



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Analiza matematyczna 2 - Mathematical analysis 2

Course

Field of study

Teleinformatics

Year/Semester

1/2

Area of study (specialization)

Profile of study

general academic

Level of study

first-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

Tutorials

30

Projects/seminars

0/0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Basic knowledge of differential and integral calculus of functions of one variable. Logical thinking skills. Understanding of the limitations of one's knowledge and motivation for further education.

Course objective

Knowledge of differential and integral calculus necessary to study engineering sciences. Ability to apply the acquired knowledge to the analysis of phenomena and problems in the field of engineering.

Course-related learning outcomes



Knowledge

1. Student has structured knowledge in mathematical analysis, knows the basic concepts and theorems and understands the relationships between them.
2. Student knows and explains the applications of known facts and theorems.

Skills

1. Student uses differential and integral calculus of functions of two and three variables.
2. Student uses the correct method of solving the differential equation.
3. Student understands mathematical texts, obtains information from literature and other sources.

Social competences

1. Student knows the limitations of her/his knowledge and understands the need for further education.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: valuation of knowledge and skills during written exam.

Tutorials: two colloquia.

Programme content

Lecture: Series of real numbers. Function sequences and function series. Differential and integral calculus of several variable functions. Selected ordinary differential equations of the first and second order.

Tutorials: Series of real numbers. Function series. Partial derivatives, approximate calculations, local extreme of functions of two variables. Double integrals (polar coordinates) and triple integrals (cylindrical and spherical coordinates), geometric applications. Selected ordinary differential equations of the first and second order.

Lecture: Series of real numbers (convergence of a series, convergence tests: integral criterion, comparison test, d'Alembert's criterion, Cauchy's criterion, Leibniz criterion). Function sequences and function series (pointwise convergence and uniform convergence, power series, the radius of convergence and interval of convergence for a power series, Taylor series, Fourier series). Differential calculus of functions of several variables (partial derivatives, geometric interpretation, exact differential form, directional derivative, gradient, local extreme of functions of several variables). Selected surfaces in space. Integral calculus of functions of several variables (double and triple integral, change of variables, selected applications). Differential equations (general, special, singular integral, initial problem). Selected ordinary differential equations (equations with separated variables, homogeneous differential equations, first order linear differential equations, Bernoulli's equations, exact differential equations, second order differential equations with constant coefficients).

Tutorials: Series of real numbers (integral criterion, comparison test, d'Alembert's criterion, Cauchy's criterion, Leibniz criterion). Function series (power series, radius of convergence, series differentiation and integration, power series expansion, Fourier series, Dirichlet criterion). Partial derivatives, approximate calculations, local extreme of functions of two variables. Double integrals (polar coordinates) and triple integrals (cylindrical and spherical coordinates), geometric applications. Ordinary differential equations (equations with separated variables, first order linear differential equations, exact differential equations, second order differential equations with constant



coefficients).

Teaching methods

1. Lecture - multimedia presentation accompanied with examples presented on the blackboard as well as asking questions to students.
2. Tutorials - solving examples on the blackboard, initiating discussions about solutions, real-time feedback from the teacher.

Bibliography

Basic

1. M. Gewert, Z. Skoczylas, Analiza matematyczna 2, Definicje, twierdzenia, wzory
2. W. Kryszicki, L. Włodarski, Analiza matematyczna w zadaniach, cz. 1 i 2
3. M. Gewert, Z. Skoczylas, Analiza matematyczna 2, Przykłady i zadania
4. J. Mikołajski, Z. Sołtysiak, Zbiór zadań z matematyki dla studentów studiów technicznych, cz. 2 i 3
5. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne

Additional

1. D.A. McQuarrie, Matematyka dla przyrodników i inżynierów cz.1 i 2
2. W.P. Minorski, Zbiór zadań z matematyki wyższej
3. G.M. Fichtenholz, Rachunek różniczkowy i całkowy, t. 1 i 2
4. H. J. Musielakowie, Analiza matematyczna, t. 1 i 2

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	5.0
Classes requiring direct contact with the teacher	64	3.0
Student's own work (preparation for tests, preparation for tutorials, preparation for exam, literature studies)	56	2.0