

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Programming Languages		Code 1010612211010630597
Field of study Mechanika i budowa maszyn	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Product engineering (Inżynieria produktu)	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: 1 Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences the sciences Mathematical sciences		ECTS distribution (number and %) 1 50% 1 50% 1 50% 1 50%
Responsible for subject / lecturer: dr hab. inż. Andrzej Frąckowiak, prof. PP email: andrzej.frackowiak@put.poznan.pl tel. +4861 652-779 Machines and Transport ul. Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student possesses elementary knowledge of the fundamentals of computer science, i.e. the computer architecture, types of variables, the general knowledge of the language of low, medium and high levels used in programming computers and typical engineering applications in the field of computer simulation of physical systems.
2	Skills	The student is able to use the concepts in the description of programming languages. The student is able to deal with specific problems that arise during the writing of programs.
3	Social competencies	Students can cooperate in a group, taking the different roles. The student is able to define priorities, which are important in solving the tasks posed before her/him. The student demonstrates self-reliance in solving problems, acquiring and improving her/his knowledge and skills.
Assumptions and objectives of the course: The aim of the course is to provide students with information concerning the selected programming languages (Fortran, C), the definitions and concepts. Students acquire knowledge and skills in the creation of computer programs.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has an extended knowledge in the area of information technology concerning computer programming and software for engineering calculations and simulation of physical systems - [K2A_W05]		
Skills:		
1. Is able to use a common numerical computations system for programming a simple simulation task with limited degrees of freedom - [K2A_U02]		
Social competencies:		
1. Understands the need for lifelong learning; is able to inspire and organize the learning process of others - [K2A_K01]		
2. Is able to set priorities for realization of undertaken tasks - [K2A_K04]		
3. Is able to think and act in an entrepreneurial manner - [K2A_K05]		

Assessment methods of study outcomes		
Written exam of lectures, written and practical credit of laboratory.		
Course description		
Construction of computer programs. Comparison of the structure of C and Fortran. Discussion of the declaration constants, variables and variable types. Arithmetic operators. Functions - value of functions and parameters, making arguments be passed by value and by reference. Expressions - attribution, data comparison, priorities and communication. Branching and loops. Arrays and structures. Standard libraries of C and Fortran. The basic concepts of numerical calculations: iteration, interpolation, approximation, extrapolation, numerical integration, solving ordinary differential equations. Square root algorithm, algorithms for finding zeros of functions - Newton's method, secants and bisection method, method using numerical integration of Richardson extrapolation, solving ordinary differential equations using Euler's method and the midpoint method. The procedures for these algorithms in C and Fortran.		
Basic bibliography:		
1. Conor Sexton, Język C to proste, Wydawnictwo RM, Warszawa 2001 2. Anna Trykozko: Fortran 77. Podstawy programowania. ZNI MIKOM, Warszawa 1994 3. Michael Metcalf and John Reid: Fortran 90/95 explained, Oxford Science Publications, 1998		
Additional bibliography:		
1. Ake Björck, Germund Dahlquist: Metody numeryczne, PWN, Warszawa 1983		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation for the lecture	3	
2. Lecture participation	15	
3. Consolidation of the lecture content	10	
4. Consultation	5	
5. Preparation for assessment	5	
6. Assessment participation	1	
7. Preparation for laboratory classes	10	
8. Participation in laboratory classes	15	
9. Lab consultation	5	
10. Preparation for lab assessment	10	
11. Assessment participation (lab)	1	
Student's workload		
Source of workload	hours	ECTS
Total workload	80	2
Contact hours	42	0
Practical activities	41	0