

Subject title: Repairing the Existing Structures

Basic information on the subject	
Academic unit:	Faculty of Civil Engineering
Subject title:	Repairing the Existing Structures
Level:	MSc
Subject status:	Elected
Year of studies:	Second year
Number of classes per week:	2+2
Credits - ECTS:	6
Time / location:	According to time table
Teacher:	Prof. Dr. Naser KABASHI
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Course description:	General data for the present conditions in durability of structures. Applied the repairing materials in structures and the full filled conditions. Potential causes in damages of the structures. Assessment and evaluation the existing stage of structure and applied the different methods for repairing. In situ examinations of repairing layers or laboratory examiners. Evaluations of the level of damages and selection the materials for repairing. Principles and methods for repairing. Monitoring and permanent maintenance of existing structures. In situ examinations after the repairing process.
Course objectives:	Understand the permanent control and maintenance in function of time for existing structures. Evaluations the stage of the existing structures and proposal for eventually partially or complete repairing. Applications the adequate and modern methods and materials for repairing process. Applied the FRP in strengthening the concrete elements of structures
Expected learning outcomes:	At the end of the course the student will be able to: <ol style="list-style-type: none"> 1. to know and to apply the permanent monitoring and maintenance of existing structures. 2. to evaluate the stage of damages and eventually propose the repairing of elements or structures in general based on the causes factors. 3. to apply the modern methodology in repairing such process using the FRP 4. To know to apply the software's in strengthening the concrete elements such are: columns; beams; slabs , etc.
Workload that falls on the student (shall correspond with Student Learning Outcomes)	

Activity	Teaching hours	Day/Week	total
Lectures	2	15	30
Theory / Laboratory work / Exercises	2	15	30
Practical work	4	2	8
Preparation for intermediate test	2	2	4
Consultation with the teacher	1	15	15
Field work	4	2	8
Test, seminar paper	2	4	8
Home work	4	2	8
Individual learning (in the library or at home)	3	5	15
Preparing for the final exam	4	4	16
Evaluation time (test, quiz, final exam)	2	2	4
Projects, presentations, etc.	2	2	4
Add any other activity that is not on the chart ...			
Total			150
Teaching methods:	<ul style="list-style-type: none"> - Lectures and presentations using the practical examples from existing structures, or elements - Numerical exercises. - seminars and practical examples. - Interactivity during the lectures and exercises - work in group 		
Evaluation methods:	<p>During the semester organize the two tests and evaluations based on the following percents:</p> <ul style="list-style-type: none"> - First test 40 %, (50 % of teaching materials) - Second test 40 %, (50 % of teaching materials) - Seminar work 20 % <p>Average of the two tests will be used on final grade Otherwise the final exam will be organized:</p> <ul style="list-style-type: none"> - Written part 50% Oral part 50% 		
Basic literature:	<ol style="list-style-type: none"> 1. Kabashi, N., <i>Mirëmbajtjadhesanimi i objekteve</i> (ligjerathtëautorizuar), 2008 2. Allen, R.T., Edwards, S. C., “<i>Repair of concrete Structures</i>” Blackie & Son Limited, 1987 3. ICRI&ACI International, <i>Concrete Repair Manual</i>, 1999 		
Additional literature:	<ol style="list-style-type: none"> 1. <i>International Conference, Proceeding from International Conference Structural Faults and Repair</i> 2. Danish Standards Institute, “<i>Repair of concrete structure to EN 1504</i>” 3. Michael Raupach: <i>Concrete Repair to EN 1504</i> 		

Curriculum development

Week	Lecture title
Week 1:	Introduction <ul style="list-style-type: none"> • General data on the conditions of the building • Requests for inspections of existing buildings • Evidence of damages and causes
Week 2:	Application of Materials in the rehabilitation of structures <ul style="list-style-type: none"> • Assessment of damages and degree of damage • The proposal of materials and the conditions that must be fulfilled depending on the exposure conditions
Week 3:	Diagnosis of building defects <ul style="list-style-type: none"> • The influence of the surroundings-aggressiveness on the structures • Alkali Silicate Reaction • Corrosion of Concrete
Week 4:	Application of Sanitation Principles and Methods <ul style="list-style-type: none"> • Principles: P1-P9 • Sanitation methods: M1,
Week 5:	Selection of Sanitation Materials <ul style="list-style-type: none"> • Application of EN 1504 for sanitation • Sanitation sprays • Protection of the armature against corrosion
Week 6:	FRP materials for strengthening structures <ul style="list-style-type: none"> • Features of FRP • Types of FRP materials • Behavior of FRP under the actions
Week 7:	Calculation theory of FRP reinforcements <ul style="list-style-type: none"> • Hypotheses and calculations according to EC 2 • Assumptions and calculations according to ACI
Week 8:	Calculation theory of FRP reinforcements <ul style="list-style-type: none"> • Hypotheses and calculations according to EC 2 • Assumptions and calculations according to ACI...
Week 9:	Renovation of existing Masonry structures <ul style="list-style-type: none"> • Basic concepts • Sanitation materials
Week 10:	Types of damage in concrete structures <ul style="list-style-type: none"> • Cracks and types of cracks • local damage to concrete elements • major damage to the structure
Week 11:	The influence of the environment-aggressiveness in Concrete <ul style="list-style-type: none"> • the influence of salts, sulfates, acids, etc
Week 12:	Examples of rehabilitation of existing structures
Week 13:	Examples of rehabilitation of existing structures
Week 14:	Monitoring and permanent maintenance <ul style="list-style-type: none"> • conditions and effect of maintenance
Week 15:	Inspections of facilities after Sanitation <ul style="list-style-type: none"> • examination methods • evaluations after renovations

Academic Policies and Code of Conduct

The teacher sets the criteria for regular attendance in lectures and exercises and rules of etiquette such as: keeping calm in class, turning off mobile phones, entering the hall on time, etc.

If the student does not complete the tasks / essay / related to the implementation of the elaboration of the subject, he cannot undergo the exam.