STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Numerical methods		**1010321321010340026**
Field of study: **Electrical Engineering**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **1 / 2**
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: **15** Classes: **-** Laboratory: **15** 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:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The student has a knowledge of mathematics (range: linear algebra, differential and integral calculus, initial value problems for ordinary differential equations), and computer science (for programming in high level language)
2	**Skills**	The student is able to solve math problems analytically within the range specified above. The student is able to implement a computer program.
3	**Social competencies**	The student is aware of the need to expand their competences. He understands the need for learning.

Assumptions and objectives of the course:

Learning of numerical methods and apply them to solve simple engineering problems in the field of electrical engineering.
The support of engineering calculations by relevant IT tools.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. The student has basic knowledge of numerical methods for solving simple engineering tasks - [K_W02+++]
2. The student knows at least one computer package supporting numerical calculations - [K_W02+++]

Skills:

1. The student is able to formulate correct algorithm and describe its implementation; He knows at least one programming language - [K_U04+++,]
2. The student is able to choose and apply the correct numerical method to solve simple engineering tasks of a practical nature - [K_U22 +++]
3. The student has the skills of self-education; can perform measurements and computer tests, interpret the results and draw conclusions - [K_U09 +++]

Social competencies:

1. The student knows the limitations of their knowledge and understands the need for further education - [K_K01+++]
2. It is aware of the validity of the effects of engineering calculations - [K_K02+++]

Assessment methods of study outcomes

Lecture:
* assess the knowledge and skills in the written form,
* control of perception during lectures.

Laboratory:
* tests and rewarding knowledge necessary for the accomplishment of the problems in the area of laboratory tasks,
* rewarding knowledge necessary to carry out laboratory tasks,
* continuous assessment, during each lesson - rewarding the increase of the ability to use the new methods,
* assess the knowledge and skills related to the implementation of the tasks.

Obtaining additional points for activity in the classroom, and in particular for:
* proposal to discuss additional aspects of the task;
* the effectiveness of applying knowledge when solving a given problem;
* comments relating to the improvement of teaching materials;

Course description

1. Floating point arithmetic, numerical errors,
2. Stability and accuracy of algorithms.
3. Solutions of nonlinear equations in one variable
4. The approximation of functions (Interpolation, Taylor series)
5. Numerical integration.
6. The Selected issues for linear systems of equations-direct methods.

Update 2017:
Applied methods of education:
Lectures:
1.Lecture with multimedia presentation (including: drawings, photos) supplemented by examples given on the board,
2.Lecture conducted in an interactive way of formulating questions to a group of students or indicated specific students,
3.Student activity is taken into account during the course of the assessment,
4.Theory presented in connection with practice,
5.Theory presented in connection with the current knowledge of students,
6.Taking into consideration various aspects of the presented issues,
Laboratories:
1.Laboratories supplemented with multimedia presentations (including drawings, photos)
2.Demonstrations,
3.Computational experiments;

Basic bibliography:

1. Fortuna, Macukow, Wąsowski, Metody numeryczne, WNT,
2. Kincaid, Cheney, Analiza numeryczna, WNT 2005,
3. Magnucka-Blandzi, Dondajewski, Gleska, Szyszka, Metody numeryczne w MatLabie. Wybrane zagadnienia, Wyd. Politechniki Poznańskiej 2013,

Additional bibliography:

1. Burden, Faires, Numerical analysis, Prindle, Weber and Schmidt, Boston,
2. Rosłoniec, Wybrane metody numeryczne z przykładami zastosowań w zadaniach inżynierskich, Oficyna Wydawnicza politechniki Warszawskiej 2008

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in laboratory classes	15
3. Participation in consultations (lectures+lab)	8
4. implementation and verification the programs (time outside of the classroom laboratory)	5
5. preparation for laboratory classes	5
6. Preparing to pass lectures laboratories	7
7. . familiarization with the indicated literature and teaching materials	6
8. final exams (lectures+lab)	2

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	63	3
Contact hours	40	2
Practical activities	23	1