SYLLABUS

Name: ***Mathematics (BudAB>SI2MATHEM19)***
Name in Polish:
Name in English: ***Mathematics***

Information on course:

Course offered by department: Faculty of Civil Engineering
Course for department: Silesian University of Technology

Default type of course examination report:

EGZ

Language:

English

Course homepage:

https://platforma2.polsl.pl/rms/course/view.php?id=75

Short description:

The aim of the course is to familiarize students with the methods of integration and integral applications, solving selected types of ordinary differential equations and differential and integral calculus of functions of many variables.

Description:

The programme of the course belongs:
Integrating rational and selected trigonometric and “irrational” functions. Definite and improper integral; their applications. Ordinary differential equations of the first order. Matrices, determinants, systems of linear equations, eigenvalues and eigenvectors. Selected issues of analytic geometry. Several variables differentia calculus (partial derivatives, total differentia, derivative a composite and an implicit function, directional derivative, gradient, extreme values). Number series. The Laplace transformation and its application for solving some differential equations.
The teaching methods used are:
- Lectures, illustrated with slides, are conducted by the traditional method. During lectures, the necessary definitions and theorems (always illustrated by examples) are presented and discussed. Slides are available on the PZE platform.
- Classes, during which practical problems related to currently discussed chapters are solved and discussed with students; materials useful in classes (e.g. sample sets of tasks) are placed on the platform.
Both during the lectures, and especially during the classes, students are expected to be active.
A number of hours of teaching with the direct participation of academic teachers or other instructors:
Lectures: 30h
Classes: 30h

Bibliography:

[1] R.A. Adams, C. Essex, Calculus. A Complete Course, 7th Edition, Pearson, 2010.
[2] H. Anton, C. Rorres, Elementary Linear Algebra, 11th Edition, NJ: John Wiley & Sons, Hoboken, 2014.
[3] J. Bird, Higher Engineering Mathematics, 6th Edition, Newnes, 2010.
[4] J.M. Erdman, Exercises and Problems in Calculus, version of August 1, 2013, https://web.pdx.edu/~erdman/CALCULUS/CALCULUS_pdf.pdf
[5] J.K. Hunter, An Introduction to Real Analysis, https://www.math.ucdavis.edu/~hunter/intro_analysis_pdf/intro_analysis.pdf
[6] E.Łobos, B.Sikora, Calculus and Differential Equations in Exercises, Wydawnictwo Politechniki Śląskiej, Gliwice, 2006.
[7] W. Rudin, Principles of Mathematical Analysi, 3rd Edition, International Series in Pure and Applied Mathematics, McGraw-Hill Book Company, Dusseldorf, 1976.
[8] E.Łobos, B.Sikora, A First Course in Calculus, Wydawnictwo Politechniki Śląskiej, Gliwice, 2010.
[9] E. Łobos, B. Sikora, Advanced calculus – selected topics. Wydawnictwo Politechniki Śląskiej, Gliwice, 2007;
[10] E. Łobos, B. Sikora, Calculus and differential equations in exercises. Wydawnictwo Politechniki Śląskiej, Gliwice, 2012, wydanie III poprawione

Learning outcomes:

The student who has completed the course
(1) understands and has ordered knowledge on basics of integrals, differential equations, linear algebra and geometry and functions of two variables (K1A_W01)
(2) can solve problems in integral calculus of functions of one variable and applications, algebra and analytical geometry and in calculus of functions of several variables (K1A_U05)

Assessment methods and assessment criteria:

Course prerequisites: Knowledge and skills learned in course Mathemathics -sem 1.

Course pass requirements:
A student may receive a maximum of 100 points during the course in the following way:
• 0-30 points during the written exam verifying learning outcome (4);
• 0-45 points during three written class tests verifying learning outcomes of (1), (2), (3)
• 0-10 points for activity during classes (points are not added to any outcomes but may increase the final grade).
To obtain a positive final grade, the student must pass each of the learning outcomes to at least 40% of the number of points provided for it, and get at least 40% from the exam. For students who do not pass at least one of the learning outcomes (1), (2), (3) a retake will be organized during the examination session. Failure to pass learning outcomes (1), (2), (3) will not affect the admission to the exam.

Transfer of partial grades from past course edition is possible after validation by the lecturer upon student's request within the first two weeks of the semester.

Attendance at classes is obligatory, attendance at lectures is not mandatory but can be monitored.

This syllabus is effective from academic year 2025/26 and its content is not subject to change during the semester.

Details of classes and study groups

lecture (30 hours)

Study groups details

missing study groups details

classes (30 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	6	2020/2021-Z	

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Signature