



# eLAICH

## Educational Toolkit

For educators and heritage authorities to introduce the values of cultural heritage and principles and challenges of its preservation to youth.

**CULTURAL HERITAGE 4 YOUTH**

### [eLAICH Project](#)

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### [eLAICH e-learning platform](#)

[elaich.technion.ac.il/e-learning](http://elaich.technion.ac.il/e-learning)

# MANUAL



[Educational Linkage Approach In Cultural Heritage ENPI I50583](#)

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<http://elaich.technion.ac.il/e-learning/>

## Preface

ELAICH - Educational Linkage Approach In Cultural Heritage - was formulated during the European project under the same name within the framework of the Euromed Heritage 4 Programme.

It was initiated by a group of experts from different fields of conservation of cultural heritage, including architecture, chemistry, and material science, combining both research and teaching in the field of conservation and preservation of cultural heritage.

The efforts of experts and conservators in preserving the world's cultural heritage should be supported by understanding and input of the general public. It will not succeed without you!

Upon the development of the ELAICH Methodology, it was applied during the eLAICH courses taught by the ELAICH partners in Greece, Israel, Malta, Turkey, and Jordan. All this served as "building technology" and "building materials" for the "construction" of the eLAICH e-learning Educational Toolkit.

It is our pleasure to share with you our knowledge and interest in cultural heritage and its conservation. We hope that study with the eLAICH Educational Toolkit will help you to "open the door" into conservation of cultural heritage - a much needed and fascinating interdisciplinary field, combining arts, architecture, sciences, and technology.

