



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematics

Course

Field of study

Safety Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

Ph.D., D.Sc., Małgorzata Migda

Responsible for the course/lecturer:

Mail to: malgorzata.migda@put.poznan.pl

Faculty of Automatic Control, Robotics and
Electrical Engineering

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Prerequisites

Basics of mathematics - secondary school level. Logical and scientific thinking, efficient calculating.

Course objective

The subject is aimed at introducing basic terms from the area of mathematics such as linear algebra and differential calculus; giving skills and competences for solving fundamental mathematic topics and for using mathematics in management.

Course-related learning outcomes

Knowledge

Student knows the issues of mathematics and statistics in the field of solving practical engineering problems [P6S_WG_04]



Skills

Student is able to properly select the sources and information derived from them, making an assessment, critical analysis and synthesis of this information [P6S_UW_01]

Student is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks, also with the use of information and communication methods and tools [P6S_UW_04]

Social competences

Student is aware of the recognition of the importance of knowledge in solving problems in the field of safety engineering and continuous improvement [P6S_KK_02]

Student is aware of the responsibility for their own work and readiness to submit to the rules of working in a team and bearing responsibility for jointly performed tasks [P6S_KR_02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: a written test on the last lecture.

Classes: evaluation of two written tests (on 7th and 14th weeks), two quizzes and the direct activity during the classes.

Programme content

Elements of linear algebra: matrices, inverse matrix, row of matrix, systems of linear equations, (Cramer Theorem, method of Gaussian Elimination, Kronecker-Capelli Theorem). Applications of matrices in economics.

Elementary functions (formulas, graphs, properties). Sequences, monotonic sequences, the limit of a sequence, the arithmetic of limits. Continuity, limits of functions, asymptote. Derivative and its geometric interpretation, monotonicity intervals, extrema, L'Hospital's rule; application of the derivative in economics. Indefinite integral, methods of integration. Definite integral and its application.

Teaching methods

Lecture: a written test on the last lecture.

Classes: evaluation of two written tests (on 7th and 14th weeks), two quizzes and the direct activity during the classes.- lecture with multimedia presentation accompanied with examples presented on the blackboard, theory presented with connections of current knowledge from previous lectures and with questions to the group of students;

- classes: solving problems on the board, initiating discussion about the solutions.

Bibliography



Basic

1. I. Fołtyńska, Z. Ratajczak, Z. Szafranski, Matematyka dla studentów uczelni technicznych, cz. I -II, Wydawnictwo Politechniki Poznańskiej.

2. Podręczniki z serii Matematyka dla studentów politechnik, Oficyna Wyd. GiS:

- M. Gewert, Z. Skoczylas: Analiza matematyczna 1, Analiza matematyczna 2, Definicja, twierdzenia, wzory.

- M. Gewert, Z. Skoczylas, Analiza matematyczna 1, Przykłady i zadania.

- T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1, Definicja, twierdzenia, wzory.

- T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1, Przykłady i zadania.

3. J. Banaś, Podstawy matematyki dla ekonomistów, WNT 2005.

Additional

W. Krywicki, L. Włodarski, Analiza matematyczna w zadaniach, cz. I, Wydawnictwo Naukowe PWN.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for classes, preparation for tests, preparation for quizzes ¹)	65	2,5

¹ delete or add other activities as appropriate