



Code and Name: FİZ5750 SEMICONDUCTORS

Unit: Graduate School of Natural and Applied Sciences

Detail: **Period:** 2023-2024 **Status:** Optional **Class:** 1 **Credits:** 2-2-0-3 **ECTS:** 6 **Language:** Turkish

INSTRUCTOR

Title, Name and Surname:

Phone:

Email:

Social Account:

Student Day and Time:

COURSE ASSISTANT

Title, Name and Surname:

Phone:

Email:

Social Account:

Student Day and Time:

Lessons Weekly Program:	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			-			

Rendering: Face-to-face lessons per week 4 It will be done on an hourly basis.

Place: YY: Faculty of Science, Department of Physics UE: -

Purpose: Semi-teaching graduate students, which has led to modern optoelectronic and industrial developments. to teach the light-matter interactions and physics of conductive materials, amaçlamaktadır.

Material: Book and The lecture will be taught using lecture notes . **Material contents:** Classification of the mechanisms of interaction of solid materials with light, optical materials, characteristic optics in solid materials , Dielectric constant and Polarizability , Investigation of the propagation of light through a dense optical medium under classical approaches , From the tape Banta absorption , Fotol Hopefulness , Excsonies , Serbest elektronlar, Fononlar.

Student Responsibility : Students have the responsibility to attend 50% of the course and to deliver the activities on time.

Weekly Lesson Plan	Week	Topic	Method
	1	Solid state, general concepts; matter, atom, electric charge.	YY
	2	Conductive, insulating and semiconductor materials	YY
	3	Energy levels and band structures in atoms	YY
	4	Characteristic optics in solid material: Crystal symmetry, electronic bands, vibration bands, state densities, diffuse states and collective excitations.	YY
	5	Doped and undoped crystals, N-type and Ptype Semiconductors and electron motions	YY
	6	Progression of light through dense optical media under the classical approach: Atomic oscillators, vibrational oscillators, free electron oscillators, dipole oscillator model.	YY
	7	Inter-band absorption: Inter-band transitions, direct absorption transition rate, band edge absorption in semiconductors, band structure of semiconductors with direct prohibited energy range	YY
	8	VISA	YY
	9	Optical absorption and optical Transitions. Excsonies :Free Excitons , Exciton absorption.	YY
	10	Luminescence : Solid Material in propagation of light, direct and indirect Band In materials Band Break Luminescence , Photoluminescence .	YY
	11	Free Electrons: Study of optical properties associated with free electrons, plasma reflectivity, free carrier conductivity, metals, Drude model, in metals Band transitions between, Plasmons	YY
	12	Photoconductivity	YY
	13	Quantum Stark Effect	YY
	14	Genel tekrar ve kazanım değerlendirilmesi	YY

Assessment and Evaluation	Method		Number	Weight
	Break Exam	Exam Face	1	%50
		Quiz It will not be done.	-	
		Homework Activities will be given before and after the midterm exam.		
		Project It will not be issued.	-	-
	General Exam	Face	1	% 50

Course Outcomes:	1	To have general and basic theoretical knowledge about the content of the course subject
	2	Understanding the optical properties of solid materials
	3	Learning the progression of light through matter with classical and quantum mechanics theory
	4	To learn the optical properties of insulators, semiconductors and metallic materials
	5	Learning the relationship between the absorption spectrum of a material and the band structure



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Course Syllabus Form

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Course-Specific Explanations:

UE: Distance Education; **YY:** Face-to-Face Education