COURSE DESCRIPTION CARD - SYLLABUS

Course name
Applied mathematics [S2Bud1>MS]

Course

Field of study
Civil Engineering

Year/Semester
1/1

Area of study (specialization)
Construction Engineering and Management

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

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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 Uczelni 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