COURSE IDENTIFICATION FORM

Course Code and Name IM5054 DURABILITY OF CONCRETE				**Department of :** CIVIL ENGINEERING / MASTER PROGRAMME			
Semester	**Theoretic Hour**	**Practice Hour**	**Total Hour**	**Credits**	**ECTS**	**Education Language**	**Type: Compulsory Elective**
Atumn/Spring	3	0	3	3	5	Turkish	Optional
Prerequisite (s)							
Instructor		Assoc. Prof. Dr. Nihan GÜLMEZ				**Mail :** nihangulmez@munzur.edu.tr **Web :**	
Course Assistant						**Mail :** **Web :**	
Groups / Classes							
Course Aim	The course will aim to cover the spectrum of exogenous (external attacks) and endogenous (internal swelling reactions) chemical attacks on concrete, by considering the reaction mechanisms, the influencing parameters, in particular those relating to the composition and characteristics of concrete, the test methods, the normative aspects, etc.						
Course Goals	To know and identify the mechanisms of various factors that cause deterioration in concrete.						
Course Learning Outs and Proficiencies	• To determine the possible effects of the voids in the concrete in terms of durability according to their size and shape. • Classification of the effects that cause damage to concrete/reinforced concrete due to physical and chemical reasons. • Ability to diagnose possible causes of cracks occurring in concrete/reinforced concrete structures due to durability problems. • Outline the mechanisms of chemical effects that lead to durability problems in concrete. • Recommend concrete production methods and precautions that can be taken to resist physical destructive effects such as abrasion. • To classify the measures that can be taken to increase the durability of concrete/reinforced concrete structures according to the level of external impact.						

Course Basic and Auxiliary Contexts	• Neville , A.M., Properties of Concrete , Longman Group Limited, Fourth Edition, 1995. • Woods , H., Durability of Concrete Construction, ACI Monograph No.4, 1968. - Mindess , S., and Young J.F., Concrete , Prentice-Hall Inc. , Englewood Cliffs , 1981.
Methods of Give a Lecture	Face to Face

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

Semester Course Plan

Week	Subjects
1	Structure of Concrete
2	Interface Zone in Concrete
3	Water as a Damaging Influence
4	Permeability
5	Classification of Effects Causing Deterioration of Concrete
6	Freeze-thaw Damage
7	Midterm Exam
8	Fire Damage
9	Deterioration by Chemical Reactions
10	Reactions that Form Expanding Products, Sulfate Attack
11	Reactions that Form Expanded Products (continued), Alkali-silica Reaction
12	Reactions Forming Expanding Products (continued), Hydration of MgO and CaO Salts
13	Reinforcement Corrosion in Concrete
14	Concrete in Sea Water