COURSE OUTLINE

GENERAL

SCHOOL	Sciences and Engineering		
ACADEMIC UNIT	Computer Science		
LEVEL OF STUDIES	1st Cycle		
COURSE CODE	COMP-142	**SEMESTER**	Spring
COURSE TITLE	Software Development Tools for Data Science		

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**
	2.5	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	special background
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	

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

After completion of the course students are expected to be able to:

- Use source code version control tools for individual and collaborative software development.
- Implement debugging techniques and locate logical errors efficiently.
- Develop and execute unit tests, automated tests, and integrate them into the software lifecycle.
- Utilize bug-tracking tools for managing software issues and feature requests.
- Apply effective documentation practices, including automated tools like Pydoc.
- Use AI-assisted Copilot tools to aid in the software development process.

General Competences

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?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Working in an interdisciplinary environment
Production of free, creative and inductive thinking

SYLLABUS

1. Introduction to Python
    a. Python scripts and the Interpreter
    b. Variables and expressions
    c. Conditional logic
    d. Loops and Functions
2. Software Development Lifecycle
    a. Project Organization
    b. IDEs
3. Programming Styles
    a. Indentation and blocks
    b. Comments
    c. Variable naming
4. Software Testing
    a. Assertions
    b. Automated testing
    c. Test-driven development
5. Debugging and Bug Tracking
    a. Runtime and logic errors
    b. The Debugger
    c. Reporting and managing bug reports
    d. Patches
6. Software Documentation
    a. The documentation process

b. Automation tools

7. Source Code Version Control
    a. Working with repositories (check-in, check-out, version comparison)
    b. Collaborative programming and team-based version control
8. AI Copilot and Modern Development Assistance
    a. AI in the software development process
    b. AI Copilots
    c. AI-based assistance for testing, bug tracking, and documentation

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	*Use of ICT in teaching / Χρήση ΤΠΕ* *Communication with students / Επικοινωνία με Φοιτητές*
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Homework Assignments, Midterm Exam, Collaborative Group Project, Participation, Final Exam

Activity	***Semester workload***
Lectures	35
Preparation	26
Coursework	40
Exam Preparation	45
Examination	4
Course total	***150***

ATTACHED BIBLIOGRAPHY

Required Textbooks / Readings:

Title	**Author(s)**	**Publisher**	**Year**	**ISBN**
Hands-On	Brian Allbee	Packt	2018	978-1788622011

Software Engineering with Python				
Introducing Python: Modern Computing in Simple Packages	Bill Lubanovic	O'Reily	2019	1492051349

Recommended Textbooks / Readings:

Title	**Author(s)**	**Publisher**	**Year**	**ISBN**
Pro Git, 2nd Ed.	Scott Chacon and Ben Staub	Apress	2014	978-1484200773
Clean Code: A Handbook of Agile Software Craftsmanship by Robert C. Martin	Robert C. Martin and Dean Wampler	Pearson	2014	978-0132350884
Python Testing with pytest: Simple, Rapid, Effective, and Scalable, 2nd ed.	Brian Okken	Pragmatic	2022	978-1680508604