COURSE IDENTIFICATION FORM

Course Code and Name: IM5034 MATERIAL SCIENCE AND MATERIAL LABORATORY IN CONSTRUCTION TECHNOLOGY				Department of: CIVIL ENGINEERING / MASTER'S DEGREE PROGRAM WITH THESIS			
Semester	**Theoretic Hour**	**Practice Hour**	**Total Hour**	**Credits**	**ECTS**	**Education Language**	**Type: Compulsory Elective**
Fall	3	1	4	3	5	Turkish	Optional
Prerequisite (s)							
Instructor		Prof. Dr. Murat Dal				**Mail : muratdal@munzur.edu.tr** **Web :**	
Course Assistant						**Mail :** **Web :**	
Groups / Classes							

Course Aim	To explain the internal structure of materials and the effect of internal structure on material classification, to introduce crystal and amorphous structures, to teach the mechanical properties of the material, to teach the physical and chemical properties of the material, water and heat permeability in materials, the effect of sound, resistance to external effects such as radiation, oxidation and corrosion, harmful water and pollutants. Giving information about the effects of weather, learning about metals, ceramics and polymers commonly used in civil engineering.
Course Goals	
Course Learning Outs and Proficiencies	• Desired appearance with different materials and production methods, • • Different materials • • Production methods in different materials • • Gaining the ability to design and apply materials with strength and durability. • • Designing materials with strength and durability • • Gaining the ability to apply materials with strength and durability • • Knows the mechanical, physical, chemical and technological properties of materials. • • Knows the mechanical properties of materials. • • Knows the physical properties of materials. • • Knows the chemical properties of materials. • Knows the technological properties of materials.

Course Basic and Auxiliary Contexts	• Malzeme Bilimi, Prof. Dr. Kaşif ONARAN, Bilim Teknik Yayınevi, 1993. • Malzeme Bilimi Prob. ve Çözümleri, Prof. Dr. Kaşif ONARAN, Bilim Teknik Yay, 1993. • Malzeme Bilimi Ders Notları, Prof. Dr. Ferruh KOCATAŞKIN, İ.T.Ü. İnş. Fak. Matbaası. • Cisimlerin Yapısı ve Özelikleri, Prof. Bekir POSTACIOĞLU, İ.T.Ü. Yayını, 1981. • Malzemelerin Yapı ve Özelikleri, Cilt I, İç Yapılar, Cilt III, Mekanik Özelikler, Yazanlar: • Moffatt, Pearsall ve Wulff, Çevirenler: K. Onaran ve B. Erman, İTÜ Yayını, 1982 ve 1978. • Civil Engineering Materials, Ed. N. Jackson, 1984. • The Nature and Properties of Engineering Materials, Zbigniev D. Jastrazebski, 1987. • Beton Teknolojisi ve Beton Teknolojisi Laboratuvarı, Yrd.Doç.Dr. Murat DAL, Mimarlık Vakfı İktisadi İşletmesi, 2013. • Doğal Taşlardaki Bozunmalar, Yrd.Doç.Dr. Murat DAL, Mimarlık Vakfı İktisadi İşletmesi, 2012.
Methods of Give a Lecture	Lecture, research, observational and experimental studies

Assessment Criteria		**If Available, to Sign (x)**	**General Average Percentage (%) Rate**
	1. Quiz	**X**	**50**
	2. Quiz		
	3. Quiz		
	4. Quiz		
	5. Quiz		
	Oral Examination		
	Practice Examination (Laboratory, Project etc.)		
	Final Exam	**X**	**50**

Semester Course Plan	
Week	**Subjects**

1	Internal structure and properties related: atomic structure, atomic arrangement, interatomic bonds, sections between interatomic bonds and properties, classification of parts.
2	Crystal and Amorphous Structures: Types of Crystal Structures, Definitions Related to Crystal Structures, Crystal Structure Defects, Amorphous Structures.
3	Mechanical properties of materials: mechanical behavior, material distribution under tension, ductility, brittle properties, material distribution under pressure, material distribution under shear, material distribution under bending,
4	Physical and chemical properties of materials: physical properties, unit volume weight, density, specific gravity, particle ratio (porosity) and filling ratio (compactness), saturation ratio, frost measurement of stones.
5	Physical and chemical properties of materials for determining the presence of water: properties related to the presence of water, permeability, capillarity, chemical properties.
6	Technological properties: deterioration in design, wear, fatigue in properties, creep, rheological models, viscosity.
7	Thermal properties: heat generation and thermal stresses, thermal conductivity, thermal events in structures, selection of materials and displays in walls, humidity events.
8	Acoustic properties: sound absorption and production, sound insulation in structures.
9	Midterm Exam
10	Metals: iron-carbon alloys and their areas of use, other metals and alloys, steel test and testing methods
11	Ceramics: crystalline ceramics, amorphous ceramics (glasses), glass-bound ceramics (terracotta products).
12	Polymers, bituminous properties and wood: polymers, asphalt and bitumen, wood.
13	Ceramics and glasses, polymers, Bituminous materials and wood Composite properties: granular composite properties, fibrous composite properties, layered composite properties.
14	General Exam