Course Information								
Course Code	**T**	**P**	**L**	**C**	**ECTS**	**Type** C/E	**Language** TR/ENG etc.	**Year/Semester**
FİZ2022	**2**	**2**	**0**	**3**	**4**	**C**	**TR**	**2/SPRING**
Course Name (Turkish**)**	**Fizikte Bilgisayar Programlama-I**							
Course Name (English**)**	**Computer Programming in Physics-I**							

Unit/Program	Physics Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	To teach students the basic principles and some applications of computational physics. To enable students to understand the basics of numerical methods used in physics and other related fields.
Course Outline	Basic structure of computers, Operating systems, Number Systems, Problem analysis in computer problem solving, Algorithms, Flow Diagrams, Overview of coding languages, Fundamentals of Numerical Analysis, Numerical Analysis Applications, Package Software for Numerical Analysis, Simulation Methods
Textbook/ Material / Resources	1. Computer Programming and Fortran 77: Assoc.Prof.Dr. Mustafa AYTAÇ and Assist.Prof.Dr. H. Kemal SEZEN, Beta Publishing. 6th Edition 1999, Istanbul. 2. Computational Physics, Bekir KARAOĞLU, Seyir Publishing, 2004, Istanbul 3. Numerical Analysis Theory and Problems, Francis Scheih, Trans.: H. Hilmi Hacısalihoğlu, A. Köksal, Nobel Publication Distribution Ltd., 1988, Istanbul. 4. Computational Physics: An Introduction, Fraz J. Vesely, Plenum Press, 1994, New York.
Internship Status	No

Course Precedents

University Name	**Program Name**	**Course Name**	**T-P-L-C; ECTS**	**Type**
Çukurova University	**Physics**	**Numerical Methods in Physics**	**3-0-0-3; 4**	**C**
Yildiz Technical University	**Physics**	**Numerical Methods in Physics**	**2-2-0-3; 5**	**C**
METU	**Physics**	**Numerical Methods in Physics-I**	**3-2-0-4; 4**	**E**

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.)

The content of the Fiz220 Programming in Physics course has been enriched and updated as Programming in Physics-I. In addition, the second course will be opened in order to improve the programming skills of physics students.

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

The course will be held face-to-face so that students can make numerical calculations of physical phenomena using computers. For this purpose, FORTRAN programming language will be used in the course. A blackboard and projection are used in the lesson.

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.)

Software Eng. Dept. Head. (Prof.Dr. Engin AVCI) Internal Stakeholder	The fact that the software industry produces indispensable products in all fields makes it inevitable to cover computer science and software-related subjects in basic sciences.

Weekly Course Content Distribution		
Week	**Theory**	**Application/Laboratory**
1	Course Description, Objective, Course Outcomes, Introduction of Course Materials, Current Issues and Motivation	
2	Basic programming concepts and algorithmic thinking	
3	The Role of Programming in Solving Problems in Physics	
4	Ethical Issues in Computer Programming	
5	Security and Privacy of Data in the Field of Physics	
6	Solving Problems in Physics with Numerical Methods	
7	Solving Mathematical Equations and Numerical Integration	
8	Programming Languages Suitable for Physics Problems (Fortran, C++, Python)	
9	Midterm Exam	
10	Advanced Programming Tools and Libraries	
11	Loops and subroutines	
12	Conditional Structures	
13	Function Structures	
14	Optimization and Optimization of Physical Problems, Parallel Programming Techniques and Their Use in Physical Simulations	
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:			**104**
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	Recognize basic computer architectures and operating systems.	**4**	**4**	**4**	**5**	**5**	**3**	**4**	**4**	**5**	**3**	**3**
2	Know the basic characteristics of the computer necessary to perform calculations.	**4**	**4**	**4**	**5**	**5**	**3**	**4**	**4**	**5**	**3**	**3**
3	Gains the ability to solve problems with computers.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**
4	Know the number systems used in computers.	**4**	**4**	**4**	**4**	**4**	**3**	**4**	**3**	**3**	**3**	**3**
5	Knows the environments required for coding and the basics of language structures.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**
6	Know the basics of numerical analysis.	**5**	**5**	**5**	**5**	**4**	**3**	**4**	**5**	**3**	**3**	**3**
7	Recognizes commonly used software for numerical analysis.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**
8	Makes the necessary definitions to solve problems with the computer.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**
9	Knows the simulation methods required for the solution of physics problems.	**5**	**5**	**5**	**5**	**5**	**3**	**4**	**5**	**5**	**3**	**3**

Organizer: Prof. Dr. Niyazi BULUT **Preparation Date:** 20.05.2024