SYLLABUS
COURSE DESCRIPTION YEAR 2022/2023

COURSE TITLE	**Computational Security**
COURSE CODE	
SCIENTIFIC SECTOR	INF/01
DEGREE	Bachelor in Computer Science
SEMESTER	1st
YEAR	3rd
CREDITS	12
MODULAR	Yes

TOTAL LECTURING HOURS	80
TOTAL LAB HOURS	40
ATTENDANCE	Attendance is not compulsory; non-attending students may contact the lecturer at the start of the course to get support on the modalities of the independent study
PREREQUISITES	Students should have done the following courses: Software Engineering, Linear Algebra. Students should have a solid mathematical foundation and be familiar with basic programming concepts, data structures and algorithms. These prerequisites are covered in any Bachelor degree in Computer Science.
COURSE PAGE	https://ole.unibz.it/

SPECIFIC EDUCATIONAL OBJECTIVES	• Type of course: "attività formativa affine o integrativa" **MODULE 1 Computational Mathematics**: The aim of this module is to teach students how to derive, analyze and implement numerical methods for solving systems of linear equations, computing eigenvalues and singular values of matrices, approximating functions and roots. To achieve these aims, students will solve mathematical problems in both exact and finite precision arithmetic, and analyze the mathematical theory to build the methods used for the numerical solution. The module will cover the basic topics of stability, error analysis and efficiency for various numerical linear algebra and approximation algorithms. A software environment for numerical computing known as Matlab will be introduced that allows high-performance matrix manipulations, data plotting, efficient implementation of algorithms.

	MODULE 2 Information Security: The main aim of this exam is to provide an introduction to the field of information security. The students learn about the technical as well as the management side of security in information systems. They acquire knowledge about fundamental principles of security and also about practical approaches to securing information systems.

MODULE 1	**Computational Mathematics**
MODULE CODE	76253A
MODULE SCIENTIFIC SECTOR	MAT/08
CREDITS	6
LECTURER	Carpentieri Bruno
SCIENTIFIC SECTOR OF THE LECTURER	MAT/08
TEACHING LANGUAGE	**English**
OFFICE HOURS	Thursday 16:00-17:30. By previous email appointment: bruno.carpentieri@unibz.it Office POS 3.10, third floor, Faculty of Computer Science.
TEACHING ASSISTANT	Same as lecturer
OFFICE HOURS	-
LIST OF TOPICS COVERED	• Principles of finite precision computation • Direct methods for solving linear systems • Iterative methods for linear algebra • Singular value decomposition • Rootfinding methods for solving nonlinear equations • Functional approximation
TEACHING FORMAT	Frontal lectures, exercises.

MODULE 2	**Information Security**
MODULE CODE	76253B
MODULE SCIENTIFIC SECTOR	ING-INF/05
CREDITS	6
LECTURER	Maggi Fabrizio Maria

SCIENTIFIC SECTOR OF THE LECTURER	ING-INF/05
TEACHING LANGUAGE	**Italian**
OFFICE HOURS	By previous email appointment: maggi@inf.unibz.it Office POS 3.08, third floor, Faculty of Computer Science
TEACHING ASSISTANT	Same as lecturer
OFFICE HOURS	-
LIST OF TOPICS COVERED	• Basic definitions: CIA, threat, attack, vulnerability, access control • Risk assessment • Basics of cryptography • Network attack and defense • Usability • Security policies
TEACHING FORMAT	Frontal classroom lecture and lab sessions

LEARNING OUTCOMES	**Knowledge and understanding:** • know critical security aspects of information systems, the basic concepts of security and techniques for the development of secure systems; **Applying knowledge and understanding:** • be able to evaluate the quality of information systems and to identify critical aspects; • be able to apply the own knowledge in different working contexts; **Making judgements** • Must have the ability to independently select the documentation required to keep abreast of the frequent technological innovations in the field by using a wide variety of documentary sources: books, web, magazines; **Communication skills** • Must be able to coordinate the work of a project team and to interact positively with members of the group; **Learning skills** • Must also be able to independently keep up to date with developments in the most important areas of Computer Science.

ASSESSMENT	Final exam: the exam covers the topics addressed in MODULE 1 and MODULE 2 and consists of two parts: • MODULE 1 (50% of the final exam): The written exam will consist of a set of verification questions, transfer of knowledge questions and exercises. • MODULE 2 (50% of the final exam): ○ Project work to test knowledge application skills and communication skills

	○ Oral exam with verification questions and questions to test knowledge application skills At the end of MODULE 1, a midterm test will be offered covering only the topics of MODULE. Students who get at least 18/30 at the midterm test, will have to pass only MODULE 2 at the final exam.
ASSESSMENT LANGUAGE	English (Module 1) Italian (Module 2)
EVALUATION CRITERIA AND CRITERIA FOR AWARDING MARKS	The exam is evaluated based on correctness of answers, clarity of answers, ability to summarize, evaluate, and establish relationships between topics, skills in critical thinking, quality of argumentation, problem solving ability. In order to pass the exam, the students should get at least 18/30 in each module. The mark related to each part contributes to the final grade as follows: • MODULE 1: 50% • MODULE 2: 50% Assessment 1: project work (30%) Assessment 2: oral exam (70%) Relevant for assessment 1: ability to work in teams, skill in applying knowledge in a practical setting, ability to summarize in your own words.

REQUIRED READINGS	MODULE 1: Greenbaum, A. and Chartier, T. P. (2012), Numerical Methods. Design, Analysis, and Computer Implementation of Algorithms, Princeton University Press Lindfield, G. R. and Penny, J. E. T. (2012), Numerical Methods Using MATLAB, Academic Press Attaway, S. (2016), Matlab: A Practical Introduction to Programming and Problem Solving, Butterworth-Heinemann MODULE 2: Material provided in the form of slides and scientific papers provided by the teacher.
SUPPLEMENTARY READINGS	MODULE 1: Atkinson, K. E. (1989), An Introduction to Numerical Analysis, Wiley Moler, C. (2004), Numerical Computing with MATLAB, SIAM, Philadelphia

	MODULE 2: CompTIA Security+ Guide to Network Security Fundamentals 6thEdition, Mark Ciampa ISBN 978-1337288781 Principles of information security 6th edition, Michael E. Whitman, Herbert J. Mattord, ISBN 978-1337102063
SOFTWARE USED	MODULE 1: MATLAB MODULE 2: Provided by teacher and tutor during lectures/lab sessions