## (1) GENERAL

SCHOOL	SOCIAL SCIENCES				
ACADEMIC UNIT	DEPARTMENT OF CULTURAL TECHNOLOGY AND				
	COMMUNICATION				
LEVEL OF STUDIES	UNDERGRADUATE				
COURSE CODE	3PLR 115	SEMESTER 4°			
COURSE TITLE	OBJECT-ORIENTED PROGRAMMING II				
INDEPENDENT TEACHING ACTIVITIES If credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits			WEEKLY TEACHING HOURS		CREDITS
	Lectures		2		
Laboratories			2		
The organization of teaching and the teaching methods used are			А		6
described in detail at (d).					0
<b>COURSE TYPE</b> General background, Special background, specialized general Knowledge, skills development	Core Course,	/Special Backgro	und		
PREREQUISITE COURSES	Object-Oriented Programming I				
LANGUAGE OF INSTRUCTIONS and	Greek				
EXAMINATIONS					
IS THE COURSE OFFERED TO	Yes				
ERASMUS STUDENTS					
COURSE WEBSITE (URL)	https://eclass.aegean.gr/courses/131275/				

### (2) LEARNING OUTCOMES

#### Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level learning outcomes for each qualification cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptions for level 6, 7 & 8 of the European Qualification Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

At the end of this course, the students will be able to:

- Be aware of the utility of Python's open source libraries related to data science.
- Understand the importance of Numpy, perhaps the most important library in the Python scientific computing ecosystem, a library for high-performance scientific computation.
- Use the Pandas library, which provides high-performance data structures for manipulating, cleaning and preparing data.
- Perform Descriptive Analytics.
- Get to know the concept of machine learning through the Python libraries.
- Delve into the Matplotlib library to create static, interactive and animated Python visualizations.
- Enrich knowledge in Python through practical examples and programming code.

<b>General Competences</b> Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?				
iraiism				
ical responsibility and				
ctive thinking				

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Production of free, creative and inductive thinking
- Transfer of know-how in other environments
- Practice Critical Thinking
- Mid-semester test

# (3) SYLLABUS

This course is an extension of the "Object-Oriented Programming (OOP) I" course and concentrates on the Python programming language. Students exploit the capabilities of Python language to implement programs and applications with the use of ready-based libraries. This language is a continuation of the same language taught in previous semesters. However, it explores in depth the capabilities of Python through its high-quality open source libraries for data science, covering every stage of data analysis. Special attention is given on the smooth transition of the "Object-Oriented Programming I" course of the 3 semester to the specific "Object-Oriented Programming II" course.

Lectures

- 1. Introduction Course structure
- 2. Review of Python basics
- 3. Introduction to Data Science with Python
- 4. Introduction to Numpy library
- 5. Basic functions, creating multidimensional arrays and Numpy
- 6. Functions and Numpy
- 7. Introduction to Pandas library
- 8. Import and export files and data using Pandas
- 9. Data cleaning using Pandas
- 10. Introduction to Matplotlib library
- <sup>11.</sup> Plotting using Matplotlib
- 12. 3D charts for data visualization
- 13. Machine Learning algorithms

# (4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face			
	Use web-based open source software for laboratory			
COMMUNICATIONS TECHNOLOGY	education.			
Use of ICT in teaching, laboratory education, communication with students	Use ICT in teaching and communication with students			
TEACHING METHODS				
The manner and methods of teaching are	Activity Semester workload			
describea in detail. Lectures, seminars, laboratory practice.	Lectures	13 *2 hours = 26 hours		
fieldwork, study and analysis of bibliography,	Lectures' study	13*4 hours = 52 hours		
tutorials, placements, clinical practice, art	Laboratory practice	13*2 hours = 26 hours		
visits, project, essay writing, artistic creativity.	Laboratory preparation and	36 hours		
etc.	semester assignment			
The studentle study hours for each lowering				
activity are given as well as the hours of non-				
directed study according to the principles of the	Course total 140 hours			
ECTS				
STUDENT PERFORMANCE	The evaluation of students' performance is conducted at the			
EVALUATION	end of the semester with exams and with a mid-semester			
Description of the evaluation procedure	test. Students may use their books or notes from the lessons			
Language of evaluation methods of evaluation	and the laboratory exercises (open book exams).			
summative or conclusive, multiple choice				
questionnaires, short-answer questions, open-	The evaluation criteria are announced during the first introductory lesson and they can be found at the storage content in the course's area in the University e-class platform (eclass.aegean.gr). The file with the first lesson contains all			
ended questions, problem solving, written work,				
presentation, laboratory work, clinical				
examination of patient, art interpretation, other				
Specifically-defined evaluation criteria are	the information.			
given, and if and where they are accessible to	The students' performance evaluation is based on the grade			
students.	of the final exam with a weighted percentage of 70% (grade			
	* 70%) and on the mid-semester test with a weighted			
	percentage of 30% (grade * 30%). The mid-semester test is			
	mandatory.			

### (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Python Data Science Handbook, VanderPlas J.
- An Introduction to Python Programming for Scientists and Engineers, Lin Johnny Wei-Bing, Aizenman Hannah, Espinel Erin Manette Cartas, Gunnerson Kim, Liu Joanne
- Introduction to Computation and Programming Using Python (3rd Edition), Guttag John V.
- -Related academic bibliography
  - Intro to Python for Computer Science and Data Science, Harvey M. Deitel, Paul J. Deitel