methods and tools for data collection, processing, selection, and distribution of information [P6S_WG_08].
The student names and describes methods and tools of descriptive statistics and their application to modeling processes and phenomena occurring in organizations [P6S_WG_09].
The student names and describes research methodology and methods and tools for modeling processes occurring between market participants [P6S_WG_10].

The student names and describes basic methods, techniques, tools, and materials used in solving simple engineering tasks in mechanical engineering [P6S_WG_16].

Skills:
The student conducts experiments, including measurements and computer simulations, interprets the results, and draws conclusions [P6S_UW_09].
The student uses analytical, simulation, and experimental methods to formulate and solve engineering tasks [P6S_UW_10].
The student identifies design tasks and solves simple design tasks in mechanical engineering [P6S_UW_14].
The student applies typical methods for solving simple problems in engineering activities [P6S_UW_15].

Social competences:
The student prepares and implements business ventures based on conducted calculations [P6S_KO_03].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

1. Lecture: Knowledge acquired as part of the lecture is verified by a 60-minute exam conducted in the exam session. Passing threshold: 50% of exam points and student activity during classes. Lecture for the grade. Exam issues, on the basis of which questions are developed. They will be sent via e-mail using the university e-mail system.
2. Knowledge acquired during the exercises is verified by two tests carried out during 7 and 14 classes and activity during classes. Each test consists of the same number of points. Passing threshold: 50% of points the sum of points obtained from tests and activity during classes.

Programme content

Lecture:
INTEGRAL CALCULUS OF ONE VARIABLE FUNCTION: indefinite integral - basic methods of integration.
DEFINITE INTEGRAL: Riemann integral and its application and improper integrals.
MULTI-DIMENSIONAL INTEGRAL: calculating, exchanging the order of integration of variables double integral for polar coordinates, the use of double integral in Cartesian and polar coordinates.
ORDINARY DIFFERENTIAL EQUATIONS: definition of ordinary differential equation, general and special solution, with separated variables, 1st order linear differential equation.
Exercises:
INTEGRAL CALCULUS OF ONE VARIABLE FUNCTION: indefinite integral - basic methods of integration and integration of functions: faithful, irrational and trigonometric.
DEFINITE INTEGRAL: Riemann integral and its application and improper integrals.
MULTI-DIMENSIONAL INTEGRAL: exchanging the order of integration of variables double integral for polar coordinates, the use of double integral in Cartesian and polar coordinates.
ORDINARY DIFFERENTIAL EQUATIONS: differential equation with separated variables, 1st order linear differential equation.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board. Conducted in an interactive way with the formulation of questions to a group of students. Initiating discussions during the lecture.
2. Exercises: solving tasks given by the teacher on the board along with analyzing the next stages. The method of solving the task by students on the board is reviewed by the tutor. Completed with tasks for independent solution at home.

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 2/Definicje, twierdzenia, wzory/ Oficyna Wydawnicza GiS, Wrocław 2011.

4. M. Gewert, Z. Skoczylas, Analiza matematyczna 2/Przykłady i zadania/ Oficyna Wydawnicza GiS, Wrocław 2011.

Additional:
1. W. Stankiewicz, J. Wojtowicz, Zadania z matematyki dla wyższych uczelni technicznych, T. 1-2, PWN, Warszawa 2003.
2. 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	125	5,00
Classes requiring direct contact with the teacher	25	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	100	4,00