

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Numerical methods		Code 1010324241010340026
Field of study Electrical Engineering	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) part-time	
No. of hours Lecture: 14 Classes: - Laboratory: 16 Project/seminars: -		No. of credits 4
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 %) 4 100% 4 100%
Responsible for subject / lecturer: dr inż. Barbara Szyszka email: Barbara.Szyszka@put.poznan.pl tel. 616652763 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		Responsible for subject / lecturer: Marian Dondajewski email: Marian.Dondajewski@put.poznan.pl tel. 61665285 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	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	Student can solve math analytically within the range specified above. Student can implement the algorithm in high-level programming language.
3	Social competencies	He understands the need to learn
Assumptions and objectives of the course: Learning basic numerical methods and apply them to solve simple problems in the field of electrical engineering. Power engineering calculations relevant tools.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. He has knowledge of the approximate calculation methods useful to solve mathematical problems - [K_W02+++] 2. Knows the basic numerical methods applied to solving engineering - [K_W02+++, K_W05+++] 3. Know at least one computer package to assist solving technical issues - [K_W02+++, K_W11+, K_W21+]		
Skills:		
1. Can select and use appropriate calculation method to solve the simple task of engineering - [K_U05++, K_U22+++] 2. Can use at least one commercial computer package for solving basic numerical methods - [K_U04+++, K_U13+++] 3. Student can carry out measurements and computer tests, interpret the results and draw conclusions - [K_U02+++, K_U10+++]		
Social competencies:		
1. student is aware of the validity of the effects of engineering calculations - [K_K02+++, K_K03+++] 2. student understands the need for learning - [K_K01+++]		
Assessment methods of study outcomes		

<p>Lectures:</p> <ul style="list-style-type: none"> * Assess the knowledge and skills listed on the completion of the writing of a problematic (student may use any teaching materials), * Control of perception during lectures. <p>Laboratory:</p> <ul style="list-style-type: none"> * Test and favoring knowledge necessary to perform the tasks of laboratory * Continuous evaluation for each course - rewarding gain skills they met the principles and methods * Assess the knowledge and skills associated with the implementation of the tasks your practice, the assessment report performed exercise. <p>Get extra points for the activity in the classroom, and in particular for:</p> <ul style="list-style-type: none"> * 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		
<p>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 methods. The basic algorithms for numerical linear algebra problems.</p>		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Kącki, Małolepszy, Romanowicz, Metody numeryczne dla inżynierów, Politechnika Łódzka 2000, 2. Fortuna, Macukow, Wąsowski, Metody numeryczne, WNT, 3. Kincaid, Cheney, Analiza numeryczna, WNT 2005, 4. Burden, Faires ? Numerical analysis, Prindle, Weber&Schmidt, Boston, 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 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	80	4
Contact hours	40	2
Practical activities	35	2