

Course Name/Kode: <b>ILT 527 OPTICAL MATERIALS</b>							ADVANCED TECHNOLOGIES			
Semester	Teaching and Learning Methods							Credit		
	Theory	App.	Lab.	Project	Homework	Other	Total	Credit	ECTS Credit	
<b>1-2</b>	42				100	46	188	<b>3</b>	<b>7.5</b>	
Language	Turkish									
Compulsory/ Elective	Elective									
Prerequisites	None									
Course Content	Maxwell equations, electromagnetic radiation in a material medium and a vacuum. Interaction of light with matter. Oscillators, dielectric function. Kramers-Kronig relations. Polaritons, surface polariton. Crystal, lattice vibrations and phonon. Phonons in low dimensional structures. Electrons in a periodic crystal, polaron concept. Electrons in low dimensional structures. Metals, semiconductors, insulators. Amorphous solids, excitons. Plasmons, magnons. Optical properties of phonons, excitons and plasmons									
Course Objectives	<ul style="list-style-type: none"> <li>• to be learn optical properties of solid materials</li> <li>• to understand optical responses of solid materials</li> </ul>									
Learning outcomes and competences	The students will be able to (1) use their knowledge in their research or engineering careers (2) follow the technological developments, (3) broaden and deepen their knowledge further in this rapidly developing discipline (4) work on interdisciplinary studies.									
<b>Textbook and /or References</b>	<ul style="list-style-type: none"> <li>• Claus F. Klingshirn, Semiconductor Optics. Springer; 3rd edition (2007).</li> <li>• P.Y. Yu, M. Cardona, Fundamentals of Semiconductors. Springer (1996).</li> <li>• J. Singh (ed.), Optical Properties of Condensed Matter and Applications. John Wiley, (2006).</li> <li>• P.K. Basu, Theory of Optical Processes in Semiconductors : Bulk and Microstructures. Oxford University Press (2003).</li> </ul>									
<b>Assessment Criteria</b>								<i>If any, mark as (X)</i>	<b>Percentage (%)</b>	
	<b>Midterm Exams</b>							X	30	
	<b>Quizzes</b>									
	<b>Homeworks</b>							X		
	<b>Projects</b>									
	<b>Term paper</b>							X	20	
	<b>Laboratory Work</b>									
	<b>Other</b>								10	
<b>Final Exam</b>							X	40		
<b>Prepared by</b>	Doç. Dr. Barış Akaoglu									

<b>Week</b>	<b>Subject</b>
1	Maxwell equations, electromagnetic radiation in a material medium and a vacuum
2	
3	Interaction of light with matter
4	Oscillators, dielectric function
5	Kramers-Kronig relations
6	Polaritons, surface polaritons
7	Crystal, lattice vibrations and phonon
8	Phonons in low dimensional structures
9	Midterm exam
10	Electrons in a periodic crystal, polaron concept
11	Electrons in low dimensional structures
12	Metals, semiconductors, insulators
13	Amorphous solids, excitons
14	Plasmons, magnons Optical properties of phonons, excitons and plasmons