January 2012  
Haifa, Israel

Anna Lobovikov-Katz  
Head, ELAICH Project

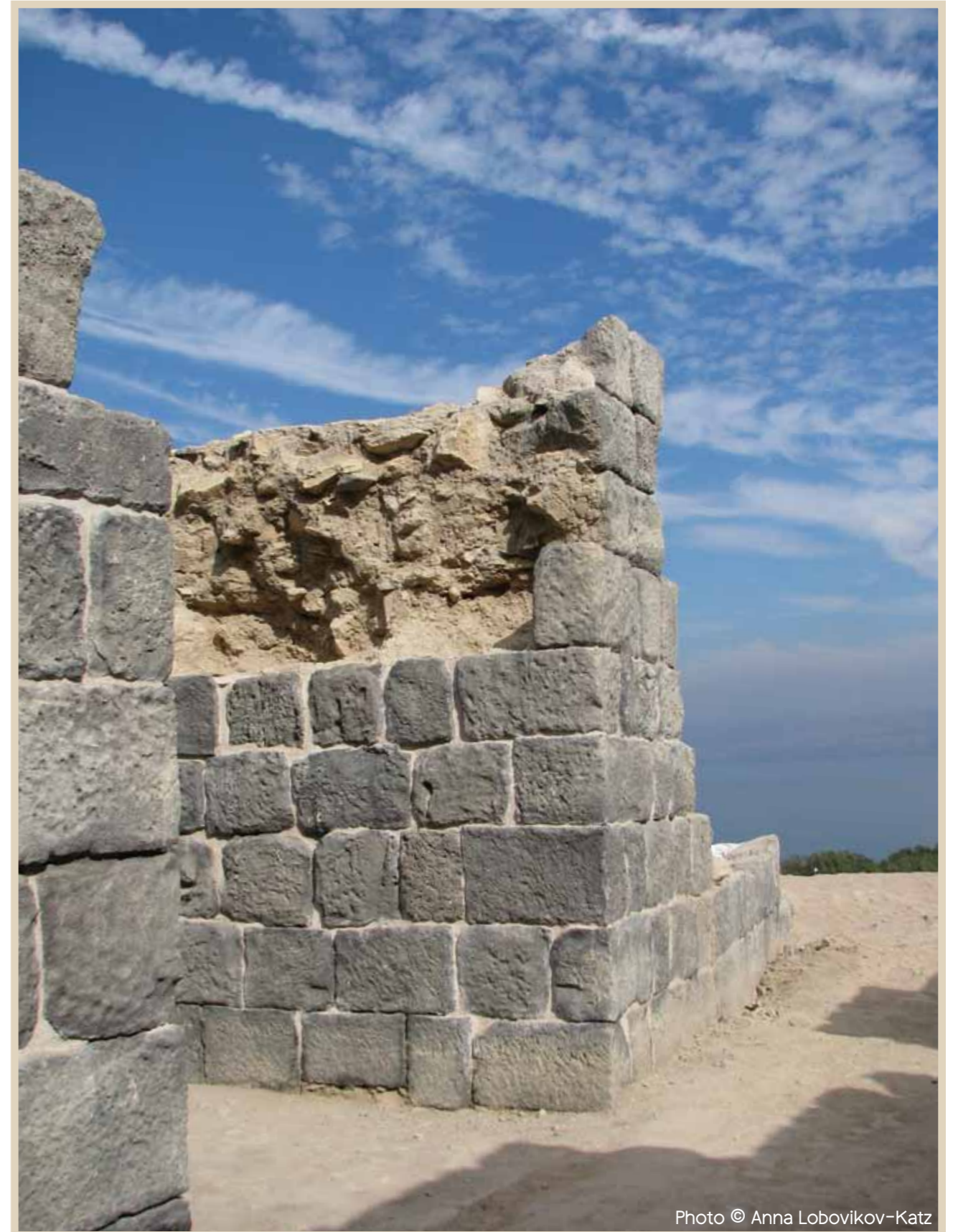



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## Table of Contents

<b>Module 1 Values and Awareness</b>		23
Coordinator: Technion		
<b>Introduction</b>		24
<b>Guidelines</b>		25
<b>Basic Course</b>		26
<b>Teaching material</b>		
1.1	What is cultural heritage?	26
1.2	Why should we preserve cultural heritage?	27
1.3	How should we preserve cultural heritage?	28
1.4	Monuments: social significance and conflict of values	29
1.5	Documentation of cultural heritage	30
<b>Exercises</b>		
1A	Preserving cultural heritage	30
<b>Advanced Topics</b>		30
<b>Teaching material</b>		Related topics of Basic Course
1.6	Conservation of the monuments of the Acropolis of Athens in compatibility with and revealing the values of the monuments	1.3 30
		
Photo © Anna Lobovikov-Katz		
<b>Module 2 Knowing the built heritage</b>		32
Coordinator: NTUA, in cooperation with Technion		
<b>Introduction</b>		34
<b>Guidelines</b>		36
<b>Basic Course</b>		36
<b>Teaching material</b>		
2.1	Knowing the building	37
2.2	Architectural Heritage - Strategic planning for protection	39
2.3	The integration of art, material and structure in built heritage	40
2.4	Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures	40
2.5	Historic building materials: Stones, ceramics, mortars	42
2.6	Historic materials of architectural surfaces: Mosaics	43
2.7	Earthquake protection of monuments	44
<b>Exercises</b>		
Exercise set	The porous structure of materials and the study of their compatibility in relation to water and soluble salts transport phenomena	46
2A	Demonstration of density - porosity measurements	
2B	Study of the hygrometric behavior of building materials with infrared thermography	
2C	The use of infrared thermography to assess compatibility of building materials: The cases of Hagia Sophia and the Venetian Fortifications of Herakleion	
<b>Advanced Topics</b>		Related topics of Basic Course
<b>Teaching material</b>		
2.8	Diagnostic study of the Hagia Sophia mosaics	2.6 46

**Module 3 Decay and environment** 48

Coordinator: University of Antwerp, in cooperation with NTUA

**Introduction** 50

**Guidelines** 51

**Basic Course** 52

**Teaching material**

3.1	Introduction - Awareness of the influence of environment on monument decay	52
3.2	Atmosphere and gas pollution	54
3.3	Atmosphere and particles	55
3.4	Phenomena and mechanisms of decay	57
3.5	Preventive Conservation	58
3.6	Diagnosis of Decay: Methodology, criteria and techniques - Non destructive and instrumental laboratory techniques for diagnosis of decay and assessment of conservation	60

