UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Programming

Academic Year 2023/2024

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Programming (L9008)

5. Scientific Area

6. Curricular Year

1st

7. Type of Curricular Unit / Semester

2nd Semester

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8. Class type and workload (work time)

Theoretical classes:	
Practical classes:	
Theoretical-Practical Classes	30,00
Tutorial Guidance:	20,00

9. ECTS Credits

6,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutora MARIA INÊS VASCONCELLOS FURTADO

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

Enable students to understand and apply the concepts of object orientation in a general way.
By the end of the course, students will be able to design and develop object-oriented programs using a programming language.

15. Specific Objectives

Comprehend the principles of OO and its importance in software development.
Create and use classes, objects, attributes, and methods.
Explore encapsulation, inheritance, and polymorphism.
Understand techniques of aggregation and composition between objects.
Understand the importance of encapsulation in protecting data and behavior.
Explore operator overloading concepts.
Use modules and packages to organize and reuse classes.
Apply concepts in practical object-oriented programming projects

16. Skills to be acquired

The students will develop the following skills: understand the principles of object orientation, design and create classes and objects, apply encapsulation, inheritance, and polymorphism, use composition and aggregation techniques, write clean and legible code, solve object-oriented programming problems, use debugging and testing tools, apply good design practices, and collaborate effectively on hands-on projects.

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17. Teaching Methodology

Theoretical classes to teach the fundamental concepts, followed by practical activities, tutorial classes, exercises, and group projects, providing hands-on learning and stimulating the application of the acquired knowledge in solving real problems.

18. Course Unit Program

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1. introduction to object orientation
   - Principles of object-oriented programming
   - Advantages and applications of object-oriented programming

2. Classes and objects
   - Defining Classes
   - Creating objects
   - Attributes and instance methods

3. Encapsulation and access modifiers
   - Protection of attributes and methods
   - Access modifiers (public, protected, private)

4. Inheritance and polymorphism
   - Concept of inheritance
   - Class hierarchy and superclass/subclass
   - Polymorphism and method overriding

5. Composition and aggregation
   - Relations between objects
   - Composition (object contains other objects)
   - Aggregation (object references other objects)

6. Operator Overloading
   - Defining operator behavior in custom classes

7. Object-oriented design principles
   - Cohesion and low coupling
   - SOLID principles

8. Exception handling
   - Error identification and handling
   - Use of try-except blocks for exception handling

9. Development of practical projects
   - Application of the learned concepts in real projects
   - Development of object-oriented programs

10. Good object-oriented programming practices
    - Writing clean, readable, modular code
    - Proper naming for classes, objects, methods and attributes

11. Testing and debugging

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- Use of testing and debugging tools
- Identifying and fixing errors in object-oriented programs

12. Collaboration and teamwork
- Developing group projects
- Effective collaboration on object-oriented projects

19. Assessment Methods

Continuous evaluation based on practical projects, individual exercises, class participation.
Work to be done autonomously by the students in addition to the classes.
There will be two tests.

20. Didactic Resources

Lectures with the support of slides; Practical examples and exercises; Support material; Integrated development environment (IDE); Audiovisual resources; Computer lab; Online collaboration tools.

21. Sustainability Objectives

22. Keywords

Object Orientation
Programming
Python

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23. Main Bibliography

Author(s): YOURDON, Edward
Title: Object-oriented systems design : an integrated approach
Edition: Year: 1994
Local: New Jersey
Publisher: Yourdon Press

Author(s): Lutz, Mark
Title: Programming Python
Edition: 4 Year: 2010
Local:
Publisher: O'Reilly

Author(s): Dusty Phillips
Title: Python 3 Object-Oriented Programming
Edition: 3 Year: 2018
Local: UK
Publisher: Packt Publishing Ltd

24. Complementary Bibliography

Author(s): Luiz Eduardo Borges
Title: Python para desenvolvedores
Edition: 1 Year: 2009
Local: Rio de Janeiro
Publisher: Creative Commons

Author(s):
Title:
Edition: Year:
Local:
Publisher:

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Autor / Author	Prof. Doutora MARIA INÊS VASCONCELLOS FURTADO
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