AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Mathematical Methods in Physics II								
Course Code	FİZ208		Couse Level	First Cycle (Bachelor's Degree)					
ECTS Credit	7	Workload	174 *(Hours)*	Theory	4	Practice	0	Laboratory	0
Objectives of the Course	To introduce the basic principles of mathematical methods in physics.								
Course Content	Residu theorem, Fourier transformation, Laplace transformation, series, differential equations								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion								
Name of Lecturer(s)	Lec. Cenk AKYÜZ								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	70
Quiz	2	10

Recommended or Required Reading	
1	Coşkun ÖNEM, "Mühendislik ve Fizikte Matematik Metodları", Birsen Yayınevi, İstanbul.
2	Mathematical Methods for Physicists, George Arfken, Academic Pres, 1985.
3	Mathematical Methods for Students of Physics and Related Fields. S. Hassani, Springer, 2008.

Week	Weekly Detailed Course Contents	
1	Theoretical	Complex Algebra
2	Theoretical	Complex integration, Cauchy theorem
3	Theoretical	Series Expansion of Complex Functions
4	Theoretical	Residu theorem
5	Theoretical	Fourier Series
6	Theoretical	Fourier Transformation
7	Theoretical	Laplace Transformation
8	Intermediate Exam	MIDTERM EXAM
9	Theoretical	Differential Equations
10	Theoretical	Power Series, Frobenius Method
11	Theoretical	Linear Equation Systems
12	Theoretical	Partial Differential Equations
13	Theoretical	Laplace Equation: Heat Conduction
14	Theoretical	Wave Equation
15	Theoretical	Calculus of Variations

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	6	4	140
Quiz	2	4	1	10
Midterm Examination	1	10	2	12
Final Examination	1	10	2	12
			Total Workload (Hours)	174
			[Total Workload (Hours) / 25*] = **ECTS**	7
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	The students should be able to calculations with complex numbers.

2	The students should be able to do series expansion.
3	The students should be able to express and solve the physical problems in the form of differential equations.
4	The students should be able to express the meaning and importance of the calculus of variations in physics.
5	The students should be able to do the relationship between the variation and the important principles in physics such as Fermat principle.
6	The students should be able to express the importance of partial differential equations in physics.
7	The students should be able to use the residues in order to calculate the integrals.

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	L5	L6	L7
P1	3	2	5	5	5	5	3
P2	4	4	5	5	5	5	5
P3	4	3	5	5	5	5	3
P4	4	3	5	3	3	4	4
P5	4	3	5	3	3	4	2
P6	2	2	4	2	2	5	3
P7	3	2	3	5	5	3	3
P8	3	2	3	2	2	2	3
P9	4	3	5	3	3	3	4
P10	4	2	5	3	2	3	4
P11	2	3	5	3	2	3	2
P12	4	2	5	3	2	3	3
P13	3	2	2	2	3	1	1
P14	3	2	4	4	4	3	2
P15	1	4	3	1	1	2	1
P16	1	1	3	2	2	2	3
P17	1	1	2	1	1	2	1
P18	2	3	4	4	3	3	3