**Exercises**

Related topics of Basic Course 61

3A	Introduction - Awareness of the influence of environment on monument decay Initial Test	3.1
3B	Atmosphere and gas pollution exercise Online Test (multiple choice questionnaires) Questionnaire 3.2	3.2
3C	Online Test (multiple choice questionnaires) Questionnaire 3.3	3.3
3D	Online Test (multiple choice questionnaires) Questionnaire 3.4	3.4
3E	Online Test (multiple choice questionnaires) Questionnaire 3.5	3.5
3F	Decay in lab and on monument scale • Salt decay in lab: Salt crystallization	
3G	Decay in lab and on monument scale • From salt decay in lab to exercise salt decay pathology on the monument: The case of the Medieval City of Rhodes	



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**Advanced Topics** 61

**Teaching material**

3.7	Environment	3.2-3.3
-----	-------------	---------

**Exercises**

3H	Off-line Exercise: Acid Rain and Atmospheric Particles in my City!	3.2-3.3
3I	Activity D-1. Learning to see	
3J	Activity D-2. Learning to analyse environmental influence	

<b>Module 4 The conservation processes, materials and techniques</b>	62
Coordinator: University of Malta, in cooperation with NTUA	
<b>Introduction</b>	64
<b>Guidelines</b>	65
<b>Basic Course</b>	
<b>Teaching material</b>	66
4.1 What's wrong? Prevention is better than cure!	66
4.2 What can be done?	67
4.3 How should it be done? Guiding principles in conservation	69
4.4 Do's and don'ts	70
4.5 Requirements for compatible materials and conservation interventions	72
<b>Exercises</b>	Related topics of Basic Course 72
4A What are the threats to Khan esh-Shawarda in the Old City of Acre?	4.1
4B What can be done?	4.2
4C Choose the mortar mix	4.3
4D Following the conservator's steps	4.4
<b>Advanced topics</b>	73
<b>Teaching material</b>	
4.6 Criteria and methodology for cleaning – pilot applications and case studies	73
4.7 Criteria and methodology for consolidation – pilot applications and case studies	74
4.8 Reverse engineering for compatible and performing restoration materials – case studies	75

<b>Module 5 Monitoring and maintenance</b>	76
Coordinator: Ca' Foscari University in cooperation with NTUA	
<b>Introduction</b>	78
<b>Guidelines</b>	78
<b>Basic Course</b>	82
<b>Teaching material</b>	
5.1 To Monitor or not to Monitor, that is the question!	82
5.2 What does Maintenance mean?	84
5.3 Preventive Conservation...also after the Conservation process	85
5.4 What do you remember of Module 5? Let's test it!	86
<b>Exercises</b>	Related topics of Basic Course 87
5A Hands on materials (1): let's immerse it completely into water and... off-line exercise	5.1
5B Hands on materials (2): how can we measure the colours? off-line exercise	5.1
<b>Advanced topics</b>	88
<b>Teaching material</b>	
5.5 Non Destructive Testing and Quality Control on monuments for monitoring the decay state and the compatibility of conservation interventions	
<b>Exercises</b>	Related topics of Basic Course 88
5C Hands on materials (3): macro and micro observations off-line exercise	5.1
5D Hands on materials (4): what the contact angle can tell us off-line exercise	5.1
5E Hands on materials (5): rising damp experiment off-line exercise	5.1

