

**AGH**AGH UNIVERSITY OF SCIENCE  
AND TECHNOLOGY

Module name: Basic of informatics

Academic year: 2013/2014 Code: RMS-1-103-s ECTS credits: 4

Faculty of: Mechanical Engineering and Robotics

Field of study: Mechatronics with English as instruction language Specialty: —

Study level: First-cycle studies Form and type of study: Full-time studies

Lecture language: English Profile of education: Academic (A) Semester: 1

Course homepage: —

Responsible teacher: dr inż. Miękina Lucjan (miekina@agh.edu.pl)

Academic teachers: dr Pluta Marek (pluta@agh.edu.pl)  
dr inż. Miękina Lucjan (miekina@agh.edu.pl)

## Description of learning outcomes for module

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Connections with FLO	Method of learning outcomes verification (form of completion)
Social competence			
M_K001	can study compound matters of informatics, regarding their critical importance with respect to practical applications	MS1A_K04	Execution of laboratory classes
M_K002	can analyze the requirements for a programming task nad properly organize the steps necessary to complete the project	MS1A_K05	Execution of laboratory classes
Skills			
M_U001	knows and can properly use the computational resources available at AGH	MS1A_U14	Execution of laboratory classes
M_U002	can describe the principle of digital computer operation (its block diagram, instruction fetching and execution, interrupting)	MS1A_U14	Examination, Test, Test results
M_U003	can encode integer and real numbers to binary system and perform on them the basic arithmetic operations	MS1A_U14	Examination, Test, Execution of laboratory classes, Test results
M_U004	can use the UNIX commands to schedule typical user actions	MS1A_U14	Examination, Test, Execution of laboratory classes

M_U005	can write a UNIX shell script to implement a compound task (installation, configuration)	MS1A_U14	Execution of laboratory classes
M_U006	can define an algorithm to computationally solve a stated problem, can assess its computational complexity	MS1A_U14	Examination, Execution of laboratory classes
M_U007	can write and execute a program in a high level programming language (C), which has: functions with parameters, arrays and pointers (including the pointers to dynamically allocated memory and to functions), loops, structures and unions, selections statements (if-else, switch, break, continue), input/output operations (file and memory oriented), expressions and operators.	MS1A_U14	Examination, Test, Execution of laboratory classes
M_U008	can use, while programming in C, the basic algorithms (recursion, sorting) and data structures (stack, queue, hash table, tree)	MS1A_U14	Execution of laboratory classes
M_U009	can use the standard C library and basic external libraries (GLib) while programming in C	MS1A_U14	Examination, Execution of laboratory classes
Knowledge			
M_W001	has a basic knowledge of computer systems architecture and operation	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W002	has a basic knowledge of numeral systems (binary, hexadecimal), including data representation and common operations.	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W003	has a basic knowledge of operating systems structure and operation (processes and threads, file systems, memory management, handling devices, interprocess communication)	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W004	knows and understands the basic UNIX system commands and tools	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W005	knows and understands the principles of writing UNIX shell scripts	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W006	knows and understands the notion of algorithm, its properties and specification methods; knows and understands methods of computer programming	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W007	knows and understands the principles of programming in the procedural high level language (C)	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W008	knows and understands the basic algorithms (recursion, sorting) and data structures (stack, queue, hash table, tree)	MS1A_W10	Examination, Test, Execution of laboratory classes
M_W009	knows the standard C library and basic external libraries (GLib), knows the principles of using external libraries	MS1A_W10	Examination, Test, Execution of laboratory classes

## FLO matrix in relation to forms of classes

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Form of classes
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		Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Others	Fieldwork classes	Workshops	E-learning
Social competence												
M_K001	can study compound matters of informatics, regarding their critical importance with respect to practical applications	-	-	+	-	-	-	-	-	-	-	-
M_K002	can analyze the requirements for a programming task and properly organize the steps necessary to complete the project	-	-	+	-	-	-	-	-	-	-	-
Skills												
M_U001	knows and can properly use the computational resources available at AGH	-	-	+	-	-	-	-	-	-	-	-
M_U002	can describe the principle of digital computer operation (its block diagram, instruction fetching and execution, interrupting)	-	-	+	-	-	-	-	-	-	-	-
M_U003	can encode integer and real numbers to binary system and perform on them the basic arithmetic operations	-	-	+	-	-	-	-	-	-	-	-
M_U004	can use the UNIX commands to schedule typical user actions	-	-	+	-	-	-	-	-	-	-	-
M_U005	can write a UNIX shell script to implement a compound task (installation, configuration)	-	-	+	-	-	-	-	-	-	-	-
M_U006	can define an algorithm to computationally solve a stated problem, can assess its computational complexity	-	-	+	-	-	-	-	-	-	-	-
M_U007	can write and execute a program in a high level programming language (C), which has: functions with parameters, arrays and pointers (including the pointers to dynamically allocated memory and to functions), loops, structures and unions, selections statements (if-else, switch, break, continue), input/output operations (file and memory oriented), expressions and operators.	-	-	+	-	-	-	-	-	-	-	-

