



POLITÉCNICA

INTERNATIONAL
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COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001



E.T.S. de Ingenieros
Informáticos

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000905 - Programming For Data Processing

DEGREE PROGRAMME

10BA - Master Universitario En Ciencia De Datos

ACADEMIC YEAR & SEMESTER

2022/23 - Semester 2

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1. Description

1.1. Subject details

Name of the subject	103000905 - Programming For Data Processing
No of credits	4.5 ECTS
Type	Optional
Academic year of the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
Tuition languages	English
Degree programme	10BA - Master Universitario en Ciencia de Datos
Centre	10 - Escuela Tecnica Superior De Ingenieros Informaticos
Academic year	2022-23

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Guillermo Antonio Viguera Gonzalez (Subject coordinator)	D4310	guillermo.viguera@upm.es	Tu - 10:00 - 13:00 Th - 10:00 - 13:00

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

2.3. External faculty

Name and surname	Email	Institution
Daniel Gómez-bravo Puerta	daniel.gomez-bravo@upm.es	Escuela Técnica Superior de Ingenieros Informáticos
Belén Ríos Sánchez	belen.rios@upm.es	Escuela Técnica Superior de Ingenieros Informáticos

3. Skills and learning outcomes *

3.1. Skills to be learned

CECD01 - Conocer los procesos de captura, extracción, manipulación y conversión de datos en diferentes entornos.

CECD02 - Conocer los principales sistemas de almacenamiento de la información estructurada y no estructurada de fuentes heterogéneas.

CG11 - Conocimiento y comprensión de la informática para crear modelos, así como sistemas y procesos de información complejos

3.2. Learning outcomes

RA23 - Destreza en el uso de distintos tipos de herramientas (software o metodológicas y conceptuales) necesarias para el correcto y eficaz desarrollo de software, incluyendo entornos y librerías en el contexto de ciencia de datos.

RA24 - Conocimiento y aplicación de algoritmos y estructuras de datos básico, así como las técnicas y métodos generales para su diseño.

RA20 - Ser capaz de procesar datos masivos

RA22 - Poseer destrezas fundamentales de la programación que permitan la implementación de algoritmos y el uso de estructuras de datos típicos en ciencia de datos. e distintos tipos de herramientas (software o metodológicas y conceptuales) necesarias para el correcto y eficaz desarrollo de software, incluyendo entornos y librerías en el contexto de ciencia de datos.

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

4. Brief description of the subject and syllabus

4.1. Brief description of the subject

This course is related with data manipulation and programming using the Python language. The main goal is to introduce main characteristics and programming style using this language of wide adoption for data analysis purposes. Once introduced the language, the course presents to students how to efficiently use the different constructs, control statements and data structures in Python. Based on this, the course describes the main characteristics of a Python framework for data storage and manipulation. All programming concepts presented in the course are accompanied with exercises in order to guarantee correct comprehension and practical knowledge.

4.2. Syllabus

1. Python programming.
 - 1.1. Introduction to Python programming.
 - 1.2. Common Python data structures.
 - 1.3. Programming in Python adopting an imperative paradigm.
 - 1.4. Programming in Python adopting a functional paradigm.
2. Data representation and manipulation.
 - 2.1. Python framework for data representation.
 - 2.2. Revision of data manipulation techniques.
3. Data visualization.

5. Schedule

5.1. Subject schedule*

Week	Classroom activities	Laboratory activities	Distant / On-line	Assessment activities
1	Python programming Duration: 02:00			
2	Python programming Duration: 02:00	Python programming Duration: 02:00		
3	Python programming Duration: 02:00	Python programming Duration: 02:00		
4	Python programming Duration: 02:00	Python programming Duration: 01:00		
5	Data Manipulation Duration: 02:00	Data Manipulation Duration: 02:00		
6	Data Manipulation Duration: 02:00	Data Manipulation Duration: 02:00		
7	Data Manipulation Duration: 02:00	Data Manipulation Duration: 02:00		
8	Parallel Constructs Duration: 02:00	Parallel Constructs Duration: 01:00		Programming Exercise Continuous assessment Presential Duration: 01:00 Programming Exercise Final examination Presential Duration: 01:00
9				
10				
11				
12				
13				
14				
15				
16				

17				
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Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.

6. Activities and assessment criteria

6.1. Assessment activities

6.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
8	Programming Exercise		Face-to-face	01:00	100%	5 / 10	CECD02 CG11 CECD01

6.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
8	Programming Exercise		Face-to-face	01:00	100%	5 / 10	CECD01 CECD02 CG11

6.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Programming Exercise		Face-to-face	01:00	100%	5 / 10	CECD01 CECD02 CG11

6.2. Assessment criteria

Sistema general de evaluación

Evaluation system during the course will consist of developing one practical exercise performed during the course. The weight in the final grade of the exercise is 100% and a minimum of 5 points out of 10 is required in order to pass the course.

Sistema de Evaluación Global

Global evaluation system will consist of developing one practical exercise to be submitted on the day scheduled for the course evaluation during for the global evaluation system. The weight in the final grade of the exam is 100% and a minimum of 5 points out of 10 is required in order to pass the course.

Sistema de Evaluación Convocatoria extraordinaria

Evaluation system during the extraordinary period will consist of developing one practical exercise to be submitted on the day scheduled for the extraordinary period. The weight in the final grade of the exam is 100% and a minimum of 5 points out of 10 is required in order to pass the course.

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
Moodle	Web resource	Main communication channel with students. Repository: slides, scripts, data sets and other resources
Data Science from Scratch: First Principles with Python	Bibliography	Joel Grus

Programming in Python 3: A Complete Introduction to the Python Language	Bibliography	Mark Summerfield
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8. Other information

8.1. Other information about the subject