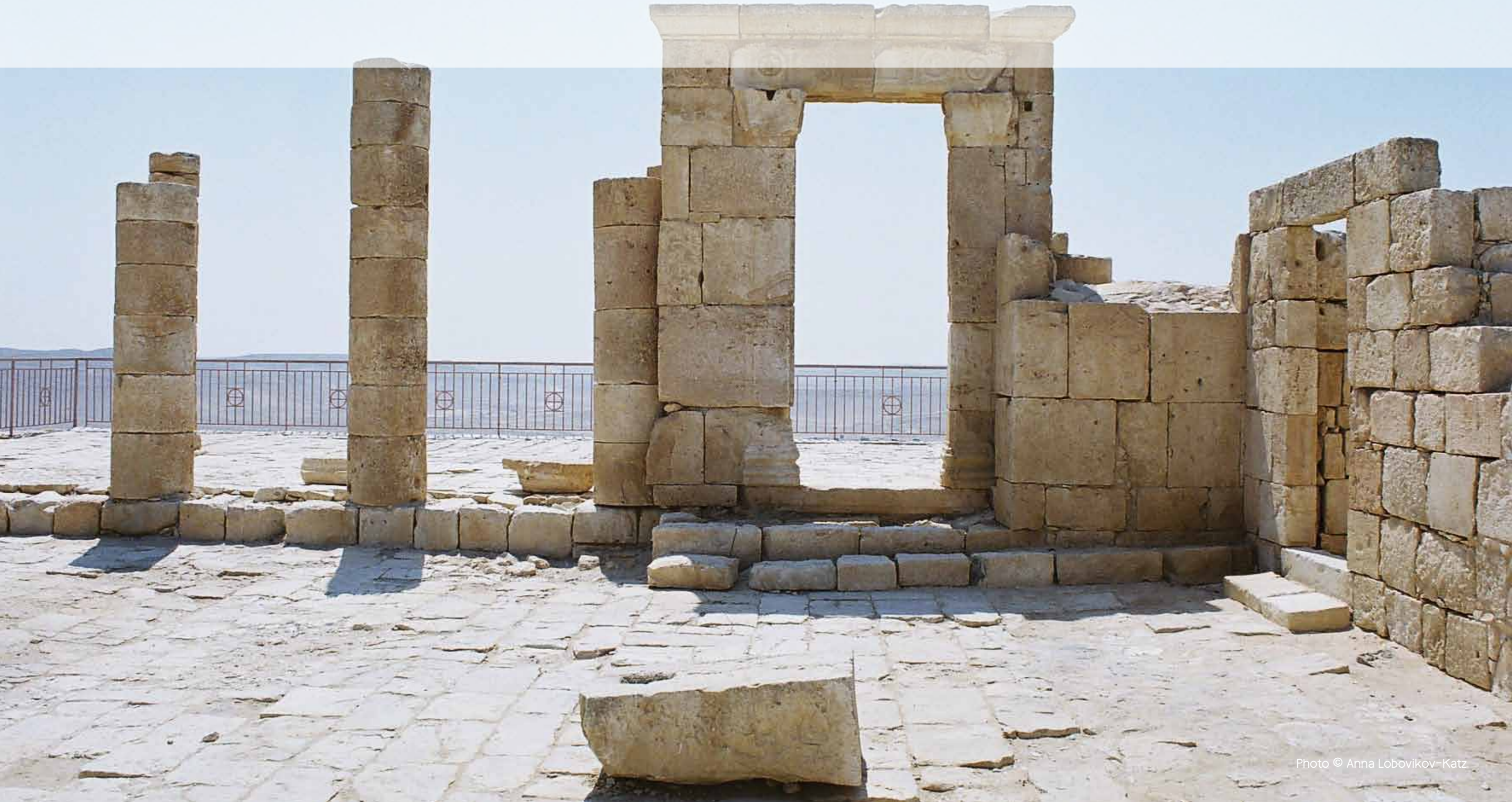
<b>Module 6 Management and use</b>	90
<b>Coordinator: NTUA with the cooperation of Technion, University of Malta, Ca' Foscari University</b>	
<b>Introduction</b>	92
<b>Guidelines</b>	92
<b>Basic Course</b>	94
<b>Teaching material</b>	
6.1 Tourism and monuments	94
6.2 Archaeological parks	95
6.3 Preservation of Historic Cities	96
6.4 Innovative technologies and strategic planning methodologies of cultural heritage preservation	97
6.5 Protection and rehabilitation of historic city of Acre	98
6.6 The megalithic temples of Malta - World Heritage Sites studies and conservation	98
6.7 Environmental management for preserving Venice	99
6.8 Keeping Heritage alive - The case of the Medieval City of Rhodes and the Aegean island of Halki - International Youth initiatives	100
<b>Module Adopt a site</b>	102
<b>Coordinator: Technion</b>	
<b>Introduction</b>	104
<b>Guidelines</b>	104
<b>Basic Course</b>	106
<b>Teaching material</b>	
Principles of study and documentation of a historic site for eLAICH students	106
Example of study and documentation of a historic site	106
<b>Guidelines</b>	
Guidelines for choosing a site	107
Guidelines for the in-situ study of a (part of) historic site for eLAICH students	108

The ELAICH Consortium has identified relevant video material on the themes of the Basic Course. We have also obtained permission by their providers to place them on our website for your convenience. Access to these videos is provided at the end of each Module.



