



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Analiza matematyczna - Mathematical analysis 1

### Course

Field of study

Teleinformatics

Year/Semester

1/1

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:

dr Anna Iwaszkiewicz-Rudoszańska  
Wydział Automatyki, Robotyki i Elektrotechniki,  
ul. Piotrowo 3A, 60-965 Poznań,  
e-mail: anna.iwaszkiewicz-  
rudoszanska@put.poznan.pl  
tel. 61 6652812

Responsible for the course/lecturer:

### 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.
2. Student knows and explains the applications of known facts and theorems.

### Skills

1. Student uses calculus in the calculations resulting from the needs of engineering practice.
2. 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 oral and written exam.

Tutorials: two colloquia.

### Programme content

Lecture: Elements of logic and the set theory. Sequences. Functions of real variables. The limit of functions, continuous function and their properties. Derivative of real function. Indefinite integral. Methods of integration functions. Define integral and its applications. Improper integrals.  
Tutorials: Limits of sequences. Limits of functions, continuous function. Founding of derivatives, tangent lines, L'Hospital Theorem, Taylor formula, selected application of derivatives. Indefinite integrals, substitution method, integration by parts, integration of rational functions. Definite integral, geometric applications, improper integrals.

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, continuous function and their properties. Derivative of real function (properties, mean value theorems, L'Hospital Theorem, Taylor formula, selected applications). Indefinite integral. Methods of integration functions. Define integral and its geometric and mechanical applications. Improper integrals.

### 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 1, 2, Definicje, twierdzenia, wzory
2. W. Kryszki, L. Włodarski, Analiza matematyczna w zadaniach, cz. 1
3. M. Gewert, Z. Skoczylas, Analiza matematyczna 1, 2, 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	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