POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to programming

Course

Field of study	Year/Semester
Mathematics in Technology	1/1
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	30	
Tutorials	Projects/seminars	

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

mgr inż. Marta Kańczurzewska

email: marta.kanczurzewska@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of high school. Computer literacy.

Course objective

The aim of the course is to familiarize students with the basics of computer programming and to teach the basics of programming in Python and MATLAB. In particular, this includes providing students with basic information about computer arithmetic, structured programming, problem algorithmization and their programming (also in the form of functions), teaching students to be fluent in an integrated programming environment.

Course-related learning outcomes

Knowledge

1. The student has knowledge about the use of mathematical tools.
2. The student knows the basics of computational and programming techniques.

Skills

1. The student is able to construct an algorithm for solving a simple engineering task, implement and test it in a chosen programming environment.

POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

2. The student is able to operate the devices in accordance with general requirements and knows how to apply the principles of health and safety at work in a computer laboratory.

Social competences

1. The student is aware of the level of his knowledge.
2. The student is aware of deepening and broadening the knowledge of programming.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Laboratories: two tests during the semester. Bonus activity during classes.

Lecture: passing the lecture in the form of a written test of a problematic and practical nature.

Programme content

1. COMPUTER ARITHMETICS

- Machine representation of numbers
- Encoding of integers and floating point numbers
- Convert decimal to binary systems and vice versa
- Coding negative integers
- Character encoding in the computer

2. ALGORITHMS

- Definition of algorithms
- Correctness of algorithms
- Pseudocode as one of the methods of writing algorithms
- Block diagrams as one of the methods of writing algorithms
- Blocks used in the recording of algorithms
- Examples of known algorithms

3. COMPUTING COMPLEXITY

- Definition of computational complexity
- Cases of computational complexity
- Notation of capital O
- Determining computational complexity

4. OPERATORS, LOOPS, AND CONDITIONAL INSTRUCTIONS

- Arithmetic and logical operators
- Assignment operators
- Declaration of variables
- Conditional statements: if, switch
- Loops: for, while, do while
- The keywords break, continue and return

POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

5. Arrays

- Array structure - matrices and vectors
- Array declaration
- Referencing array elements
- Iterating over array elements
- Operations on arrays

6. FUNCTIONS

- Function motivation in programming
- Examples of built-in functions
- Create functions
- Calling up functions
- Anonymous functions

7. COMPARISON OF BASIC INSTRUCTIONS IN MATLAB AND PYTHON

Teaching methods

Laboratories: practical exercises and writing programs in Python and MATLAB.
Lecture: multimedia presentation supplemented with examples.

Bibliography

Basic

1. Cormen T.H., Leiserso Ch.E., Rivest R.L. Introduction to Algorithms Third Edition , The MIT Press, 2009.
2. Brzózka J., Dorobczyński L. MATLAB : środowisko obliczeń naukowo-technicznych, MIKOM, 2008.
3. Summerfield M. Programming in Python 3: A Complete Introduction to the Python Language, Addison-Wesley Professional, 2010.

Additional

1. Mrozek B., Mrozek Z. MATLAB i Simulink Poradnik użytkownika. Wydanie II, Helion, Wrocław, 2004.
2. Lutz M. Python. Intoduction, 4th edition, O'Reilly Media, 2010.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	55	2,0

---

[1] delete or add other activities as appropriate