COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematical Analysis [S1MiKC1E>AM]

Course

Field of study
Microelectronics and Digital Communication

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

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Prerequisites

Basic mathematical knowledge from secondary school. 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 [K1_W01].
2. Student knows and explains the applications of known facts and theorems [K1_W01].

Skills:
1. Student uses calculus in the calculations resulting from the needs of engineering practice [K1_U03].
2. Student understands mathematical texts, obtains information from literature and other sources [K1_U03].

Social competences:
1. Student knows the limitations of her/his knowledge and understands the need for further education [K1_K01].

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.
Tutotials: two colloquia.
Passing threshold: 50% of total points.
For passing the lecture and tutorials, the following percentage thresholds apply to individual grades: 2.0 (< 50%), 3.0 (50%-59%), 3.5 (60%-69%), 4.0 (70%-79%), 4.5 (80%-89%), 5.0 (90% and more). The students' answers (independently for each question/task) are scored by awarding a portion of the points allocated for the question/task that corresponds to the degree to which the answer given is correct.

Programme content

Sequences. Functions of real variables. The limit of functions, continous function and their properties. Derivative of real function. Methods of integration functions. Define integral. Improper integrals.

Course topics

Lecture: Elements of logic and the set theory. Sequences (properties, limits of sequences, Euler's number). Functions of real variables (properties, elementary functions). The limit of functions, continous function and their properties. Derivative of real function (properties, mean value theorems, l'Hospital Theorem, Taylor's formula, selected applications). Indefinite integral. Methods of integration functions. Define integral and its geometric and mechanical applications. Improper integrals. Series of real numbers (convergence of a series, convergence tests: integral critesion, comparison test, d'Alembert's criterion, Cauchy's criterion, Leibniz criterion).
Tutorials: Limits of sequences. Limits of functions, continous function. Founding of derivatives, tangent lines, L'Hospital Theorem, Taylor's formula, selected application of derivatives. Indefinite integrals, substitution method, integration by parts, integration of rational funtions. Definite integral, geometric applications, improper integrals.

Teaching methods

1. Lecture - mulimedia 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 1, Definicje, twierdzenia, wzory
2. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, cz. 1
3. M. Gewert, Z. Skoczylas, Analiza matematyczna 1, Przykłady i zadania
4. J. Mikołajski, Z. Sołtysiak, Zbiór zadań z matematyki dla studentów studiów technicznych, cz. 2

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	125	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50