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# Introduction and Guidelines





## Introduction to the eLAICH - Educational Toolkit

### *ELAICH and its aim*

#### **Description - ELAICH - What is it about?**

ELAICH - Educational Linkage Approach In Cultural Heritage - was formulated during the European project under the same name, which resulted in the development of the eLAICH Educational Toolkit.

ELAICH is about connecting young people to their cultural heritage.

It is about understanding our role as humans in the cycle of creation-deterioration-conservation. It is about learning to appreciate the importance of cultural heritage.

ELAICH students address their immediate heritage through an interdisciplinary approach, benefiting the preservation of the built history around us, contributing to the community and the wider world. The ELAICH project, part of the Euromed Heritage 4 Programme, contributes to the development of awareness and appreciation of cultural heritage.

Join us  
in a journey  
into your cultural heritage  
Join ELAICH



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#### **Objectives - ELAICH - what is it for?**

The overall objective of the ELAICH project is to contribute to raising awareness of youth of the importance of cultural heritage and its preservation. In order to achieve this objective, the eLAICH Educational Toolkit is focused on enabling eLAICH students, by the completion of the eLAICH learning process, to acquire the basic knowledge and develop basic understanding of the following:

- \* values of cultural heritage (historic buildings and sites) and their complex equilibrium;
- \* principal causes and types of physical deterioration of cultural heritage, and the dangers it is subject to, including the impact of the environment;
- \* main principles and techniques of studying historic buildings and sites, investigating and diagnosing their deterioration;
- \* main principles, processes, materials and technologies of conservation of cultural heritage;
- \* meaning, importance and basic methods of preventing deterioration of cultural heritage, and its monitoring; and careful use of cultural heritage.

Learning by means of the eLAICH Educational Toolkit will help students to develop an accurate and careful approach towards cultural heritage preservation, and to be helpful in collecting data on and alerting the appropriate authorities about deterioration of cultural heritage.

#### **Target audience - ELAICH - whom is it for?**

ELAICH is intended for groups of high school students with their teacher. No previous knowledge in cultural heritage or its preservation is required from the students or from the teacher.

## Guidelines to the eLAICH - Educational Toolkit

### How to use ELAICH

#### General information

The **eLAICH Educational Toolkit** provides a “**Basic Course**” as well as a number of optional “**Advanced Topics**” which can be taken separately by the user. The ELAICH Toolkit provides flexibility through its e-learning platform, enabling easy navigation and immediate access to all main titles and activities of the Toolkit and at the same time it provides an easy sequential learning progress through the whole of eLAICH.

The eLAICH Toolkit is accompanied by a set of thematic **Introductions** and **Guidelines** on all levels: from general level to the level of a single topic of teaching material. The Introductions relate to the content of each relevant part of the Toolkit, explain what it is about and provide an abstract of material to be studied. Guidelines explain how to actually do and study each relevant part, e.g. time duration, equipment (if any), etc. Altogether, **Introductions** and **Guidelines** make up a manual to enable the use and management of eLAICH by users with no expertise in cultural heritage. The Manual is available in a number of different languages on-line and can be downloaded.

eLAICH educational activities are to be held in the classroom, school laboratory (if available), and at a historic site.

#### eLAICH structure

**Modules:** The eLAICH Educational Toolkit consists of six Modules, subdivided in turn, into specific topics. Each Module is devoted to a specific integral part of contemporary interdisciplinary conservation of cultural heritage, and linked to eLAICH's on-site teaching unit - “Adopt a site”.



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#### The Modules are the following:

- \* Module 1 - Values and Awareness
- \* Module 2 - Knowing the Built Heritage
- \* Module 3 - Decay and Environment
- \* Module 4 - The Conservation Processes, Materials and Techniques
- \* Module 5 - Monitoring and Maintenance
- \* Module 6 - Management and Use

**Topics:** Each Module, in turn, comprises several Topics. The number of each Topic starts from the number of a relevant Module, in order to provide easy orientation, e.g. the first topic of Module 4 has a number 4.1, etc.



