AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Magnetic Resonance II								
Course Code	FZK528		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 application fields of magnetic resonance								
Course Content	Nuclear magnetic resonance, electron paramagnetic resonance, double resonance, MR and its applications								
Work Placement									
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Individual Study								
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	Magnetic Resonance
2	The principles of nuclear magnetism, A. Abragam

Week	Weekly Detailed Course Contents	
1	Theoretical	Nuclear magnetic resonance at solids
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 6. 1
2	Theoretical	Dipol dipol interaction, second moment
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 6.2, 6.3, 6.4, 6.5
3	Theoretical	Nuclear magnetic resonance at liquids
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 7. 1
4	Theoretical	Chemical shift, spin spin coupling
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 7.2, 7.3, 7.4, 7.5
5	Theoretical	Electron paramagnetic resonance at liquids
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 8. 1
6	Theoretical	g factor, hyperfine splitting
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 8.2, 8.3, 8.4, 8.5
7	Theoretical	Electron magnetic resonance in single crystals
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 9.1 9.2, 9.3, 9.4, 9.5
8	Intermediate Exam	Midterm Exam
9	Theoretical	g tensor, A tensor, quadrupole interactions
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 9.6, 9.7, 9.8, 9.9
10	Theoretical	Double resonance
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 10. 1
11	Theoretical	Dynamic nuclear polarization
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 10.2
12	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 10.3
13	Theoretical	NMR imaging
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 12.1, 12.2, 12.3
14	Theoretical	NMR relaxation
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 12.4, 12.5, 12.6

15	Theoretical	Clinical applications of NMR imaging
	Preparation Work	Manyetik rezonans, Fevzi Apaydın Section 12.7, 12.8
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	10	2	1	30
Term Project	1	10	0	10
Midterm Examination	1	10	2	12
Final Examination	1	12	2	14
			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 understand nuclear magnetic resonance and its applications
2	To be able to learn electron paramagnetic resonance and its applications
3	To be able to learn the g factor and the hyperfine constant
4	To be able to learn double resonance and its applications
5	To be able to learn MR imaging and its applications

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	4	4	4	4	4
P3	4	4	4	4	4
P4	5	5	5	5	5
P5	4	4	3	4	4
P6	4	4	4	4	4
P7	4	4	5	4	4
P8	5	5	5	5	5