AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Computer Simulations in Physics II								
Course Code	FZK510		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	6	Workload	151 *(Hours)*	Theory	2	Practice	2	Laboratory	0
Objectives of the Course	To gain the ability related with the knowledge about the basics of application of computer in physics and the application to solve different physics problems.								
Course Content	Numerical solution techniques of differential equations, solutions of nonlineer differential equations, simulation of some physical problems by using Monte-Carlo and molecular dynamics methods.								
Work Placement									
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Demonstration, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	15
Final Examination	1	25
Quiz	4	10
Assignment	13	20
Term Assignment	1	30

Recommended or Required Reading	
1	Sayısal Fizik, Author: B. KARAOĞLU, Seyir Yayıncılık, 2004, İstanbul.
2	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK, Addison-Wesley, 1996, New York.

Week	Weekly Detailed Course Contents	
1	Practice	Numerical solution of some initial condition problems in physics
	Preparation Work	Sayısal Fizik, B. KARAOĞLU 7.Bölüm
2	Practice	Numerical solution of some boundary condition problems in physics
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK:Chapter 2
3	Practice	Numerical solution of some partial differantial equations in physics
	Preparation Work	Sayısal Fizik, B. KARAOĞLU 7.Bölüm
4	Practice	Numerical Solutions of Schrödinger Equations for various potentials
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK: Chapter 3
5	Practice	Numerical solution of Lagrange equations of some systems.
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK Chapter 4
6	Practice	Numerical solutions of some nonlinear differantial equations and comparison of their linear counterpart
	Preparation Work	Sayısal Fizik, B. KARAOĞLU 6.Bölüm
7	Practice	Definition of cycle structures in computer programme and its applications.
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK:Chapter 5
8	Intermediate Exam	Midterm Exam
9	Practice	Inroduction to simulations of some physical systems
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK :Chapter 6
10	Practice	Introduction to Monte Carlo and molecular dynamic methods
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK : Chapter 11
11	Practice	Monte Carlo simulations of Isıng systems
	Preparation Work	Sayısal Fizik, B. KARAOĞLU 4.Bölüm
12	Practice	Molecular dynamic simulations of ideal gas system.
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK :Chapter 17
13	Practice	Probabilistic solutions of Schrödinger equations.
	Preparation Work	An Introduction to Computer Simulations Methods, H. GOULD, J: TOBOCHNICK :Chapter 18

14	Practice	Probabilistic solutions of path integral problems
	Preparation Work	Sayısal Fizik, B. KARAOĞLU 8.Bölüm
15	Practice	Applications on some physical systems
	Preparation Work	Sayısal Fizik, B. KARAOĞLU 8.Bölüm
16	Practice	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Practice	14	3	2	70
Assignment	14	2	0	28
Term Project	1	10	0	10
Quiz	4	1	1	8
Midterm Examination	1	12	2	14
Final Examination	1	18	3	21
			Total Workload (Hours)	151
			[Total Workload (Hours) / 25*] = **ECTS**	6

**25 hour workload is accepted as 1 ECTS*

Learning Outcomes

1	To be able to devolope algorithm in order to perform the numeric solution of a complex physical problem.
2	To be able to transfer any algorithm to the computer by using a computer programme.
3	To be able to use the programme developing interfaces.
4	To be able to analyze any complex physical problem by using the computer programme.
5	To be able to describe the characteristics of various numerical methods.

Programme Outcomes *(Physics Master)*

1	The student should conceive the concepts in physics and may apply them on her/his own
2	The student should be able to conceive the relationship between the different physics laws and integrity of them and apply them in solving different physics problems
3	The student should know the basic principles of classical, quantum and relativistic physics and use them in the solutions of problems
4	The student should be able to do research in a specific area of physics
5	The student should be able to prepare reports on papers on the subject of her/his research and present her/his research subject in scientific conferences
6	The student should be able to explain the relationship between complicated problems and basic physics laws.
7	The student should be able to use computers for solving complicated physics problems
8	The student should be able to interrelate between the theory and the experiment. If she/he is experimentalist he/she has to explain the theory behind her/his work. If she /he is a theorist she/he should has to know the experiments in her/his subject.

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	3	4	5	4	4
P2	3	4	4	4	4
P3	4	3	3	4	3
P4	5	4	4	4	4
P5	2	3	3	4	3
P6	3	4	4	5	3
P7	5	5	5	5	5
P8	4	4	5	2	4