



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Applied mathematics [S2Bud1>MS]

### Course

Field of study

Civil Engineering

Year/Semester

1/1

Area of study (specialization)

Structural Engineering

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other

0

Tutorials

15

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

dr inż. Jolanta Pozorska

jolanta.pozorska@put.poznan.pl

### Lecturers

### Prerequisites

Knowledge of linear algebra and calculus at the level of first-cycle studies in Civil Engineering.

### Course objective

Application of differential equations in engineering and technical sciences.

### Course-related learning outcomes

Knowledge:

Student have extended and detailed knowledge of mathematics, forming theoretical principles appropriate to formulate and solve tasks related to building engineering.

Social competences:

Student take responsibility for the reliability of working results and their interpretation.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

## LECTURE:

Knowledge acquired during the lecture is assessed by a short written test, primarily covering the theoretical portion of the course. Points are converted into a final grade. The passing threshold is 50% of the points. Points can be earned by completing additional assignments. Additional points can be earned for active participation during classes.

## TUTORIALS:

Knowledge acquired during the tutorials is assessed by a test/tests. Points can be earned by completing additional assignments. Additional points can be earned for active participation during classes.

The following percentage thresholds were adopted for both classes:

below 50% grade 2.0

50%-59% grade 3.0

60%-69% grade 3.5

70%-79% grade 4.0

80%-89% grade 4.5

90%-100% grade 5.0

## Programme content

Ordinary and partial differential equations and their applications.

## Course topics

1. First-order ordinary differential equations and their applications.
2. Second-order and higher-order differential equations and their applications.
3. Systems of ordinary differential equations and their applications.
4. Partial differential equations.
5. Elements of vector field theory.

## Teaching methods

1. Interactive multimedia lectures with questions for students, illustrated with examples solved by the lecturer on the board.
2. Exercises - students solve problems on the board, the lecturer discusses the solutions, and initiates discussions on the solutions. Knowledge is reinforced through homework assignments.

## Bibliography

### Basic

1. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne, Oficyna Wydawnicza GiS, Wrocław 2001
2. J. Mikołajski, Z. Sołtysiak, Zbiór zadań z matematyki dla studentów studiów technicznych Część III, Wydawnictwo Uczelniane Państwowej Wyższej Szkoły Zawodowej w Kaliszu, Kalisz 2008
3. W. Stankiewicz, J. Wojtowicz, Zadania z matematyki dla wyższych uczelni technicznych, T.2, PWN, Warszawa 2001.
4. D. Bobrowski, J. Mikołajski, J. Morchało, Równania różniczkowe cząstkowe, Wydawnictwo PP, Poznań 1995.

### Additional

1. Peter V. O'Neil, Matematyka dla inżynierów wraz zastosowaniami, PWN 2024
2. E. Kącki, L. Siewierski, Wybrane działy matematyki wyższej z ćwiczeniami, PWN, Warszawa 1975
3. E. Kącki, Równania różniczkowe cząstkowe w zagadnieniach fizyki i techniki, Wydawnictwo Naukowo-Techniczne, Warszawa 1989

## Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,00
Classes requiring direct contact with the teacher	45	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	1,50