COURSE DATA

DATA SUBJECT

Code: 42603
Name: Programming
Cycle: Master's Degree
ECTS Credits: 9
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2116 - Master's Degree in Bioinformatics	Escola Tècnica Superior d'Enginyeria	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2116 - Master's Degree in Bioinformatics	Programming	ELECTIVES

COORDINATION

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CASAS YRURZUM SERGIO

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SUMMARY

This course is intended for students without a background in programming to acquire the basic knowledge to carry out programs. We begin with the Python programming language and it will be different types of data that we use and basic control structures used to perform a computer program.

Also give the basics of other programming languages like C and Perl, traditionally used in Bioinformatics.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

None

COMPETENCES / LEARNING OUTCOMES

2116 - Master's Degree in Bioinformatics

Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

DESCRIPTION OF CONTENTS

1. Introduction to Programming

Types of programming languages and paradigms
Vs. compiled languages. interpreted languages
Examples

2. Python as a calculator

First examples of using Python: The Python shell

3. Programs

Definition of program
First examples of Python programs

4. Control structures

Defining control structures
Sequential control structure: Definition and Examples
Conditional control structure: Definition and Examples
Iterative control structure: Definition and Examples

5. Structures data types

Definition of structured data type. Types and examples
Homogeneous structured data types in Python.

6. Functions

Modular programming: Definition and simple examples
Passing parameters

7. Records

Definition and use of records
Examples

8. Files

File types
Working with files: Basic Operations
Usage and Examples

9. Programming in C

Basics of programming in C
Examples

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	27,00
Laboratory	18,00
Total hours	**45,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	12,00
Individual or group project	3,00
Independent study and work	60,00
Preparation of lessons	54,00
Preparation for assessment activities	24,00
Resolution of case studies	23,00
Total hours	**176,00**

TEACHING METHODOLOGY

MD1 - Task training of the teaching-learning environment interaction in the classroom through expository sessions. Previous assignments include preparation (information search, reading texts supplied by teachers), teaching sessions themselves and the later work of deepening.

MD2 - Learning through problem solving and case studies, through which it is acquiring skills on different aspects of materials and subjects.

MD3 - Hands-on lab. Include preparation, implementation of practices to monitor and teacher support, independent work online and reporting practices.

MD4 - Cross-disciplinary skills. Include attendance at courses, conferences or round tables organized by the CEC of the Master and / or conduct of a bibliographic work on issues that contribute to the integral. It produces a report of activities.

EVALUATION

Evaluation of reports or reports delivered training activities on problems and case studies of cross-cutting activities or other arising (10%).

Evaluation of reports or reports delivered on laboratory practices (30%).

Evaluation of on-site exams (60%).

It is necessary to get at least a 3.5 in the evaluation of the exams to be able to mediate the notes.

In the second call will remain the weights of the various items, being able to improve the work handed in the labs.

REFERENCES

- Referencia b1: [Andr¿es Marzal, Isabel Gracia, 2003] Introducción a la programación con Python
- Referencia b2: [Mitchell L Model, 2009] Bioinformatics Programming Using Python
- Referencia b3: [Vern Ceder,2010] The Quick Python Book
- Referencia c1: [Michael Dawson, 2009] Python® Programming for the Absolute Beginner
- Referencia c2: [Cody Jackson,2011] Learning to Program Using Python
- Referencia c3: [James Payne, 2010] Beginning Python®: Using Python 2.6 and Python 3.1