COURSE INFORMATION					
Course Title	*Code*	*Semester*	*L+P+L Hour*	*Credits*	*ECTS*
Introduction to Scientific Computing in Python	ES 118	Fall/Spring	2 + 0 + 2	3	5

Prerequisites	None

Language of Instruction	English
Course Level	Bachelor's Degree (First Cycle Programme)
Course Type	Compulsory/Elective
Course Coordinator	
Instructors	
Assistants	None
Goals	Introduce students with computer hardware, operating systems and scientific open softwares running on them. Engage with the console, start coding, and get help from open AI tools. Use open scientific libraries for computing. Control versions using git.
Content	Basic parts of computer hardware. Knowledge about the operating system and structure of the filesystem. The shell interpreter. Scientific computing and programming using Python language and it's libraries.
Contribution of the Course to Engineering Education	To overcome the barriers in way of human-machine communications by teaching one or more computer languages

Learning Outcomes	**Programme Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Calculate moderately complex mathematical expressions using an appropriate scientific library	4a	1,5	A
2) Define and manipulate numerical and character arrays	4a	1,5	A
3) Use relational and logical operators to construct loops and conditional statements	4a	1,5	A

4) To translate an algorithm from a pseudocode or flowchart to a code in computer language	4a	1,5	A
5) To read and trace code in computer language and construct it’s pseudocode	4a	1,5	A
6) To use a modern version control system to collaborate with others	4b	5	G
7) To get help from AI interfaces during the learning process	8a	2	B

Teaching Methods:	1: Lecture, 2: Self-study, 5: Laboratory
Assessment Methods:	A: Written Exam, B: Homework, G: Lab Assessment

COURSE CONTENT

Week	Topics	Study Materials
1	Course conduct	syllabus, lecture-1
2	Interacting with an operating system	lecture-2, lab-1
3	Programming environments: Python and Git	lecture-3, lab-2
4	Data types, operator precedence, registers	lecture-4
5	Array definitions in Python	lecture-5, lab-3
6	Basic input and output, and defining functions	lecture-6, lab-4
7	Midterm	Materials by the midterm
8	Logical operators, using “find”	lecture-7, lab-5
9	The "if-else" conditional	lecture-8, lab-6, lab-7
10	“for” loops	lecture-9, lecture-10, lab-7
11	“while” loops	lecture-9, lecture-10, lab-7
12	Generating data series for plotting	lecture-11, lab-8
13	File read/write operations	lecture-12, lab-8
14	Term review	lab-9

RECOMMENDED SOURCES	
Textbook	N/A
Additional Resources	1- Scientific Python: https://lectures.scientific-python.org/ 2- Python programming language: https://www.python.org/ 3- Version control, git book: https://git-scm.com/book/en/v2

MATERIAL SHARING	
Documents	Lecture Slides, https://github.com/muhendislikYeditepe/es117-template Lab Manuals, https://github.com/muhendislikYeditepe/es117-template
Assignments	Weekly assignments
Exams	Midterm and Final

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterm Exam	1	35
Homework / Lab Assessment	10	15
Final Exam	1	50
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		50
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		50
Total		**100**

COURSE CATEGORY	Faculty Elective

COURSE'S CONTRIBUTION TO PROGRAMME

No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
4a	Ability to select and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice.					X
4b	Ability to employ information technologies effectively.					X
8a	Ability to select and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice.			X		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Lectures	13	2	26
Laboratories	13	2	26
Off-the-classroom study (pre-study, practice for 14 weeks)	14	4.5	63
Midterm Exam	1	2	2
Final Exam	1	2	2
Total Work Load			119
Total Work Load / 25 (h)			4.7
ECTS Credit of the Course			5