

SYLLABUS

Name: Mathematics for Engineers

Name in Polish: Matematyka dla inżynierów

Name in English: Mathematics for Engineers

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Bachelor's degree, Full-time
Term:	summer semester 2022/2023
Coordinator of course edition:	dr hab. inż. Edyta Hetmaniok, prof. PŚ

Default type of course examination report:

EGZ

Language:

English

Course homepage:

<https://platforma.polsl.pl/rms/course/view.php?id=52>

ECTS

7

Short description:

Introduction to mathematics for engineering. The aim of the course is to familiarize students with the basic issues of differential and integral calculus of a single-variable and double-variable function and its applications, ordinary differential equations, linear algebra, elements of combinatorics and probabilistic calculus.

Description:

Detailed programme's content:

Lecture:

Elements of analytic geometry, Indefinite integral of 1-variable function, Indefinite and definite integral of 1-variable function, Applications of integral, Ordinary differential equations of the 1st order, Ordinary differential equations of the 2nd order, Systems of the ordinary differential equations, Differential calculus of 2-variable function, Double integral, Elements of combinatorics, Elements of probabilistic calculus, Difference equations, Elements of optimization.

Exercises:

Practical realization of the issues, presented during the lectures, on the way of discussing and solving the tasks illustrating the undertaken problems.

Number of hours allocated for contact hours:

Lecture: 30h

Exercises: 60h

Student workload hours:

Preparation for classes (realization of homeworks): 60h

Preparation for tests (theoretical and practical): 60h

Total number of hours: 210

Number of ECTS credits: 7

including number of ECTS credits allocated for contact hours: 3

Bibliography:

- (1) E. Łobos, B. Sikora, A first course in calculus. Wydawnictwo Politechniki Śląskiej, Gliwice, 2007.
- (2) E. Łobos, B. Sikora, Advanced calculus. Selected topics, Wydawnictwo Pol. Śl. Gliwice 2006.
- (3) E. Łobos, B. Sikora, Calculus and differential equations in exercises. Wydawnictwo Politechniki Śląskiej, Gliwice, 2012, wydanie III poprawione.
- (4) H. Anton, C. Rorres, A.Kaul, Elementary linear algebra, Applications, Wiley, 2019.
- (5) S. Roman, An Introduction to Discrete Mathematics, CBS College Publishing, Philadelphia, 1986.
- (6) Sheldon M. Ross, Introduction to probability and statistics for engineers and scientists, Elsevier Inc., University of California, Berkeley, 2014.
- (7) R. Grzymkowski, Matematyka dla studentów wyższych uczelni technicznych. Wydawnictwo Pracowni Komputerowej Jacka Skalmierskiego, Gliwice, 2000, wydanie II poprawione.
- (8) R. Grzymkowski, Matematyka. Zadania i odpowiedzi. Wydawnictwo Pracowni Komputerowej Jacka Skalmierskiego, Gliwice, 2002.

Learning outcomes:

Knowledge: a student knows and understands

- basic issues in the field of differential and integral calculus of a 1-variable function and its applications
- basic issues in the field of differential and integral calculus of a 2-variable function and its applications

- basic issues in the field of ordinary differential equations
- basic issues in the field of combinatorics, probabilistic and discrete calculus

Skills: a student can

- compute derivatives and integrals of 1 and 2-variable functions and use them in practice
- solve the basic types of ordinary differential equations
- solve the basic combinatoric tasks and calculate the probabilities
- solve the simple optimization problems

Assessment methods and assessment criteria:

Student may get maximally 100p. in the following way:

Activity during the exercises: 10p.

Tests 1,2 and 3 (practical tasks): 25p. each

Theoretical test: 15p.

To pass each practical test (1,2 and 3) student must get 10p.

To pass the theoretical test student must get 7p.

To pass the course student must collect 41p.

The final grade in the course, based on the number of points scored, is calculated as follows:

0-40 insufficient (2.0);

41-55 sufficient (3.0);

56-70 above sufficient (3.5);

71-80 good (4.0);

81-90 above good (4.5);

91-100 very good (5.0).

Exam consists in retaking the tests written during the semester. Students, who failed or want to improve the tests written during the semester, can retake the tests. Students satisfied with their final grade don't need to participate in such retakes.

Practical placement:

Not applicable