Syllabus
2025 - 2026

TECHNICAL SHEET OF THE SUBJECT

Data of the subject

Subject name	Programming
Subject code	DTC-MBD-519
Mainprogram	Official Master's Degree in Big Data
Involved programs	Máster Universitario en Big Data [First year]
Credits	7,5 ECTS
Type	Optativa
Department	Department of Telematics and Computer Sciencies
Coordinator	José Luis Gahete Díaz

Teacher Information

Teacher

Name	José Luis Gahete Díaz
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SPECIFIC DATA OF THE SUBJECT

Contextualization of the subject

Contribution to the professional profile of the degree

To access the master's program, you must hold a MECES 2 or higher degree in one of the following areas:

- Telecommunications
- Computer Science
- Mathematics

However, degrees in Industrial Engineering and related fields, Physics, and Statistics may be considered by the Master's Academic Committee, subject to the completion of additional training (AT) in programming to successfully complete the different courses in the master's program. An exception may be granted if a candidate can demonstrate the acquisition of the relevant competencies in their prior degree.

Competencies - Objectives

Competences

Conocimientos o contenidos

COCF1	Conocer el uso y la programación de los ordenadores, sistemas operativos, bases de datos y programas informáticos.

COCF2	Comprender la estructura, organización, funcionamiento e interconexión de los sistemas informáticos, los fundamentos de su programación, y su aplicación para la resolución de problemas.
Competencias	
CPCF1	Aplicar conocimientos de programación y bases de datos sobre los que basar la enseñanza de técnicas y métodos avanzados para el tratamiento de grandes volúmenes de datos e inteligencia artificial.
CPCF2	Diseñar programas que usen software estadístico y de investigación operativa conociendo su alcance y limitaciones
Habilidades o destrezas	
HA5	Mantener una formación y aprendizaje continuo y adaptación a los cambios tecnológicos y científicos.

THEMATIC BLOCKS AND CONTENTS

Contents - Thematic Blocks

1.- Introduction: Basic Computer Architecture. What is an Operating System?

2.- Basic Programming Concepts: Scripting/IDE

3.- Introduction to the Language: Operators and Expressions

4.- Control Flow

5.- Data Structures

6.- Functions

7.- Text and Binary Files

8.- Classes and Objects

9.- Exception Handling and Capturing

10.- Code Quality: Documentation, Version Control, Debugging, and Virtual Environments

11.- Introduction to Libraries for Analytics, Data Processing, and Visualization

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TEACHING METHODOLOGY

General methodological aspects of the subject

Training Activities		
Training Activity	**Hours**	**Attendance**
Lectures: Expository and Participatory	**45**	100
Practical Exercises and Problem Solving	**40**	75
Personal Study	**60**	0
Projects	20	0
Assignments	**60**	0
Tutorials for Clarifying Doubts		

In-class Methodology: Activities	
Lectures: Expository and Participatory	HA5, COCF1, COCF2, CPCF1, CPCF2
Practical Exercises and Problem Solving	HA5, COCF1, COCF2, CPCF1, CPCF2

Non-Presential Methodology: Activities	
Personal Study	HA5, COCF1, COCF2, CPCF1, CPCF2
Projects	HA5, COCF1, COCF2, CPCF1, CPCF2
Assignments	HA5, COCF1, COCF2, CPCF1, CPCF2

SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS	
Clases magistrales expositivas y participativas: Exposición de contenidos fundamentales por parte del profesor impulsando la reflexión y participación del alumno.	Ejercicios prácticos y resolución de problemas: Sesiones prácticas con uso de software: Actividad formativa con ordenador que, bajo la guía del profesor-tutor, fomenta el aprendizaje autónomo y/o cooperativo del alumno mediante la ejecución de programas para la consecución de los objetivos marcados
45.00	30.00
NON-PRESENTIAL HOURS	

