SYLLABUS

Name: ***Fundamentals of computer programming (AESAu-A>SI1FCP24)***
Name in Polish:
Name in English: ***Fundamentals of computer programming***

Information on course:

Course offered by department: Faculty of Automatic Control, Electronics and Computer Science
Course for department: Silesian University of Technology

Default type of course examination report:

ZAL

Language:

English

Short description:

The course provides the knowledge required to understand, design and write computer programs in C and C++. The aim of the course is to lay a solid foundation of good software engineering and programming language practice. The program contains: introduction to imperative programming in C/C++ language (basic knowledge required to create and understand programs as well as skills essential for good software engineering and programming practice), basic algorithms and data structures, substantial knowledge on object-oriented programming using C++, and some techniques essential for programmers. Lectures are illustrated with slides with many sample programs. They are supported by laboratories, which give students an opportunity to create programs on their own.

Description:

ECTS: 5
Total workload: 125 hours (65 contact hours / 60 students' own work hours)
Lecture: 30h
Laboratory: 30h
Other (e.g. test and reports revision and discussion): 5h

Lecture:
An introduction to programming languages and the language C / C++. Description of variables and data types, instructions, operators, preprocessor commands. Presentation of programmer environment IDE elements: source code editors, compilers, debuggers, header files. Overview of the most important codes from the ASCII table.

Presentation of the most commonly used standard input-output functions contained in the StdIO library: putchar(),printf(), scanf(), itoa().Presentation of the function declaration method, as a local and external. Demonstrating the use of static variables.
Discussing the rules for default and forced type conversions. Rules for changing variable values when changing a variable's type. Meaning of "void" declarations. Methods for initializing variable values.
Dynamic memory allocation, malloc and free (used in C), new and delete (used in C++), the special value NULL, memory leaks; Deallocating allocated memory. Declaring and defining pointers to structures; accessing structure members using pointers to structures.

Recursion, recursive method of printing a tree, arithmetic expressions stored in a tree, the infix and postfix notation (Reverse Polish Notation, RPN).

Laboratory:
After each lecture, students receive a detailed list of the topics discussed and proposed topics for short programming tasks related to the lecture to be completed during laboratory classes. The laboratory instructor may prepare other tasks with similar topics. The tasks are solved individually on computers. The instructor provides instructions and verifies solutions.
Points are awarded for solved tasks. The instructor may also choose another form of checking skills, e.g. a short written test. After about two months of study, students also receive individual programming projects, which they work on at home and consult with the teacher during classes and/or consultations. This task is assessed on the basis of the documentation provided and the presentation of the solution

Bibliography:

1. B. W. Kernighan, D.M. Ritchie, The C Programming Language (ANSI C), Prentice-Hall.
2. B. Stroustrup, The C++ Programming Language. Addison-Wesley, Reading, MA. Also available in Polish: Język C++, WNT
3. https://www.learncpp.com/ - online tutorials
4. Robert Sedgewick - Algorithms in C

Learning outcomes:

1. Knows how to create computer software using standard programming libraries as well as specialized tools for creating simple computer graphics (K1A_W10).
2. Is able to implement basic algorithms in the C/C++ programming language (K1A_U10).

Assessment methods and assessment criteria:

The basis for passing the course is the laboratory (a positive assessment from the laboratory is necessary). Attendance at the laboratory and performance of individual exercises in the basic scope is obligatory (detailed rules for passing each laboratory exercise are presented during the laboratory classes). The final grade from the subject is a combination of laboratory grades and examination scores.

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	5	2024/2025-Z	