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**Educational activities:** two types of educational activities could be undertaken: learning the new material, and exercising and reinforcing the acquired knowledge, provided by **Teaching material** and **Exercises**.

**Teaching material** comprises mainly Power Point presentations which may be viewed on-line or downloaded (see Terms of Use; Copyright).

**Exercises** are of different types:

- \* On-line exercises
- \* Off-line exercises

Off-line exercises might be undertaken in class, on a historic site or in a school laboratory (if available) - according to guidelines. It is recommended to undertake all exercises, if recommended laboratories and equipment are available.



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#### Sequence

The eLAICH Modules should be taken sequentially, according to this order: Module 1, then Module 2, etc., up to Module 6. After Module 6 the “Adopt a site” unit should be undertaken.

The eLAICH e-learning Platform provides an easy sequential learning process through the whole of eLAICH. The eLAICH e-learning Platform provides easy navigation and immediate access to each of the main titles and activities of the Toolkit, in order to let the user return to any given point in the study, or to

have a quick view of any part of the material.

**Basic Course** is a core obligatory track which will provide you with material on all topics of eLAICH. Working your way through eLAICH means working your way through the Basic Course.

**Advanced Topics** are optional, and may be taken (or not) upon the choice of the user, from the List of Advanced Topics provided in the end of each Module. They extend the subjects of the Basic Course.

#### Adopt a site

The “Adopt a site” unit is the last unit in the ELAICH learning process. It is based on knowledge and understanding developed through all 6 Modules. The “Adopt a site” unit provides an opportunity for students to:

- \* Apply knowledge from the eLAICH lessons on a historic site
- \* Develop a basic ability to understand a historic site, record its characteristics and undertake basic analysis
- \* Collect data about a historic site which might help its preservation by conservation experts and conservators.

The “Adopt a site” unit is a package which will enable you to undertake these activities during the final work by the students in each eLAICH course. It is recommended that the school choose the historic site in cooperation with relevant heritage or conservation authorities responsible for historic sites. The final work might be submitted by the school to a relevant conservation/heritage authority at the completion of the eLAICH course.

Our website provides a list of contacts in several countries in the **Feedback** section.

A school might choose a historic site near the school, if available, for easy logistics. In this case all off-line in-situ educational activities might take place on the same site. This would enrich the scope of documentation, understanding and analysis of the site.

### Duration

Recommended duration of the “**Basic Course**” is 30 hours, including study on-site (according to “Adopt a site”). The **Basic Course** is the core obligatory course. The Advanced Topics may be either taken or not - this is a decision for the school to make.

