

Course Title	Foundations and Special Topics for Intervention on Historical Structures				
Course Code	MACOM28				
Course Type	Required (Civil Engineering Specialization)				
Level	Master				
Year / Semester	3 rd semester				
Teacher's Name	Ch. Onisiforou & D. Nicolaides				
ECTS	10	Lectures / week	--	Laboratories / week	--
Course Purpose	<p>The course is divided in two parts:</p> <p>At the first part, the main scope is the acquiring knowledge from the students on the topics of Foundations of historic buildings, Geotechnical pathology in soil and / or foundation faults and methods and techniques for supporting and strengthening foundations.</p> <p>The main objective of the second part includes a number of special topics strongly related to the procedure to complete a study and the works of intervention on a historical structures, such as special topics on the materials used for the intervention, Underpinning – retaining of monuments and historic buildings, environmental studies, energy efficient of monuments and project management. It is the aim of the course to provide to students a wide knowledge on a variety of relevant topics, so that to be able to use and integrate in other courses, in their research projects and theses, or during their professional career.</p>				
Learning Outcomes	<p>By the end of the course, the students should be able to:</p> <ul style="list-style-type: none"> • Be aware of the different types of foundations used occasionally in historic buildings. • Evaluate the magnitude and causes of any failure in foundation or soil. • Identify the current situation and calculate the bearing capacity of the soil and recognize the need for support. • Be competent to explore and collect required data on soil, foundation and building and evaluate them. • To propose, study and design appropriate support and support techniques for different ground and loading conditions. • Students will obtain fundamental knowledge on a variety of topics related to conservation, restoration and general preservation of monuments, traditional buildings and other elements of cultural heritage. • Students will also complement their knowledge regarding the required works for the successful restoration of monuments. 				
Prerequisites	MACOM21 & MACOM22	Corequisites	--		

<p>Course Content</p>	<p>The first part contains the follow topics:</p> <ul style="list-style-type: none"> • Soil parameters and soil categories. • Schedule of geotechnical investigation and evaluation of the results • Relations between the soil parameters • Methods for the definition of soil capacity • Foundation types of historical structures • Damages and failures of monuments due to soil and foundation conditions • Criteria for interventions on foundation systems and strengthening of soil • Methods and techniques for interventions on foundation systems (micropiles, strengthening of soil, strengthening of rough foundations e.t.c.) <p>The second part contains the follow topics:</p> <ul style="list-style-type: none"> • Underpinning – retaining of monuments and historic buildings • Specialised mortars and grouts for the restoration of historic buildings • Instrumentation of historic buildings and museums • Environmental Impact Assessment for monument restoration projects • Energy performance of historic buildings • Project management (for intervention on monumental structures)
<p>Teaching Methodology</p>	<p>The taught part of the course is delivered to students by means of lectures, conducted by electronic presentations. Lecture notes and pictures are given to students in electronic form.</p> <p>All course materials will be available to students through the platform e-Learning that is available at the university.</p>
<p>Bibliography</p>	<ul style="list-style-type: none"> • Simons, Menzies and Matthews, A Short Course in Geotechnical Site Investigation, 2002. • Craig, R.F., Soil Mechanics, 7th ed., Spon Press, 2004. • Smith, I., Smith's Elements of Soil Mechanics, 8th ed., Wiley-Blackwell, 2006. • Simons, N. & Menzies, B., A Short Course in Foundation Engineering”, Thomas Telford Publishing, 2nd ed., 2000. • Bowles, J., Foundation Analysis and Design, McGraw-Hill, 2001. • Tomlinson, M.J., “Foundation Design and Construction”, Prentice-Hall, 7thed., 2001. • Tomlinson, M. J. & Woodward, J., “Pile Design and Construction Practice”, 6thed., CRC Press, 2014. • Viggiani, C. (Editor), Scientific research papers (selection) from “Geotechnical Engineering for the Preservation of Monuments and Historical Sites”: Proceedings of the International Symposium, Naples, Italy, 1996. • Przewlocki, J., Dardzinska, I. and Swinianski, J., Review of historical

	<p>buildings' foundations, <i>Geotechnique</i>, 55 (5), 363-372, 2005.</p> <ul style="list-style-type: none"> • relevant research, review or case studies scientific papers on historical foundations. • Lizzi, F. (1981), <i>The static restoration of monuments: basic criteria, case histories</i>, Sage Publishers. • Νομικός, Μ. (1997), <i>Αποκατάσταση και επανάχρηση ιστορικών κτηρίων και συνόλων: Μεθοδολογία-εφαρμογές</i>, Εκδόσεις Γιαχούδη. • Σ. Τσότσος, «Ενίσχυση των θεμελιώσεων μνημείων – Κριτήρια, αρχές σχεδιασμού, εφαρμογή και τεχνολογικές εξελίξεις», Σεμινάριο «Διατήρηση - Αποκατάσταση – Αναστήλωση», σελ. 271-293, Θεσσαλονίκη, 1994. • Δημοσθένους, Μ.Α., <i>Μέθοδοι και υλικά αποκατάστασης και ενίσχυσης διατηρητέων κτηρίων από φέρουσα τοιχοποιία</i>, Ινστιτούτο Τεχνικής Σεισμολογίας και Αντισεισμικών Κατασκευών, Θεσσαλονίκη. • Καραδέδος, Γ., (2009), <i>Ιστορία και Θεωρία της Αποκατάστασης</i>. • Η Εφαρμογή των Ενεμάτων στην Αποκατάσταση Μνημείων, Ουρανία Μπουντά, Διδακτορική Διατριβή Πανεπιστήμιο Πατρών, 2007. • Stefanidou M. "Study of the microstructure and the mechanical properties of traditional repair mortars" Doctoral thesis Department of Civil Engineering, Thessaloniki, 2000. • Παράμετροι για τη Σύνθεση Παραδοσιακών Επισκευαστικών Κονιαμάτων, Μαρία Στεφανίδου, Τεχν. Χρον. Επιστ. Έκδ. ΤΕΕ, τεύχος 1, 2010. • Papayianni, I. "Criteria and methodology for manufacturing compatible repair mortars and bricks". In <i>Compatible materials for the protection of European cultural heritage</i>, PACT 56. Biscontin, G., Scientific Editor. Technical Chamber of Greece, Athens 1998. <p>In addition to the above, specific bibliography and other references will be suggested to the students depended on the topics will be examined and discussed through the semester asynchronous and synchronous online learning methods. However, the students will search through the international bibliography as a part of the learning methodology procedure.</p>
<p>Assessment</p>	<p>Continuous Evaluation (50%)</p> <p>Exercise 1 (Assessment of damages on a monumental structure due to geotechnical and foundation conditions and proposal for interventions) 20%</p> <p>Exercise 2 (Free elective one of the topics of the second part and completion of project) 15%</p> <p>Exercise 3- study on a special topic of the first part of the course and group commentary 7.5%</p> <p>Exercise 4-study on a special topic of the second part of the course and group commentary 7.5%</p> <p>Final Exams (50%)</p>



Language	Greek
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