Course Information								
Course Code	**T**	**P**	**L**	**C**	**ECTS**	**Type** C/E	**Language** TR/ENG etc.	**Year/Semester**
FİZ3011	**2**	**2**	**0**	**3**	**4**	**C**	**TR**	**3/Fall**
Course Name (Turkish**)**	**Fizikte Bilgisayar Programlama-II**							
Course Name (English**)**	**Computer Programming in Physics-II**							

Unit/Program	Physics Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	It is aimed to teach the usability of the Python programming language in scientific studies. It is aimed to make students understand the basics of scientific programming.
Course Outline	• Python Dili, • Numerical data analysis.
Textbook/ Material / Resources	1. Computational Physics, Mark Newman, 2012. 2. Computational Physics, Bekir KARAOĞLU, Seyir Publishing, 2004, Istanbul 3. Introduction to Computation and Programming Using Python, John V. Guttag, Springer 2013.
Internship Status	No

Course Precedents

University Name	**Program Name**	**Course Name**	**T-P-L-C; ECTS**	**Type**
METU	**Physics**	**Numerical Methods in Physics-II**	**3-2-0-4; 4**	**Optional**

The instructor who proposed the course (Title, Name and Surname)	*Signature*
Prof. Soner Özgen, MD	
Instructors who can teach the course (Title, Name and Surname)	*Signature*
Prof. Sinan Akpinar, MD	
Prof. Niyazi Bulut, MD	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

It is proposed to implement the Quantitative Methods in Physics-I course using a different program and to improve students' skills with the scientific program.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

The course with the students will be held face-to-face using the Python program.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	**Opinion** (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	**Theory**	**Application/Laboratory**
1	Overview of Fortran, C++, and Python programming languages	
2	Variables, Operators, Lists	
3	Use of libraries	
4	Graphical Data Analysis	
5	Computer-aided experimental design and data analysis	
6	Programming of events/equations in the field of physics	
7	Effective visualization and interpretation of data in physics	
8	Application development for solving physical problems	
9	Midterm Exam	
10	Students' work on projects that solve their problems in the field of Physics	
11	Group projects and collaboration	
12	Solving physics problems with artificial intelligence and machine learning	
13	Solving physics problems with artificial intelligence and machine learning	
14	Use of cloud-based calculations	
15	Final Exam	
16		

Assessment			
Evaluation Criteria	**Activity**	**Custom**	**Contribution to Success Grade (%)**
	Midterm Exams	1	%40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	%60
		Sum:	100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	%60
	Engineering Sciences	%40
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	**Number**	**Duration (Hours)**	**Total workload (Hours)**
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	14	1	14
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	4	56
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument			
Application/Practice	14	2	28
Other			
TOTAL WORKLOAD:			**100**
ECTS CREDİTS OF THE COURSE: *(The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)*			**4**

The Relationship Between Course Learning Outcomes and Program Outcomes												
Program Outcomes (PO) / **Learning Outcomes (LO)** *(Course Outcomes)*		1	2	3	4	5	6	7	8	9	10	11
1	Have an idea about basic programming languages.	**4**	**4**	**4**	**5**	**5**	**3**	**4**	**4**	**5**	**3**	**3**
2	Can read and understand algorithms written in Python programming language.	**4**	**4**	**4**	**5**	**5**	**3**	**4**	**4**	**5**	**3**	**3**
3	Can use the Python language to perform calculations on different physics topics.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**
4	Define functions required in physics studies using Python language.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**3**	**3**	**3**
5	Design an algorithm using Python language.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**
6	Can use Python program in different areas.	**5**	**5**	**5**	**5**	**4**	**3**	**4**	**5**	**3**	**3**	**3**
7	Analyze and interpret graphical data using Python language.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**
8	Can use Python language in the analysis of different data types.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**

Organizer: Prof. Dr. Niyazi BULUT
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