UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Fisica e Chimica - Emilio Segrè
ACADEMIC YEAR	2023/2024
BACHELOR'S DEGREE (BSC)	OPTICS AND OPTOMETRY
SUBJECT	COMPUTER SCIENCE
TYPE OF EDUCATIONAL ACTIVITY	A
AMBIT	50164-Discipline matematiche e informatiche
CODE	03927
SCIENTIFIC SECTOR(S)	INF/01
HEAD PROFESSOR(S)	GARLISI DOMENICO Ricercatore a tempo determinato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**GARLISI DOMENICO** Wednesday 15:00 16:30 Stanza 222 presso il Dipartimento di Matematica e Informatica, via Archirafi 34 Friday 15:00 16:30 Stanza 222 presso il Dipartimento di Matematica e Informatica, via Archirafi 34

DOCENTE: Prof. DOMENICO GARLISI

PREREQUISITES	No prerequisites.
LEARNING OUTCOMES	Knowledge and comprehension skills Acquisition of basic knowledge of fundamentals of Computer Science; representation of information in electronic computers; data transmission protocols, INTERNET and its applications; operating systems; algorithms; programming languages and their classification; spreadsheets, software packages for information processing. Ability to apply knowledge and understanding The student must be able to a) have a thorough knowledge of a personal computer, know how to use it to write and store texts and tables; b) know how to organise experimental data, calculate quantities related to them and create graphs related to them; c) be able to surf the net and know how to search for information on the INTERNET and process it locally; Autonomy of judgement Being able to assess how to organise knowledge independently in order to choose the most appropriate ways to use software for writing and filing, texts and tables, to know how to search for information on the INTERNET and to know how to use spreadsheets and other computer tools for advanced information processing. Communication skills Ability to present information processing issues in an accomplished form. Learning ability To be able to continue independently in the study and in-depth study of spreadsheets and computer tools for information processing, using the knowledge, skills and competencies developed during the course to apply them in the continuation of the activities of the course of study.
ASSESSMENT METHODS	The test consists of two parts: a practical computer-based test and an oral test. The computer-based practical test consists of implementing a simple data analysis program using a spreadsheet. The objective of this test is to verify that the student knows how to use a computer tool for information processing. The oral examination consists of a first part in which a discussion is held on the program constructed by the student in order to highlight which parts can be improved/optimised. The second part of the oral examination aims to test the student's degree of autonomy. The final assessment will be graded on the basis of the following conditions: a) only basic knowledge and limited ability to develop the relevant arguments or derivations, sufficient ability to expound and analyse phenomena, problems and solutions (mark 18-21); b) good knowledge and good ability to develop arguments or derivations, good ability to expound and analyse phenomena as well as conceptual problems and their solutions (mark 22-25); c) thorough (but not full) knowledge of the subject matter, articulate presentation and analysis, but with some hesitation, of the phenomena, problems and relative solutions (grades 26-28); d) thorough and full knowledge of the concepts and full mastery in developing the relative arguments or derivations, excellent capacity for presentation and analysis, including critical analysis, of the phenomena, problems and solutions, in the best of cases with original contributions of study and analysis as well as excellent communication skills (grades 29-30L).
EDUCATIONAL OBJECTIVES	Provide basic elementary knowledge of the structure of computer systems and the principles of their operation. To have an understanding of computer tools suitable for information processing and analysis, as well as the ability to use them in the further course of study.
TEACHING METHODS	Lectures and Laboratory. During the lectures, basic computer science concepts are covered, such as algorithms, computer structure, the Internet, and the rudiments of programming techniques. During the laboratory, practical experiences with data science concepts are carried out in spreadsheets. The laboratory activities are mandatory. The maximum permissible limit for absences during laboratory activities at 25%.
SUGGESTED BIBLIOGRAPHY	Testo di Base: M. Schneider, J. Gersting;Informatica. Algoritmi, architetture, linguaggi, applicazioni; Maggioli Editore; ISBN: 9788891644817 Testi di approfondimento con importanza secondo l'ordine riportato di seguito: 1) A. Brogi, A. Martinelli, V. Gervasi, P. Manghi, A. Fabrizio, G. Pacini; Il foglio elettronico per Medicina e Farmacia, Collana IT4PS, McGraw-Hill. ISBN 978-8838662546 2) P. Manghi, A. Brogi, V. Gervasi, A. Martinelli, G. Fiorentino, A. P: Pala; Le basi di Dati per Medicina e Farmacia, Collana IT4PS, McGraw-Hill. ISBN 978-8838662576 3) P. Atzeni, S. Ceri, P. Fraternali, S. Paraboschi, R. Torione; Basi di Dati; McGrawHill, V edizione, ISBN 978-8838694455

SYLLABUS

Hrs	Frontal teaching
1	Introduction to the Course. Computer and Algorithms.
1	Computer systems and their classification. Historical notes. Personal computers and workstations.
2	Architecture of a personal computer. The buses, RAM memory, ROM, Cache, registers. Mass memories. The CPU. Operating principles of a personal computer.
1	Introductin to the wordprocessor applications
2	Spreadsheets
2	The Internet, how it was born and developed. General information on the use of the Internet. The networks topology. The main network actors: routers, access points. Introduction on TCP/IP. The main ways of accessing the network: telnet, ftp, ssh.
3	Advanced Internet tools: the World Wide Web; e-mail, client-server communication, http. HTML
1	Identity and the Web.
2	Binary, octal and hexadecimal numbering systems. Encoding of integers. Encoding of real numbers in fixed and floating point.
2	Encoding of characters and logical operators. Encoding of images and sounds.
4	Operating systems. Algorithms and flowcharts. Implementation of algorithms using flowcharts. Introduction to programming languages, interpreters and compilers. The stages of compilation: from source to executable.
1	Presentation tool
2	Introduction to relational databases and DBMSs, definition and management of an record.

Hrs	Workshops
2	Use of text editors and word processors
2	Computer organisation in files and folders. Use of spreadsheets
9	From basic operations to the calculation of complex statistics of a data file using a spreadsheet (I, II, III).
6	Graphs, elementary fit procedures of measured data via spreadsheet (I and II).
6	Histograms and hints at statistical significance using spreadsheet (I and II).
2	Simulation of a shop record using spreadsheet
3	Spreadsheet - extraction of aggregated information.
1	Web browsing applications. E-mail applications. Access and search techniques in Google and Pubmed.
2	Databases.
3	Programmes for creating presentations.