

Course Title-Course Code: ILT532 GLASS CERAMIC STRUCTURES					Name of the Program: Advanced Technologies				
Semester	Teaching Methods							Credits	
	Lecture	Recite	Lab.	Field Study		Other	Total	Credit	ECTS Credit
	42	36		50		60	188	3	7.5
Language	Turkish								
Compulsory / Elective	Compulsory								
Prerequisites	-								
Course Contents	Glass-Ceramics, Crystallisation and Devitrification, The properties of glass-ceramics, Application of glass-ceramics, Bonding in ceramics - Structure of atoms, Preparing methods of Glass-ceramics (Solid-state Methods, Melt-quenching methods), Thermal properties of Glass-ceramics (DTA, TGA), Crystallographic Analysis (XRD), Microstructure and quantitative analysis of Glass-ceramics, Electrical conductivity in ceramics, Dielectric properties								
Course Objectives	The objective of this course is to make students familiar with the fundamentals of ceramic material science from the viewpoint of structure-properties relations								
Learning Outcomes and Competences	The students who have taken the course can learn basic principle and application of glass-ceramics. Students will be able to use the acquired knowledge in the related master studies of material engineering and apply it to the solution of appropriate problems of industrial practice particularly the problems connected with the selection of special structural materials.								
Textbook and /or References	<ol style="list-style-type: none"> 1. Handbook of ceramics, glasses, and diamonds, Charles A. Harper, McGraw-Hill, 2001 2. Superconducting Glass-Ceramics in Bi-Sr.Ca-Cu-O: Fabrication and its Application, Yoshihiro Abe, World Scientific, 1997 3. Glass- Ceramics, P.W. McMillan, Academic Press, 1979 4. Glass, Chemistry, Properties and Processing, Doç. Dr. Duran KOCABAĞ, Birsen press, 2002 5. Ceramic and glass materials, James F. Shackelford, Robert H. Doremus, Springer, 2008 								
Assessment Criteria								<i>If any, mark as (X)</i>	Percent (%)
	Midterm Exams							x	20
	Quizzes								
	Homeworks							x	20
	Projects								
	Term Paper								
	Laboratory Work								

	Other	x	10
	Final Exam	x	50
Instructors	Assist. Prof. Dr. Haluk KORALAY, koralay@gazi.edu.tr		
Week	Subject		
1	Glass-Ceramics, Definition and History, The Scientific Importance of Glass-Ceramics		
2	Special Glass-ceramic Processes		
3	Applications of Glass-ceramics		
4	Structure of crystalline and glass ceramics		
5	Reactions controlled by diffusion, rate of chemical reaction, activation energy Preparation and analysis of Glass for Thermal Analysis (Differential Thermal Analysis, Thermogravimetric Analysis)		
6	Preparation and analysis of Ceramic for Crystallographic Analysis (X-ray Diffractometer)		
7			
8	Optical Properties of ceramics (Scanning Electron Microscopy)		
9	Optical Properties of ceramics (Scanning Electron Microscopy)		
10	Electrical Properties of ceramics (Resistivity-Temperature)		
11	Electrical Properties of ceramics (Resistivity-Temperature)		
12	Dielectric Properties of ceramics (I-V, C-V)		
13	Dielectric Properties of ceramics (I-V, C-V)		
14	Results and Discussions		