| | | | |
|---|---|---|---|
| **Title of Course** | **Low level programming** | | |
| **Semester** | **Spring** | | |
| **Teaching Hours per Course:** | **Total** | **- Lectures:** | **- Tutorials:** |
| | 60 | 30 | 30 |
| **ECTS Credits** | 4 | | |

**The content of education**

| | |
|---|---|
| **Aims of Course** | The aim of the course is to acquire knowledge, skills and social competences in the field of: computer operation at the processor and memory level, creating programs in C and assembler languages, using knowledge about the operation of the computer processor and memory to optimize programs, recognizing and fixing problems with programs written in low-level programming languages. |
| **Program** | ***Lectures:***<br>• CISC assembler (x86 family (32- and 64-bit for Linux systems)<br>• RISC assembler (Atmel AVR family (8-bit, modified Harvard architecture), Arduino platform)<br>• RISC assembler (ARM family (32- and 64-bit), Raspberry Pi platform)<br><br>***Tutorials:***<br>• Pointers. Pointer operations. Dynamic memory allocation.<br>• Memory management methods. Implementing different memory management strategies. Custom allocators. Detecting and fixing memory leaks. Using valgrind tool.<br>• Creating multi-file projects. Build scripts. Make and cmake tools.<br>• Detecting memory errors and undefined behavior.<br>Optimizing programs. |
| **Conditions of completion** | ***Lectures:*** test with closed questions; +1 for correct answer, -1 for wrong answer, 0 for leaving question unanswered (min. -N points, max. +N points). Open-ended questions are also possible, scored depending on the level of difficulty of the question (min. 0 points, max. M points).<br>> 86% of N+M: A<br>> 72% of N+M: B<br>> 58% of N+M: C<br>> 44% of N+M: D<br>>= 30% of N+M: E<br>< 30% F<br><br>***Tutorials:***<br>E od D - complete all small project during the semester. For better mark (from C to A) complete final project.<br><br>***Final mark:*** average grades from lectures and tutorials (positive mark from A to E is required for both of them). |
| **Teacher** | PhD. Piotr Fulmański |