AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Magnetic Resonance I								
Course Code	FZK525		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	6	Workload	150 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	To teach the fundamental principles of magnetic resonsance.								
Course Content	Motion equations of spin systems, spectrocopy and magnetic resonance concept, experimental methods of magnetic resonance.								
Work Placement									
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	15
Final Examination	1	60
Attending Lectures	14	10
Assignment	5	15

Recommended or Required Reading	
1	Manyetik rezonans, Fevzi Apaydın
2	Introductin to magnetic resonance, A. Carrington, A. D. Mclachlan

Week	Weekly Detailed Course Contents	
1	Theoretical	Quantum mechanical theory
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Chapter 2
2	Theoretical	Motion equation of isolated spin systems
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 3.1
3	Theoretical	Motion equation of unisolated spin systems
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 3.2
4	Theoretical	Magnetic susceptibility
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 3.3
5	Theoretical	Absorption energy of spin system, transition effects
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 3.4, 3.5
6	Theoretical	Investigation of spin system by quantum mechanical methods
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 4.1, 4.2
7	Theoretical	Transition probability, linewidth, temperature dependent of saturated state
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 4.3, 4.4, 4.5
8	Intermediate Exam	Midterm Exam
9	Theoretical	Spectroscopy and magnetic resonance
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 1.1
10	Theoretical	Basic principles of magnetic resonance
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 1.3
11	Theoretical	Experimental techniques of magnetic resonance, EPR and NMR spectrometer
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 1.4
12	Theoretical	Technique of continuous wave NMR and EPR
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 5.1, 5.2
13	Theoretical	Phase-sensitive detector
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 5.3, 5.4

14	Theoretical	Mechanism of pulsed spectrometer
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 5.5
15	Theoretical	Measurement techniques of relaxation times
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 5.6
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	2	3	70
Assignment	5	3	2	25
Seminar	2	3	3	12
Midterm Examination	1	15	3	18
Final Examination	1	22	3	25
			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 learn motion of isolated spin systems in magnetic field
2	To be able to understand resonance condition.
3	To be able to learn spectrum concept.
4	To be able to understand the importance of the use of magnetic resonance in experimental
5	To be able to examine the spin systems with quantum mechanical 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	5	5	5	5	5
P2	3	3	4	4	4
P3	4	4	4	4	4
P4	4	4	5	5	5
P5	3	3	4	5	4
P6	4	4	4	4	3
P7	5	5	5	5	5
P8	4	4	5	5	3