

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Computational methods		Code 1010104151010120574
Field of study Civil Engineering First-cycle Studies	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 10 Classes: - Laboratory: 20 Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Responsible for subject / lecturer: dr Albert Kubzdela email: albert.kubzdela@put.poznan.pl tel. 61 6652686 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		Responsible for subject / lecturer: dr Tomasz Garbowski email: tomasz.garbowski@put.poznan.pl tel. 61 6652814 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge on linear algebra, mathematical analysis and probability theory. Familiarity with programming, especially using scientific software package Scilab
2	Skills	Some experience in using of Linux operating system and programming using scientific software package Scilab
3	Social competencies	Feeling the need to raise their professional and personal competences, knowledge and skills. Ability to work in team.
Assumptions and objectives of the course: Theoretical background and knowledge of numerical methods used in engineering practice. Develop programming skills, get more experience in creating computing applications.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The student knows basic numerical methods, used in engineering practice - [K1_W01, K1_W11]		
2. The student knows the possible use of selected computer programs to realize specific numerical algorithms - [K1_W01, K1_W11]		
3. The student knows the basic ways to design numerical algorithms - [K1_W11]		
Skills:		
1. Student is able to choose proper computational model to solve specific engineering tasks - [K1_U03, K1_U05]		
2. Students can select the right algorithm needed to solve the numerical tasks - [K1_U03, K1_U05, K1_U06]		
3. Students can make a critical evaluation of the results of numerical analysis - [K1_U06]		
Social competencies:		
1. The student can work independently and in the team on the specific task - [K1_K01]		
2. Students can formulate conclusions - [K1_K02, K1_K09]		
Assessment methods of study outcomes		

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.		
Course description		
Computational methods of basic numerical tasks, in particular the		
- Solve systems of linear and nonlinear equations,		
- Problem solving interpolation and approximation, determine the regression model		
- Optimization tasks,		
- Numerical differentiation and integration,		
- The use of Monte Carlo methods.		
Basic bibliography:		
1. D. Kincaid, W. Cheney, Analiza Numeryczna, PWN, Warszawa 2006.		
2. Z. Fortuna, B. Macukow, J. Wąsowski, Metody numeryczne, WNT, Warszawa 2005.		
Additional bibliography:		
1. S. Rosłaniec, Wybrane metody numeryczne z przykładami zastosowań w zadaniach inżynierskich, Oficyna Wydawnicza Politechniki Warszawskiej, 2002.		
Result of average student's workload		
Activity	Time (working hours)	
1. participation in class	30	
2. consolidate the knowledge acquired in lectures	5	
3. preparation to the laboratory	15	
4. to prepare for the final test	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	70	3
Contact hours	30	1
Practical activities	50	2