AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Semiconductor Physics								
Course Code	FİZ430		Couse Level	First Cycle (Bachelor's Degree)					
ECTS Credit	7	Workload	175 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The purpose of this lecture is to that the electronic and structural properties of impurity, pure semiconductor should be understood by using physics laws. And also, The background is done for future work.								
Course Content	Crystal structure, Fermi energy, energy band diagram, junctions								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion								
Name of Lecturer(s)									

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	Semiconductor Devices, M. Sze, 1981.
2	Introduction to Solid State Physics, Charles Kittel, 1996.
3	Solid State Physics, J. R. Hook, H. E. Hall, 2006.

Week	Weekly Detailed Course Contents	
1	Theoretical	Crystal Structure
2	Theoretical	Energy band diagram of Semiconductor
3	Theoretical	The concept of effective mass
4	Theoretical	The source of band gap of semiconductor
5	Theoretical	Intrinsic and doped semiconductor
6	Theoretical	Electronic properties of n-type semiconductor
7	Theoretical	Calculation of Fermi Energy
8	Intermediate Exam	Midterm Exam
9	Theoretical	Electronic properties of p-type semiconductor
10	Theoretical	Diffusion of electrons within intrinsic semiconductor and Ficks law
11	Theoretical	The conduction mechanism in n-p junction
12	Theoretical	Semiconductor-Metal junctions
13	Theoretical	Schottky Effect
14	Theoretical	Diode and transistor
15	Theoretical	The latest development of semiconductor and nanotechnology

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	3	98
Assignment	6	2	2	24
Quiz	6	1.5	0.5	12
Midterm Examination	1	18	2	20

Final Examination	1	19	2	21
			Total Workload (Hours)	175
			[Total Workload (Hours) / 25*] = **ECTS**	7
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	It should be cleared that how to occurs semiconductor crystal by learning lattice and basis.
2	An idea about the electron behavior at semiconductor should be had.
3	Impurities the effect on energy-band diagram should be explained.
4	The effect of Acceptor and donor on the properties of electronic and conduction properties of semiconductor should be known.
5	It is known that the change of the electron or hole with time is associated with diffusion at n-type and p-type semiconductor contacts
6	It should be explained that the Fermi level of different structures is equal after the contact
7	The fundamental idea about the conduction mechanism for metal-semiconductor contacts should be have
8	It should be understand that the differences between semiconductor, insulator , metal and semimetal by using quantum mechanical background.

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	L8
P1	5	1	1	1	1	1	1	1