Ejercicios prácticos y resolución de problemas: Sesiones prácticas con uso de software: Actividad formativa con ordenador que, bajo la guía del profesor-tutor, fomenta el aprendizaje autónomo y/o cooperativo del alumno mediante la ejecución de programas para la consecución de los objetivos marcados	Estudio personal: Reflexión y análisis individual de los contenidos teóricos y prácticos de las materias y/o asignaturas del Master	Proyectos: Los alumnos tendrán que hacer trabajos de tamaño medio o grande (individuales y/o en grupo), por indicación del profesor	Trabajos: Los alumnos tendrán que hacer trabajos breves (individuales y/o en grupo), por indicación del profesor
10.00	60.00	20.00	60.00
ECTS CREDITS: 7,5 (225,00 hours)			

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
Written Exam with Multiple Exercises	To pass the exam, you must achieve a score of 5 or higher.	60
Evaluation of Laboratory Practical Work and Practical Sessions Using Software	Participation and Problem Solving in Class	30
Individual/Group Work/Project/Case Study	The proposed project must be submitted on time and in the required format.	10

Ratings

Ordinary Exam Session

1. Final Exam (60% of the total): The minimum passing grade for the final Theory exam is 5. If the score is below 5, it will be the final grade for the course.
2. Performance Evaluation (30% of the total): In-class tests and individual and group assignments.
3. Attendance and Active Participation in Class (10% of the total).

Extraordinary Exam Session

1. Exam (80% of the total): The minimum passing grade for the extraordinary Theory exam is 5. If the score is below 5, it will be the final grade for the course.
2. Performance Evaluation (20% of the total): Average of the continuous assessment grades obtained throughout the course.

The use of AI is permitted for documentation, study, presentation of topics chosen by students, and laboratory work, within the scope

provided in levels 2 and 3 of the guide https://aiassessmentscale.com/:

Level 2: "AI may be used for pre-task activities such as brainstorming, outlining, and initial research. This level focuses on planning, synthesis, and idea generation, but assessments should emphasize the ability to develop and refine these ideas independently."

Level 3: "AI may be used to help complete the task, including idea generation, drafting, feedback, and evaluation. Students must critically assess and modify AI-suggested outputs, demonstrating their understanding."

In all cases, the use of AI must be cited, and sources independently verified by the student.

The use of AI is not permitted in examinations or performance assessment tests.

"The use of AI to create complete works or substantial parts, without citing the source or tool, or without being expressly authorized in the assignment description, will be considered plagiarism and regulated in accordance with the University's General Regulations."

Recommendation: Use this version in official documents or course regulations to ensure clarity and consistency.
Next step: Decide whether you need a more formal legal style (closer to university bylaws) or keep this straightforward academic wording.

WORK PLAN AND SCHEDULE

Activities		Date of realization	Delivery date
Teoría	Laboratorio	semana 1	
Cap1_Introduccion_Arquitectura básica de un ordenador. ¿Qué es un sistema operativo? Cap2_Intro_Python_Instalacion_Conceptos_básicos_programación Cap3_Tipos_Operadores_Expresiones	p1_python_v1.doc p2_python_v1.doc. Se manda para casa		
Cap4_Control_Flujo_Alternativas	p4 Alternativas p3 repaso_P1_P2_P3_Chapter 2.pdf Se manda para casa	semana 2	
Cap5_Repetitivas: bucles while, for	p5 Bucles	semana 3	
Cap6_Cadenas	p6_Cadenas	semana 4	
Cap7_Listas	p7_Listas, p8_Matrices	semana 5	
Cap8_Tuplas_Diccionarios	p9_Tuplas_Diccionarios	semana 6	

Cap9_Funciones p10_Funciones	semana 7	
Cap10_Ficheros_Texto p11_Ficheros	semana 8	
Cap11_Ficheros_Binarios p13_Ficheros	semana 9	
Cap12_Clases_Objetos p13_Objetos	semana 10	
Cap13_Gestion_Captura_Excepciones	semana 11	
Cap14_Calidad_Código Proyecto I	semana 12	
Proyecto II Proyecto III	semana 13	
Repaso Repaso	semana 14	

BIBLIOGRAPHY AND RESOURCES

Basic Bibliography

Fundamentos de Programación con Python
D. José Luis Gahete Díaz/D. Carlos Miguel Vallez Fernández/D. Atilano Fernández-Pacheco Sánchez-Migallón
ISBN: 9788448645274
Ed. McGRAW-HILL

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