M_U008	can use, while programming in C, the basic algorithms (recursion, sorting) and data structures (stack, queue, hash table, tree)	-	-	+	-	-	-	-	-	-	-	-	-
M_U009	can use the standard C library and basic external libraries (GLib) while programming in C	-	-	+	-	-	-	-	-	-	-	-	-
Knowledge													
M_W001	has a basic knowledge of computer systems architecture and operation	+	-	-	-	-	-	-	-	-	-	-	-
M_W002	has a basic knowledge of numeral systems (binary, hexadecimal), including data representation and common operations.	+	-	-	-	-	-	-	-	-	-	-	-
M_W003	has a basic knowledge of operating systems structure and operation (processes and threads, file systems, memory management, handling devices, interprocess communication)	+	-	-	-	-	-	-	-	-	-	-	-
M_W004	knows and understands the basic UNIX system commands and tools	+	-	-	-	-	-	-	-	-	-	-	-
M_W005	knows and understands the principles of writing UNIX shell scripts	+	-	-	-	-	-	-	-	-	-	-	-
M_W006	knows and understands the notion of algorithm, its properties and specification methods; knows and understands methods of computer programming	+	-	-	-	-	-	-	-	-	-	-	-
M_W007	knows and understands the principles of programming in the procedural high level language (C)	+	-	-	-	-	-	-	-	-	-	-	-
M_W008	knows and understands the basic algorithms (recursion, sorting) and data structures (stack, queue, hash table, tree)	+	-	-	-	-	-	-	-	-	-	-	-
M_W009	knows the standard C library and basic external libraries (GLib), knows the principles of using external libraries	+	-	-	-	-	-	-	-	-	-	-	-

## Module content

### Lectures

The lecture covers:

- computer systems architecture and operation
- numeral systems (binary, hexadecimal), including data representation and common operations
- operating systems structure and operation (processes and threads, file systems, memory management, handling devices)
- basic UNIX system commands and tools
- principles of writing UNIX shell scripts
- notion of algorithm, its properties and specification methods; knows and understands methods of computer programming
- principles of programming in the procedural high level language C, in particular: functions with parameters, arrays and pointers (including the pointers to dynamically allocated memory and to functions), loops, structures and unions, selection statements (if-else, switch, break, continue), input/output operations (file and memory oriented), expressions and operators.
- basic algorithms (recursion, sorting) and data structures (stack, queue, hash table, tree)
- standard C library and basic external libraries (GLib), the principles of using external libraries

### **Laboratory classes**

During laboratories the students first discuss the ideas presented in the lectures, then apply these ideas to solve the scheduled problems. The solution can have a form of manually conducted computations, operating system commands, scripting or programs in high level programming language. Next, the solution is applied and its result is evaluated and discussed.

### **Method of calculating the final grade**

Grades are calculated as follows:

- software labs 50 %
- semi exam (quizz) 25 %
- final exam 25 %

All of them must be passed.

### **Prerequisites and additional requirements**

Prerequisites and additional requirements not specified

### **Recommended literature and teaching resources**

- W. Stallings, Computer Organization and Architecture, 9 Ed., Prentice Hall, 2013
- Silberschatz, Galvin, Gagne: Operating System Concepts, 8 Ed., John Wiley & Sons, Inc.
- B. Kernighan; Dennis M. Ritchie (March 1988). The C Programming Language, 2nd Ed., Englewood Cliffs, NJ: Prentice Hall. ISBN 0-13-110362-8

### **Scientific publications of module course instructors related to the topic of the module**

Additional scientific publications not specified

### **Additional information**

None

**Student workload (ECTS credits balance)**

Student activity form	Student workload
Participation in lectures	30 h
Preparation for classes	28 h
Participation in laboratory classes	28 h
Realization of independently performed tasks	25 h
Examination or Final test	4 h
Summary student workload	115 h
Module ECTS credits	4 ECTS