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

Programming languages

## Course

| | |
|---|---|
| Field of study | Year/Semester |
| Biomedical Engineering | 2/4 |
| 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 | 15 | |
| Tutorials | Projects/seminars | |
| | 0 | |

## Number of credit points

2

## Lecturers

| | |
|---|---|
| Responsible for the course/lecturer: | Responsible for the course/lecturer: |

dr hab. inż. Maciej Tabaszewski

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Faculty of Mechanical Engeenering

ul. Piotrowo 3 60-965 Poznań

## Prerequisites

Basic knowledge of logic and computer science

## Course objective

Transfer of knowledge allowing procedural and object-oriented programming

## Course-related learning outcomes

Knowledge

The student recognizes and knows the features of procedural, object-oriented and visual programming

The student knows the basic structures of selected programming languages

The student knows the concepts of classes, structures, objects, inheritance, polymorphism, encapsulation

Skills

The student can create dedicated software

Social competences

The student understands the role of computerization in the modern economy. Is able to participate creatively

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Test, 20 closed questions, passing the subject -50% of the maximum points

Laboratory: short tests, passing the subject- 50% of the maximum points

## Programme content

Lecture: General principles of program construction. Compilers and interpreters. Programming in low and high level languages, overview and division of languages. Visual programming languages. Basics of Python programming. Features of the language. Variables, data types (lists, tuples, dictionaries, sets, complex numbers, logical type and others), references, operators, loops, conditional statements, input and output functions, library import. Object-oriented programming. Concepts of encapsulation, classes, objects, inheritance, polymorphism. Basics of object-oriented programming in Python. Writing and reading files, exception handling, namespaces. Libraries useful for numerical calculations.

Laboratory: Python programming, examples: data input and output, simple calculations, string operations, print formatting, date operations, conditional statement application, list expressions, selection statements, loops, break, continue, pass, write and read statements text file, binary, function creation. Object-oriented programming, examples: creating classes, inheritance, operator overloading, using libraries

## Teaching methods

Lecture: multimedia presentation with theory and examples.

Laboratory classes: practical exercises, problem solving

## Bibliography

Basic

Michael Dawson, Python dla każdego, podstawy programowania, Wydanie III, Helion, Gliwice 2014

Ana Bell, Python, uczymy się programowania, Helion, Gliwice 2018

Additional

Mark Lutz, Python, wprowadzenie, Helion, Gliwice 2013

Wes McKinney, Python w analizie danych, Wydanie II,  Helion, Gliwice 2018

Douwe Osinga, Deep Learning, Receptury, Helion, Gliwice 2019

Robert C. Martin, Czysty kod, podręcznik dobrego programisty, Helion, Gliwice 2014

Aurelien Geron, Uczenie maszynowe z użyciem Scikit-Learn i TensorFkow, Helion, Gliwice 2018

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 50 | 2,0 |
| Classes requiring direct contact with the teacher | 35 | 1,5 |
| Student's own work (literature studies, preparation for lecture, for laboratory classes, preparation for tests ) [1] | 15 | 0,5 |

[1] delete or add other activities as appropriate