

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Numerical methods		Code 1010341541010340026
Field of study Mathematics	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 4
Elective path/specialty -	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: 2 Laboratory: 2 Project/seminars: -		No. of credits 9
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 the sciences Mathematical sciences		ECTS distribution (number and %) 9 100% 9 100%
Responsible for subject / lecturer: Barbara Szyszka email: Barbara.Szyszka@put.poznan.pl tel. 61 665 27 63 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student has knowledge of mathematics (in terms of linear algebra, calculus, ordinary differential equations) and computer science (the basic data structures and programming in high-level language).
2	Skills	Students can solve math analytically within the range specified above. Students can implement the algorithm in high-level programming language.
3	Social competencies	The student understands the need for learning
Assumptions and objectives of the course: Learning basic numerical methods and apply them to solve simple mathematical problems and engineering problems. Power calculations relevant mathematical and engineering tools.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. choose the approximate calculation methods used to solve mathematical problems - [K_W06+, K_W12+++] 2. offer basic numerical methods applied to solving engineering - [K_W08++, K_W09++] 3. use a computer at least one package to assist solving technical issues - [K_W08+++, K_W09+++]		
Skills:		
1. Select and use appropriate calculation method to solve simple problems in the field of technical sciences - [K_U11+, K_U15+++ , K_U29++] 2. Use at least one commercial computer package for solving basic numerical methods - [K_U26+++ , K_U27+++ , K_U28+++] 3. Carry out measurements and computer tests, interpret the results and draw conclusions - [K_U27++, K_U28+++]		
Social competencies:		
1. student is aware of the validity of the mathematical consequences - [K_K02+, K_K07++] 2. student understands the need for learning - [K_K01+++ , K_K06++]		
Assessment methods of study outcomes		

lecture * Assess the knowledge and skills listed on the written exam * Control of perception during lectures. Classes: * Assess the knowledge and skills demonstrated in written tests Laboratory: * Test and favoring knowledge necessary to perform the tasks of laboratory * Continuous evaluation for each course - rewarding gain skills use the principles and methods have met, * Assess the knowledge and skills associated with the implementation of the tasks your practice, evaluation reports performed exercise. Get extra points for the activity in the classroom, and in particular for: * Propose to discuss further aspects of the subject; * The effectiveness of the application of the knowledge gained during solving the given problem; * Subsequent to the improvement of teaching materials; * Developed aesthetic diligence reports and jobs - in the self-study.		
Course description		
Floating point arithmetic, the numerical errors. Numerical stability and accuracy of task conditioning algorithms. Numerical solution of nonlinear equations. Function approximation. Numerical integration and differentiation. Numerical solution of ordinary differential equations of the first order with the initial condition - one-step method. The basic algorithms for numerical linear algebra problems.		
Basic bibliography:		
1. Fortuna, Macukow, Wąsowski, Metody numeryczne, WNT, 2. Kincaid, Cheney, Analiza numeryczna, WNT 2005, 3. Burden, Faires ? Numerical analysis, Prindle, Weber&Schmidt, Boston, 4. Kaćki, Maćolepszy, Romanowicz, Metody numeryczne dla inżynierów, Politechnika Łódzka 2000,		
Additional bibliography:		
1. Björck, Dahlquist, Metody numeryczne, PWN Warszawa, 2. Marlewski, Podstawowe metody numeryczne dla studentów kierunków inżynierskich, ARTPRESS		
Result of average student's workload		
Activity	Time (working hours)	
Student's workload		
Source of workload	hours	ECTS
Total workload	220	9
Contact hours	107	5
Practical activities	86	4