COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	UNIVERSITY OF PIREAUS
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY
LEVEL OF STUDY	UNDERGRADUATE
COURSE UNIT CODE	ΤΕΠΛΗ02

COURSE UNIT CODE	ΤΕΠΛΗ02	**SEMESTER OF STUDY**	4th

COURSE TITLE	DATA PROCESSING & PROGRAMMING LANGUAGES

INDEPENDENT TEACHING ACTIVITIES *in case in which credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	6	5.5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at section 4.		
COURSE TYPE *general background, special background, specialized general knowledge, skills development*	General background	
PREREQUISITE COURSES:	None	
LANGUAGE OF INSTRUCTION and EXAMINATION/ASSESSMENT:	Greek	
THE COURSE IS OFFERED TO ERASMUS STUDENTS		
COURSE WEBSITE (URL)	https://eclass.unipi.gr/courses/BDT236/	

2. LEARNING OUTCOMES

LEARNING OUTCOMES

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each qualifications' cycle, according to the European Higher Education Area's Qualification Framework.*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and APPENDIX B*
- *Guidelines for writing Learning Outcomes*

The course encompasses basic programming skills and data use in the context of the Python programming language. Specifically, it focuses on the sequential execution paradigm of the language, and in the use of basic data structures. Additionally, it includes debugging techniques and basic input-output for programmes. Apart from the understanding of the basic concepts and the underlying theory, the course aims to bring the methodologies presented in-class, to real-world problems.

Following the successful completion of the course, students:

- Will have formulated the ability to handle in a logically consistent and methodical manner simple Python problems

- Will know the basic principles and concepts of sequential programming

- Will be able to distinguish between the basic data structures that are offered by Python, and

to understand the use of a basic data structure in a given application

- Will be able to develop programmes using functions

- Will have the ability to use input and output appropriately, in order to provide information on the execution of their programme

- Will be able to use appropriate applications in order to develop, to run and debug their programmes

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aims

Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
Adapting to new situations
Decision-making
Independent work
Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research

Project planning and management
Respect for difference and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical consciousness, criticism and self-criticism
Development of free, creative and inductive thinking

- Search, analysis and synthesis of data and information using relevant technologies
- Decision-making
- Autonomous work
- Project planning and management
- Working in a multidisciplinary environment
- Independent work

2. COURSE CONTENT

The course covers the following topics:

1. **Introduction to programming using the Python language**

   This unit contains an introduction to the concept of programming, the Python language and the main means which can be used to program it (by the use of Intellij IDEA Community Edition, a programming notepad and the console)

2. **Main types**

   This unit contains a discussion of the main types and operators used by the language, as well as the purpose served by each type, and the flexible type system adopted by the language.

3. **Sequential programming and Data collections**

   - Strings

   - Lists

   - Arrays

   - Tuples

   - Sets

   - Dictionaries

For each of the individual entities mentioned above, the indicative cases which are recommended for their use will be showcased, the advantages and the disadvantages in comparison to other data structures as well as the special cases they are being used for. These will be discussed not only when an individual data collection is presented, but also in a specific lecture devoted to their comparison

4. **Input and Output**

In this unit, there will be a discussion of the capabilities of Python related to reading and processing data originating either from the console or from files. The process which can be used to process input data to create appropriate output at runtime, will be clarified through appropriate applications.

5. **Control statements and Iteration Statements**

In this unit, the if/elif/else and matches statemens will be outlined (and the cases they are recommended for), as well as the basic iteration statements (while/for) and iteration termination.

6. **Functions**

The unit related to functions includes an introduction on the reasons of using functions, their naming, the handling of input and return arguments, as well as a clarification of their scope.

7. **Debugging and testing**

During the study of the debugging process, emphasis will be placed not only in the creation of appropriate diagnostic messages and the use of assertions but also in the use of tools that are provided by modern platforms (e.g Intellij IDEA) to facilitate debugging. Moreover, this unit contains material related to exceptions and their handling in Python.

8. **Case studies and problem solving**

In this unit we will treat more complex problems arising in challenges related to industrial management, in order to strengthen the connection to the main subject of student studies in the school.

3. TEACHING METHODS - ASSESSMENT

TEACHING MODE *Face-to-face, in-class lecturing, on distance teaching and distance learning etc.*	In-class lecturing / Laboratory teaching
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, Laboratory Education, Communication with students*	• Whiteboard use • Use of projector and computer • Educational videos • Electronic books/articles • Use of the Internet • Code development software • Code execution software • E-communication with students

COURSE DESIGN	Activity / Method	Semester Workload
Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, clinical practice, Art Workshop, Interactive teaching, Educational visits, project, Essay writing, Artistic creativity, etc.	Lectures and Exercises	78
	Independent study	80
	Course Total	*158*
The study hours for each learning activity as well as the hours of non- directed study are given according to the principles of the ECTS		

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS	**Language of exams:** Greek
Detailed description of the evaluation procedures: Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice questionnaires, short- answer questions, open-ended questions, problem solving, written work, Essay/report, oral exam, public presentation, laboratory work, art interpretation, other……etc	**I. Written final examination (70% of the final grade) including:** - Multiple choice questions - Brief answer questions - Problem solving/choice of correct problem solution **II. Three brief examinations (3x10% of the final grade) including:** - Multiple choice questions and/or brief answer questions
Evaluation criteria are specifically defined and given as well as if and where they are reported and accessible to students.	The examination criteria will be available from the website dedicated to the lesson

4. SUGGESTED BIBLIOGRAPHY

- *Suggested bibliography:*
  - Το βιβλίο της Python: Γράφοντας κώδικα (2019), Σαμαράς Νικόλαος, Τσιπλίδης Κωνσταντίνος, Κριτική.
  - Python - Εισαγωγή στους υπολογιστές (2018), Νικόλαος Αβούρης, Μιχαήλ Κουκιάς, Βασίλειος Παλιουράς, Κυριάκος Σγάρμπας, ΙΤΕ-Πανεπιστημιακές Εκδόσεις Κρήτης.
  - Ξεκινώντας με την Python (2020), Tony Gaddis, DA VINCI Μ.Ε.Π.Ε.
  - Python Crash Course, 3rd Edition: A Hands-On, Project-Based Introduction to Programming (2023), Eric Matthes, No Starch Press.
  - Think Python (2015), Allen B. Downey, O' Reilly.
  - Automate the Boring Stuff with Python (2019), Al Schweigart, self-published.
  - Building Skills in Python (2015), Steven F. Lott, self-published.

- *Related scientific journals:*

  - Computers and Operations Research
  - Computers in Industry
  - Computers and Industrial Engineering
  - Journal of Computer Languages
  - Proceedings of the ACM on Programming Languages
  - Journal of Information and Software Technology
  - Future Generation Computer Systems
  - *Science of Computer Programming*