



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Differential Equations Applications in Physics							
Course Code		FİZ232		Course Level		First Cycle (Bachelor's Degree)			
ECTS Credit	6	Workload	150 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		To introduce the basic knowledge of differential equations in physics and make it understandable to students							
Course Content		Basic concepts and the solutions of differential equations, first order linear differential equations, second order linear differential equations, second order linear differential equations with constant coefficient, systems of first order linear differential equations, systems of second order linear differential equations, higher order linear differential equations, higher order non-linear differential equations							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study					
Name of Lecturer(s)		Lec. Cenk AKYÜZ							

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	70
Quiz	6	10
Assignment	6	10

Recommended or Required Reading

1	Ordinary Differential Equations, Morris Tenenbaum, Harry Pollard
2	Differential Equations, Shepley L. Ross, John Wiley&Sons Inc. (1974)
3	Bayağı Diferansiyel Denklemler: Atatürk Üniversitesi yayınları, İhsan Dağ

Week	Weekly Detailed Course Contents	
1	Theoretical	Basic concepts and the solutions of differential equations
2	Theoretical	First order linear differential equations
3	Theoretical	First order linear differential equations
4	Theoretical	Second order linear differential equations
5	Theoretical	Second order linear differential equations
6	Theoretical	Second order linear differential equations with constant coefficient
7	Intermediate Exam	Midterm
8	Theoretical	Second order linear differential equations with constant coefficient
9	Theoretical	Systems of first order linear differential equations
10	Theoretical	Systems of first order linear differential equations
11	Theoretical	Systems of second order linear differential equations
12	Theoretical	Systems of second order linear differential equations
13	Theoretical	Higher order linear differential equations
14	Theoretical	Higher order non-linear differential equations

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	6	1	1	12
Quiz	6	1	0.5	9
Midterm Examination	1	14	2	16



Final Examination	1	27	2	29
Total Workload (Hours)				150
[Total Workload (Hours) / 25*] = ECTS				6
*25 hour workload is accepted as 1 ECTS				

Learning Outcomes

1	To be able to introduce and classify differential equations
2	To be able to make the solutions of differential equations
3	To be able to describe the physics problems related to the motion of particle with constant velocity, radioactive decay and absorption which agree with first order linear differential equations with smooth linear motion of a particle matching, to express physics problems related to radioactive decay and absorption
4	To be able define the motion of a particle with constant acceleration, forced, damped and un-damped harmonic motions, behaviour of current and voltage in alternating current circuits via second order linear differential equations
5	To be able express the coupled mass-spring systems, behaviour of electrical circuits and the motion of a particle under effect the central force in the plane

Programme Outcomes (Physics)

1	To understand the importance of physics by understanding the general concepts of physics, matter and energy
2	To be able to define the movements of matter and to distinguish the characteristics of movements under different force (potential)
3	Be able to say the meaning of Lagrange and Hamiltonian formulations of the movement and apply them to simple problems,
4	To be able to express the fundamental concepts such as time, space, force, momentum and energy in the movements of matter close to the speed of light and be able to solve and interpret the simple problems related to
5	To be able to establish the relationship between electric and magnetic forces and to be able to illustrate their applications to technology and solve problems related to the movement of particles in electric and magnetic fields
6	Be able to say the basic laws of electromagnetics and apply them to problems, illustrate their applications to simple technology
7	To be able to tell the reasons of the differences between the classical cases and the quantum scale and explain the reasons
8	Explain the concepts of discontinuity, uncertainty, matter-antimatter, indecisiveness of quantum physics with examples and explain simple problems related to the subject.
9	To be able to solve the problems of micro-particles under different simple potentials and be able to say their meanings
10	To be able to establish the relationship between the movements and properties of multi-particle systems and the laws of probability and solve simple problems
11	To be able to illustrate the laws, meanings and applications of thermodynamics and use them
12	Be able to use their knowledge about quantum physics and mechanics in explaining some properties of atoms and nuclei
13	To be able to show the meanings of some theoretical concepts by experimenting, and develop a strong relationship between thought and the real world, develop analytical thinking
14	To be able to apply the meanings of the basic laws of physics, their comprehension of universality and the relations between them and the unity of the laws of nature.
15	Use computer to solve physics problems
16	To be able to understand the problems by using their analytical knowledge skills and to propose solutions by dealing with the laws of physics
17	Be able to use the knowledge of physics to understand new technologies
18	To be able to tell the relations between symmetry and conservation laws in laws of physics

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

	L1	L2	L3	L4
P1	5	5	5	5
P2	5	5	5	5
P3	2	1	2	2
P4	1	1	1	1
P5	5	5	5	5
P6	5	3	5	5
P7	3	1	1	3
P8	1	1	1	1
P9	1	3	5	3
P10	1	1	1	1
P11	2	1	3	1
P12	2	3	1	5



P13	2	1	5	5
P14	2	3	5	5
P15	2	5	1	2
P16	2	5	5	5
P17	2	5	5	5
P18	2	5	5	5

