

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
FİZ3012	3	0	0	3	5	E	TR	3/SPRING
Course Name (Turkish)	Fizikte Spektroskopi							
Course Name (English)	Spectroscopic Methods in Physics							

Unit/Program	Physics Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	To provide students with basic knowledge about spectroscopic methods in physics and microwave spectroscopy.
Course Outline	Properties of Electromagnetic Radiation, Quantization of Energy, Spectrum Regions, Rotation of Molecules, Rotation Spectra, Diatomic Molecules, Polyatomic Molecules, Vibration of a Diatomic Molecule, Vibration of Polyatomic Molecules
Textbook/ Material / Resources	1. C.N. Banwell, Fundamentals of Molecular Spectroscopy, McGraw-Hill 2. T. Gündüz, Instrumental Analysis Method, Ankara University, F. Köksal, R. Köseoğlu, Spectroscopy and Introduction to Lasers
Internship Status	No

Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Yildiz Technical University	Physics	Spectroscopy	2-0-0-2; 4	E
Gazi University	Physics	Spectroscopy Techniques	3-0-0-3; 3	E
The instructor who proposed the course (Title, Name and Surname)			Signature	
Instructors who can teach the course (Title, Name and Surname)			Signature	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
Face-to-face courses will be taught under the supervision of the relevant faculty member.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/Laboratory
1	Properties of Electromagnetic Radiation, Quantization of Energy	
2	Spectrum Regions, Representation of Spectra, Basic Elements of Practical Spectroscopy	
3	Signal-to-Noise: Resolving Power	
4	Amplitude and Intensity of Spectral Transitions	
5	Rotation of Molecules, Rotation Spectra	
6	Diatomic Molecules, Polyatomic Molecules	
7	Techniques and Instruments Used, Chemical Analysis by Microwave Spectroscopy,	
8	Vibration of a Diatomic Molecule, Diatomic Vibrating-Rotator,	
9	Midterm Exam	
10	Vibration-Rotation Spectrum of Carbon Monoxide	
11	The Failure of the Born-Oppenheimer Approach: The Interaction of Rotation and Vibrations	
12	Vibration of Polyatomic Molecules	
13	Effect of Rotation on Polyatomic Molecular Spectra	
14	Analyzing with Infrared Techniques, Techniques and Tools	
15	Final Exam	
16		

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	60
	Engineering Sciences	40
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	14	2	28
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	3	42
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	12	3	36
Argument	14	1	14
Application/Practice			
Other			
TOTAL WORKLOAD:			126
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			5

		Program Outcomes (PO)										
		1	2	3	4	5	6	7	8	9	10	11
Learning Outcomes (LO) (Course Outcomes)												
1	Comprehend the basis of the interaction of matter and light	5	5	5	4	3	3	4	5	5	1	1
2	Have detailed information about the electronic structure of atoms	5	5	5	4	3	3	4	5	5	1	1
3	Learn various infrared techniques and analyze the results	5	5	5	4	3	3	4	5	5	1	1

Organizer: Prof. Dr. Niyazi BULUT

Preparation Date: 20.05.2024