Computer Programming 1 - course description

General information

Course name	Computer Programming 1
Course ID	11.3-WK-MATP-PK1-L-S14_pNadGen1CNU5
Faculty	Faculty of Mathematics, Computer Science and Econometrics
Field of study	Mathematics
Education profile	academic
Level of studies	First-cycle studies leading to Bachelor's degree
Beginning semester	winter term 2020/2021

Course information

Semester	1
ECTS credits to win	6
Course type	obligatory
Teaching language	polish
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Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Laboratory	30	2	-	-	Credit with grade
Lecture	30	2	-	-	Exam

Aim of the course

The ability of elementary programming in Java with application of basic data structures, with regard to principles of structured programming. Knowledge and skills in basics of analysis of algorithms. The knowledge of basic methods of effective algorithms' constructing.

Prerequisites

Advanced skills in computer operating. The competences in maths at secondary school level.

Scope

Lecture

1. Computer system. Hardware and software. Algorithm, program, compiler, block diagram. (2 h)

2. Programming in Java. Programming paradigms. Program structure and syntax. Data simple types: integer, real, boolean, character, string. Variables declarations. Assignment statements. Input and output standard procedures. Procedures and functions: declaring procedures and functions, local declarations, value and variable parameters, constant parametrs, untyped parameters, string parameters, array parameters, open parameters, recursion, standard procedures and functions. Conditional and repetitive statements. Arrays. Strings (18 h)

3. Algorithmics. Computational complexity. Correctness of algorithms. Asymptotics. (5 h)

4. Techniques of constructing effective algorithms. Divide and conquer , greedy methods, dynamic programming. The basic algorithms of sorting. (5 h)

Laboratory

1. Block diagrams. (2 h)

2. Data simple types. Variables declarations. Assignment statements. Input and output standard procedures. (2 h)

3. Design, code, and debug simple programs with assignment statements, conditional statements and input-output standard procedures. (2 h)

4. Design, code, and debug programs with application of procedures and functions. (2 h)

5. Design, code, and debug programs with application of repetitive statements. (6 h)

6. Processing of arrays. (10 h)

7. Processing of strings. (4 h)

8. Run self written application, including all Java elements learned during the classes with documentation according to assigned specification. (2 h)

Teaching methods

Lecture: problem lecture.

Laboratory: laboratory exercises in computer lab – writing and running programs on assigned leading themes, analysis of these programs and analysis of algorithms applied. Students will work on some programs in groups consisting of 2-3 persons.

Besides, each student is required to present on last classes a self written application, including all Java elements learned during the classes, with documentation according to assigned specification.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form

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Student can design, write and debug simple programs using basic elements of Java.	• K_U26	• a test • activity during the classes • an exam - oral, descriptive, test and other	• Lecture • Laboratory
Student is able to work in group.	• K_U27	• activity during the classes	• Laboratory
Student is able to design and analyze algorithm based on specification and interpret and analyze exemplary programs in Java.	• K_U26	• a test • activity during the classes • an exam - oral, descriptive, test and other	• Lecture • Laboratory
Student has basic knowledge about computers arithmetic, paradigms of programing, algorithms and computational complexity.	• K_W08	• a test • activity during the classes • an exam - oral, descriptive, test and other	• Lecture • Laboratory
Student is able to prepare program documentation according to specification assigned.	• K_K05	• a test • activity during the classes • an exam - oral, descriptive, test and other	• Lecture • Laboratory

Assignment conditions

Lecture. Written examination verifying the education outcome in area of knowledge and skills.

Laboratory. Final grade is granted based on number of points received during studies. Points are received for written tests, active participation in classes and on last classes presented application.

Final course grade consists of laboratory classes' grade (60%) and examination grade (40%). Positive grade from laboratory classes is the necessary condition for participation in examination. The positive grade from examination is the necessary condition for course completion.

Recommended reading

1. Banachowski L., Diks K., Rytter W.: Algorytmy i struktury danych, WNT, W-wa 1999.
2. Lembas J., Kawa R.: Wstęp do informatyki PWN 2017.
3. Majczak A.: Programowanie strukturalne i obiektowe, Helion, Gliwice, 2010.
4. Schildt H.: Java. Przewodnik dla początkujących, Wydanie VI, Helion 2015.

Further reading

1. Cormen T.H,. Leiserson Ch.E, Rivest R.L. : Introduction to Algorithms, MIT Press, 2001.
2. Wirth N.: Algorithms and Data Structured, 1985.

Notes

Modified by dr Alina Szelecka (last modification: 03-12-2020 06:57)