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|--------------|--|-----------|-----------------------|
| Course name: | <b>FOUNDATIONS OF COMPUTER SCIENCE III</b><br><b>(FONDAMENTI DI INFORMATICA III)</b> |           |                       |
| Year:        | <b>1<sup>st</sup></b>  | Semester: | <b>2<sup>nd</sup></b> |
| Course type: | <b>Compulsory</b>  |           |                       |
| Teacher:     | <b>Letizia LEONARDI</b>  |           |                       |

|                        |           |                        |           |
|------------------------|-----------|------------------------|-----------|
| <b>Lectures</b>        |           | <b>Laboratory</b>      |           |
| Total number of hours: | 52        | Total number of hours: | 26        |
| Duration:              | 6.5 weeks | Duration:              | 6.5 weeks |
| Hours per week:        | 8         | Hours per week:        | 4         |
| <i>Theory:</i>         | 6         |                        |           |
| <i>Exercise:</i>       | 2         |                        |           |

**Assessment method**  
Final grade is given in conjunction with course "Foundations of Computer Science IV"

|              |                |
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| CODE: IDI003 | ECTS CREDITS 6 |
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### AIMS

The course, in conjunction with the following course of Foundations of Computer Science IV, aims at furnishing a comprehension of computers in terms of system programming. To this purpose, the aim is to achieve good system knowledge of the programming language C, focusing on the aspects of modular and data abstraction programming. In addition, the course introduces the object-oriented programming paradigm by using the programming language C++. Finally, the basic operating system concepts are presented together with the use of command processors for MS-DOS and UNIX. The laboratory activities use an integrated programming environment for C and C++, and both the MS-DOS and UNIX operating systems.

### PROGRAMME

- Programming  
Design of programs by using high-level languages: C as system programming language and C++ as evolution of C for in-the-large programming.
- Programming environments and tools  
Basic operating system concepts: properties and structure of the file system. Mono-user and multi-user operating systems: MS-DOS and UNIX.  
Definitions of the characteristics of the command processors and their environment: the MS-DOS command interpreter and the UNIX shell.  
Support tools for the development and the execution of C and C++ programs (in MS-DOS and in UNIX).  
Methods of use of the operating system functions by using a high-level programming language as C.

### BIBLIOGRAPHY

- G.BELLAVIA, A.CORRADI, L.LEONARDI: Fondamenti di Informatica II: Dispense del corso. ESCULAPIO, PROGETTO LEONARDO (seconda edizione) 1994 (in Italian).
- L.LEONARDI: Linguaggio C: Raccolta di esercizi e relative soluzioni. ESCULAPIO, PROGETTO LEONARDO, 1996 (in Italian).
- B.W.KERNIGHAN, D.M.RITCHIE: Il linguaggio C. CASA EDITRICE JACKSON, 1985 (anche nuova edizione (C ANSI), 1990) (in Italian).
- N.GEHANI: Advanced C: Food for the Educated Palate. COMPUTER SCIENCE PRESS, 1985.
- B.STROUSTRUP: The C++ Programming Language. ADDISON WESLEY (second edition) 1991.

### PRE-REQUISITES

Knowledge of the programme of the course "Foundations of Computer Science II".

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|--------------|--|-----------|-----------------------|
| Course name: | <b>FOUNDATIONS OF COMPUTER SCIENCE IV</b><br><b>(FONDAMENTI DI INFORMATICA IV)</b> |           |                       |
| Year:        | <b>1<sup>st</sup></b>  | Semester: | <b>2<sup>nd</sup></b> |
| Course type: | <b>Compulsory</b>  |           |                       |
| Teacher:     | <b>Letizia LEONARDI</b>  |           |                       |

|                        |           |                        |           |
|------------------------|-----------|------------------------|-----------|
| <b>Lectures</b>        |           | <b>Laboratory</b>      |           |
| Total number of hours: | 52        | Total number of hours: | 26        |
| Duration:              | 6.5 weeks | Duration:              | 6.5 weeks |
| Hours per week:        | 8         | Hours per week:        | 4         |
| <i>Theory:</i>         | 6         |                        |           |
| <i>Exercise:</i>       | 2         |                        |           |

**Assessment method**  
Written test + evaluation of a laboratory project + oral  
(Final grade is given in conjunction with course "Foundations of Computer Science III")

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| CODE: IDI004 | ECTS CREDITS 6 |
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### AIMS

The course, in conjunction with the course of Foundations of Computer Science III, aims at furnishing a comprehension of computers in terms of system programming. To this purpose, the aim is to achieve good system knowledge of an Assembler programming language and its corresponding architecture. Particularly, the course focuses on the development of programs part by using Assembler and part by using C. The laboratory activities use an integrated programming environment for C and Assembler, and the MS-DOS operating system.

### PROGRAMME

- Architecture and low-level languages  
Basic architectural elements: central processing unit, main memory, secondary storage, input/output devices.  
Design of Assembler programs: instructions and addressing modes, absolute and relocatable programs, recursive and reentrant code, segmentation and modularity, asynchronous event handling.
- Program execution environment  
Execution program model on the operating system virtual machine. Run-time support organisation for a program.
- Programming environments and tools  
Support tools for the development and the execution of Assembler programs in MS-DOS. Methods of use of the operating system functions by using an Assembler programming language.  
Relationship between high-level languages (as C) and an Assembler language.

### BIBLIOGRAPHY

- G.BELLAVIA, A.CORRADI, L.LEONARDI: Fondamenti di Informatica II: Dispense del corso. ESCULAPIO, PROGETTO LEONARDO (seconda edizione) 1994 (in Italian).
- H.S.STONE (ed.): Introduction to Computer Architecture. SRA Inc., 1980.

### PRE-REQUISITES

Knowledge of the programme of the course "Foundations of Computer Science III".