Fundamentals of computer science and digital technique - course description

General information

Course name	Fundamentals of computer science and digital technique
Course ID	06.9-WE-ELEKTP-FCSDT
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Electrical Engineering
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2021/2022

Course information

Semester	3
ECTS credits to win	6
Course type	obligatory
Teaching language	english
Author of syllabus	• dr inż. Kamil Mielcarek • dr inż. Mirosław Kozioł

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
Lecture	30	2	-	-	Exam
Laboratory	30	2	-	-	Credit with grade

Aim of the course

- familiarize students with the rules of using the operating systems of the UNIX family
- development of students' ability to use UNIX mechanisms and tools
- development of shell programming skills
- introduce students to the basics of digital circuits technology

Prerequisites

Scope

Introduction to digital circuits technology. Digital information - numerical codes (binary, decimal, hexadecimal, and its conversions).
Arithmetic operations on binary codes without sign. Negative values representation (sign-and-magnitude, ones' complement, two's complement).
Boolean algebra. Logical function (algebraic, truth table, Karnaugh map). Karnaugh map minimization.
Digital circuit structure. Combination circuit, sequential circuit. Synchronous and asynchronous systems.
Basic logic gates (symbols, basic parameters, systems with three-state output, open collector, Schmitt inputs). Connecting different technology gates.
Digital circuits of medium scale integration (multiplexer, demultiplexer, SR, JK, D, T, counters, registers, monostable flip-flop).

Basic concepts, features and operating system construction.
Connecting to the system. Basic configuration files.
Working on multi-access systems. Communication between users. E-mail.
File system basics. The concept of relative and absolute path. File name, mask names and meta-symbols.
Basic file operations commands. Links.
Layout of a typical directory tree. Location of the most important system files.
Simple file processing. View the contents of text files. Access rights.
VI Text editor. Find command. Shell programs. User configuration files.
Environment Variables. Streams and pipes, filters. Regular expressions.
Programming in shell language. Test instruction. Conditional instruction. Loops and conditional executing. Functions.

Teaching methods

Conventional lecture
Laboratory exercises

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student is able to develop programs in the UNIX shell language		• a quiz • an ongoing monitoring during classes	• Laboratory

Outcome description	Outcome symbols	Methods of verification	The class form
Student has basic knowledge of: digital circuits, operating system construction, its services, safe use of the system.		• an evaluation test • an exam - oral, descriptive, test and other	• Lecture
Student uses UNIX commands and utilities		• a quiz • an ongoing monitoring during classes	• Laboratory
Student can perform a logical function, apply the rules of middle-scale integration.		• a quiz • an ongoing monitoring during classes	• Laboratory
Student knows the rules of mid-scale integration and UNIX commands and utilities		• an evaluation test • an exam - oral, descriptive, test and other	• Lecture

Assignment conditions

Lecture: student have to obtain positive marks from written tests conducted at least once in a semester,
Laboratory: student have to get positive grades with all the exercises planned for the course.

Components of the final grade: lecture: 50% + laboratory: 50%

Recommended reading

1. Pratta S., Martin D.: Biblia systemu UNIX V, LT&P, Warszawa 1994.
2. Marczyński J.: Unix: użytkowanie i administracja, Helion, 2000.
3. Armstrong J., Taylor D.: UNIX dla każdego, Helion, 2000.
4. T. Łuba, Synteza układów logicznych. Podręcznik, Oficyna Wydawnicza PW, Warszawa 2005.
5. T. Łuba (red.), Synteza układów cyfrowych, Wydawnictwa Komunikacji i Łączności, Warszawa 2003.
6. G. De Micheli, Synteza i optymalizacja układów cyfrowych, Wydawnictwa Naukowo-Techniczne, Warszawa 1998.

Further reading

1. Lal K., Rak T.: Linux. Komendy i polecenia. Praktyczne przykłady, Helion, 2005,
2. Silberschatz A., Galvin P. B.: Podstawy systemów operacyjnych, WNT, Warszawa, 2000.
3. S. Hassoun, T. Sasao, R. Brayton (ed.), Logic Synthesis and Verification, Kluwer Academic Publishers, 2002.
4. T. Sasao, Switching Theory for Logic Synthesis, Kluwer Academic Publishers, 1999.

Notes

Modified by dr hab. inż. Paweł Szcześniak, prof. UZ (last modification: 08-07-2021 21:49)