

Teacher name	Vito Nicola Convertini
Degree Course	SMEF-EFI-ESMI
Teaching	Information and Communication Technology
Academic year	2024-2025
Period of development	First semester
University credits (CFU)	4/6
Academic discipline	INF/01
Teacher web page	

Pre-requisites

NOBODY.

Target skills and knowledge (Objectives)

The course aims to provide a general epistemological approach to computer science and the minimum set of knowledge and skills that every student of statistical sciences should possess to actively participate in digital transformation within organizations.

Detailed program

1. Computer structure

The concept of virtual machine. Hardware and Software. General scheme of a data processing system. Types of computers. Computer memories. The central memory. The ROM memory. The cache memory. Buffer memory. Flash memories. Mass memories. The processor. Evolution of microprocessors. Multiprocessor architectures. Input/Output: The input/output ports of the computer. The input units. The output units.

2. Algorithms

The concept of algorithm. Constants, variables, and instructions of an algorithm. Representation of algorithms. Programming languages. Interpreted and compiled languages.

3. Operating systems

Features of operating systems. The Onion Skin model. Monotasking operating systems. Multitasking operating systems. The processor manager. The central memory manager. The file system. Peripheral managers. The Windows operating system. The Linux operating system. Linux commands.

4. Data Storage

The concept of traditional data files. Sequential and index files. Data file operations. The Data Base Management System (DBMS). Database design. Requirements analysis. Conceptual design. The Entity-Relationship model. Implementation according to a database model. Database management languages. Type of database users. The operations of relational algebra.

5. Computer networks

Communication between computers. The ISO/OSI model. The layers and their functions. How transmission takes place. Protocols and interfaces. Local networks. The means of transmission. The types of networks. Network technologies. Client-server and peer-to-peer architectures. Geographical networks. Analog connectivity. Digital connectivity. Packet-switched networks. Repeaters. Bridges. Routers. Gateways. Internet. Internet services. HTML and CSS. Firewall.

6. Business Information Systems

Resources. Information systems. Classification of information systems. OLTP and OLAP. Data backup. Disaster recovery. Business continuity. Introduction to Cloud computing. Software for advanced statistical analysis and big data.

7. Computer security, cryptography and digital signature (only for degree courses with 6 CFU assignment)

Security concepts, data threats, information value, personal security, file security. Malware, types and methods, protection and removal. Access control, password management, secure data management. Cryptography, symmetric and asymmetric cryptography. Digital signature

Bibliographic References and Teaching Materials

- Lecture notes issued by the teacher

Organization of teaching

- Internal lesson cycles: Yes
- Supplementary courses: Yes
- Tutorials: Yes
- Seminars: Yes
- Lab Activity: Yes
- Project work: No
- Study Visits: No

Modality of delivery of training activities

Lessons frontal exercises, exercises

practices, seminar activities with external professionals.

Assessment methods

The collection of student attendance at lessons is envisaged, in order to establish the status of "attending" for all those who have reached a minimum of 70% of attendance.

Attending students can choose to take the exam divided into two exemptions:

- First exemption to be held during the suspension of lessons, typically in mid-November. Duration of the test: 1 hour.
- Second exemption to be held in conjunction with the first session in January. Duration of the test: 1 hour

The two exemptions include 15 questions weighing 1 point; for a maximum grade of 15/15.

The final result of the exam will therefore be given by the sum of the marks of the two exemptions.

For non-attending students, an appeal with a written test in a single solution. Duration of the test: 2 hours.

The written test includes 20 questions of variable weight with sum of 30 points.

All written tests include both open-ended and closed-ended questions (with exhaustive justification for the choice made).

The final result of the exam depends heavily on the grade of the written test; in fact, in the case of voting

- from 0 to 13: the exam session is not passed; the student will have to take the test at a subsequent session.
- from 14 to 17: the exam is not passed with the possibility of recovery; To pass the exam (with a maximum mark of 18), the student will have to take the oral test.
- from 18 to 30: the exam session is passed; The student, therefore, will be able to:
 - accept the grade, in which case they must accept the same through the online procedure for recording the exams. You may decide to take the oral exam for increase the grade: however, the grade may decrease below the threshold of 18
 - refuse the grade, in which case he/she will not have to accept the grade through the online procedure of
Recording of exams

At the written test, the student must observe the following rules:

- Present yourself with an identification document (identity card or driving license).
- Go to the bathroom before the roll call: during the test you will not be allowed to go out, without any exception.
- Smartphones will have to be turned off. If a smartphone rings or vibrates during the test, the examination of the owner of the smartphone will be cancelled. Students who need to keep their smartphone on, for any reason, can place it on the chair. It will be the teacher's responsibility to hand over the smartphone if it rings/vibrates
- All calculations should be evident on the task.

- For those who write with bad handwriting: the assignment will NOT be correct if it is illegible. For this reason, it is advisable to write in block letters. In which case, the teacher is available, on request, to give additional time to make the content readable.
- Calculators cannot be used.
- The results will be communicated via a notice on Microsoft Teams or other platform made available by the Department. The notice will contain:
 - Date of the exam session
 - Freshman