POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematics [S1FT2>Mat2]

Course

Field of study
Technical Physics

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
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
30

Projects/seminars
0

Number of credit points

5,00

Coordinators

dr Leszek Wittenbeck
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Lecturers

Prerequisites

Knowledge of mathematics in the field of high school and the first semester of mathematics at the university of technology. The ability to solve mathematical problems based on the possessed knowledge, the ability to obtain information from the indicated sources. Understanding the need to expand your competences, readiness to cooperate within the team.

Course objective

1. Provide students with basic mathematical content concerning the integral calculus of functions of several variables, functions and series of power complex values. 2. Developing students' ability to formulate and solve mathematical problems. 3. Shaping students' teamwork skills.

Course-related learning outcomes

Knowledge:
The student knows the mathematical apparatus necessary to describe the basic laws of physics and solve problems related to the issues of technical physics, including: the basics of differential and integral calculus, linear algebra and analytical geometry

Skills:
The student can use the acquired mathematical knowledge to describe processes, create models, write algorithms in the field of technical physics

Social competences:
The student can work independently and in a team on a given task, shows responsibility in this work

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: written or oral exam in theory and tasks.
Classes: ecaluation of written tests during the semester and the direct activity during the classes.
Getting extra points related with activity(presentations of examples of applications of mathematics, use of literature, discussion of problems, presenting reports concerning applications of the theory and diligence of the study).

Programme content

Complex functions of a real variable.
- complex power series,
- relation between trigonometric and exponential functions,
- relation between circular and logarithmic functions,
-differentiation and integration of functions with complex values.
Elements of integral calculus of functions of several variables.
- double integrals,
- oriented and non-curved integrals,
- Green's theorem,
-triple integrals,
- oriented and non-oriented surface integrals,
-Gauss and Stokes theorems.
Selected ordinary differential equations.
-differential equation with separated variables,
- first order linear differential equation,
- linear differential equations of the second and higher order with constant coefficients,
-Euler's differential equation.

Course topics

Teaching methods

1. Lecture: multimedia presentation, solving sample tasks on the blackboard,
2. Exercises: problem solving, discussion.

Bibliography

Basic:
1.F. Leja, Rachunek różniczkowy i całkowy ze wstępem do równań różniczkowych, PWN 2018.
2. W. Krysicki, L. Włodarski, Analiza Matematyczna w zadaniach, Część I, II, PWN.
3. Izabela Foltyńska, Zbigniew Ratajczak, Zdzisław Szafrański, Matematyka dla studentów uczelni technicznych. Część I, II, Wydawca: Wydawnictwo Politechniki Poznańskiej.

Additional:
1. E. Karaśkiwicz, Zarys reorii wektorów i tensorów, PWN

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	62	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	63	2,50