POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Numerical methods [S1Bud1>MO]

Course

Field of study	Year/Semester
Civil Engineering	2/3
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
15	30	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge on linear algebra, mathematical analysis and probability theory.

Course objective

Theoretical background and knowledge of numerical methods used in engineering practice. Develop programming skills, get basic experience in creating computing applications.

Course-related learning outcomes

Knowledge:
1. The student knows basic numerical methods, used in engineering practice - [KB_W01, KB_W11]
2. The student knows the possible use of selected computer programs to realize specific numerical algorithms - [KB_W01, KB_W11]
3. The student knows the basic ways to design numerical algorithms - [KB_W11]

Skills:
.1. Student is able to choose proper computational model to solve specific engineering tasks - [KB_U03, KB_U05]

2. Students can select the right algorithm needed to solve the numerical tasks - [KB_U03, KB_U05, KB_U06]
3. Students can make a critical evaluation of the results of numerical analysis - [KB_U06]

Social competences:
. The student can work independently and in the team on the specific task - [KB_K01]
2. Students can formulate conclusions - [KB_K02, KB_K09]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: check test knowledge through a written test,
Laboratory: test the knowledge and skills by:
a) assessment of student activity in the classroom,
b) an assessment of the project tasks performed during the course during the semester (standalone, or in small teams) involving the preparation of a brief application executing indicated numerical algorithm,
c) ending course test - working alone at the computer.

Programme content

Numerical methods of basic numerical tasks, in particular
- Solving systems of linear and nonlinear equations,
- Interpolation and approximation, determine the regression model
- Optimization tasks,
- Numerical differentiation and integration,
- Using of Monte Carlo methods.

Course topics

Basic numerical methods and algorithms used in solving engineering problems

Teaching methods

Informative lecture, Programmed text, Classical problem method

Bibliography

Basic
1. D. Kincaid, W. Cheney, Analiza Numeryczna, PWN, Warszawa 2006.
2. Z. Fortuna, B. Macukow, J. Wąsowski, Metody numeryczne, WNT, Warszawa 2005.
Additional
1. S. Rosłaniec, Wybrane metody numeryczne z przykładami zastosowań w zadaniach inżynierskich, Oficyna Wydawnicza Politechniki Warszawskiej, 2002.
2. A. Bjorck, G. Dahlquist, Metody numeryczne, PWN, Warszawa 1983.
3. A. Brozi, Scilab w przykładach, Nakom, Poznań 2007.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00