

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Computer aided design of technical systems		Code 1010342531010327413
Field of study Mathematics	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty -	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies		Form of study (full-time, part-time) full-time
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: 1		No. of credits 6
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 %) 6 100% 6 100%
Responsible for subject / lecturer: Prof. dr hab. inż. Ryszard Nawrowski email: ryszard.nawrowski@put.poznan.pl tel. 616652788 Elektryczny ul. Piotrowo 3A, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Information in field of Mathematics, Numerical Analysis, Informatics, Theory of circuits, Electrical engineering, Electrical Power Engineering.
2	Skills	Skills in understanding and interpretation of information and effective self-education in field of science related with chosen academic discipline.
3	Social competencies	Student should have consciousness of necessity of improving his competences, readiness to work individual and cooperate within groups.
Assumptions and objectives of the course: Presentation of: - basics of design, - rules for creating project documentation, - selected numerical analysis methods used to solve issues in field of theory of technical sciences, - parts of codes in c#.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. student knows advanced computational techniques, supporting the work of mathematics and understand their limitations - [K_W08+++]		
2. student knows approximate numerical methods for solving mathematical problems (eg, differential equations) made ??in other fields of science (eg, electrical engineering, industrial technology, management, etc.) - [K_W10++]		
3. student knows well, at least one software package used for symbolic computation, and one package for statistical data processing - [K_W12++]		
Skills:		
1. student recognizes mathematical structures (such as algebra, geometry) in physical theories - [K_U17+++]		
2. student understands the mathematical basis of the analysis of algorithms and computational processes - [K_U19++]		
3. student is able to construct a correct numerical algorithms, taking into account the complexity of computing, designed to solve common and unusual mathematical problems - [K_U20++]		
Social competencies:		

1. student knows his own limitations of knowledge and understands the need for further education - [K_K01+++]
2. student is able to work as a team, understands the need for regular work on any projects that are long term in nature - [K_K03++]
3. student can independently search the literature, even in foreign languages - [K_K06++]

Assessment methods of study outcomes

Lecture:

- assess the knowledge and skills listed on the written and oral exam of the computerization of designing in electrical engineering.

Class project:

- Assessment of knowledge and skills on the basis of assessment involving the numerical solution of the problem-information in the field of technical sciences (eg, electrical engineering),
 - Checking and favoring knowledge and skills for the implementation issues of problem (homework).

Obtaining additional points for activity during exercises, in particular way for:

- proposing to discuss additional aspects of the subject,
 - effective use of knowledge obtained during solving of given problem,
 - comments related to improve teaching material,
 - aesthetics of solved problems ? within self-education.

Course description

Presentation of: rules of designing and creating projects documentation, convergence and stability of numerical solutions, calculations errors, issues of numerical integration of electrical quantities, numerical solutions of equations and systems of equations: linear, nonlinear, differential and partial differential used in electrical engineering and methods of determined and not determined optimization.

Basic bibliography:

1. Kącki E.: "Metody numeryczne dla inżynierów", WPL, Łódź 2003.
2. Bolkowski S.: "Teoria obwodów elektrycznych", WNT, Warszawa 1998.
3. Fortuna Z.: "Metody numeryczne", WNT, Warszawa 1998.

Additional bibliography:

1. Baron B.: "Metody numeryczne w Turbo Pascalu", Helion, Gliwice 1996.
2. Normy i katalogi do danego projektu.

Result of average student's workload

Activity	Time (working hours)	
1. participation in the lectures	30	
2. participate in the consultations on of the lecture	4	
3. preparation for the exam	20	
4. participation in the exam	5	
Student's workload		
Source of workload	hours	ECTS
Total workload	152	6
Contact hours	82	3
Practical activities	82	3