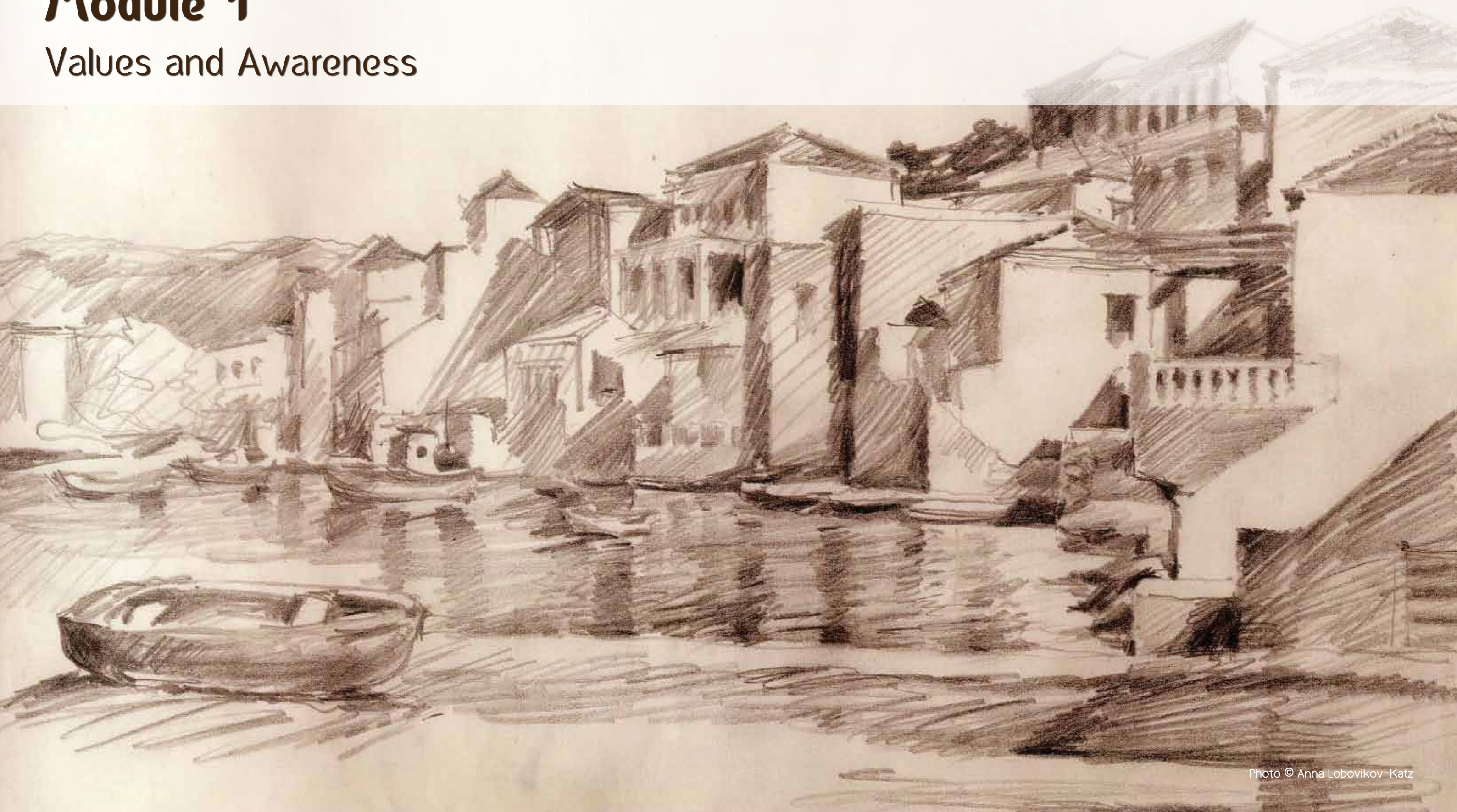
### Navigation

The main menu is visible on the top of each page of the eLAICH website. You will find the full table of contents under the button “Content” of the main menu. From there you can access each Module (by clicking the “Module” title on the picture) or each Topic in the table of contents. You can also go forward/backward with relevant buttons at the bottom of each page within the Modules. We recommend starting from the beginning, after reading the Introduction and Guidelines, and working your way through, preferably with forward/backward buttons, to ensure the complete study of the material of the **Basic Course**.



# Module 1

## Values and Awareness



# Module 1

## Introduction

Module 1 of the e-learning platform “eLAICH” provides an introduction to the whole of eLAICH and yet has its own specific focus.

Module 1’s objective is to introduce to the eLAICH student the subject of cultural heritage, the importance of its preservation and of awareness by the general public. It outlines and exemplifies cultural heritage; what are its main types; and what does it consist of.

Module 1 introduces the idea of tangible and intangible heritage, with a focus on the most

abundant type of cultural heritage, which we see every day in our life and which surrounds us: architectural, or built heritage, and introduces its variety and main components.

Module 1 introduces the idea of the value of cultural heritage, what and why of its worth, and what are the reasons for preserving cultural heritage. It focuses on heritage, its architectural, technological, historic and other values, and at the same time draws the path for further understanding of the fragility of cultural heritage, the understanding that cultural heritage is subject to material and structural deterioration, and the many factors and agents responsible for its deterioration - an understanding which will be developed in the subsequent Modules.

Module 1 contributes to a basic awareness of the metamorphoses undergone over time by the field of the conservation of cultural heritage. It provides the first general introduction to contemporary inter- and multi-disciplinary conservation of cultural heritage to be discussed systematically in further Modules - a field which comprises such different areas as arts, history, architecture, crafts, building technology and engineering, and scientific research in different fields e.g. chemistry, mathematics, physics, biology, engineering and nano-materials.

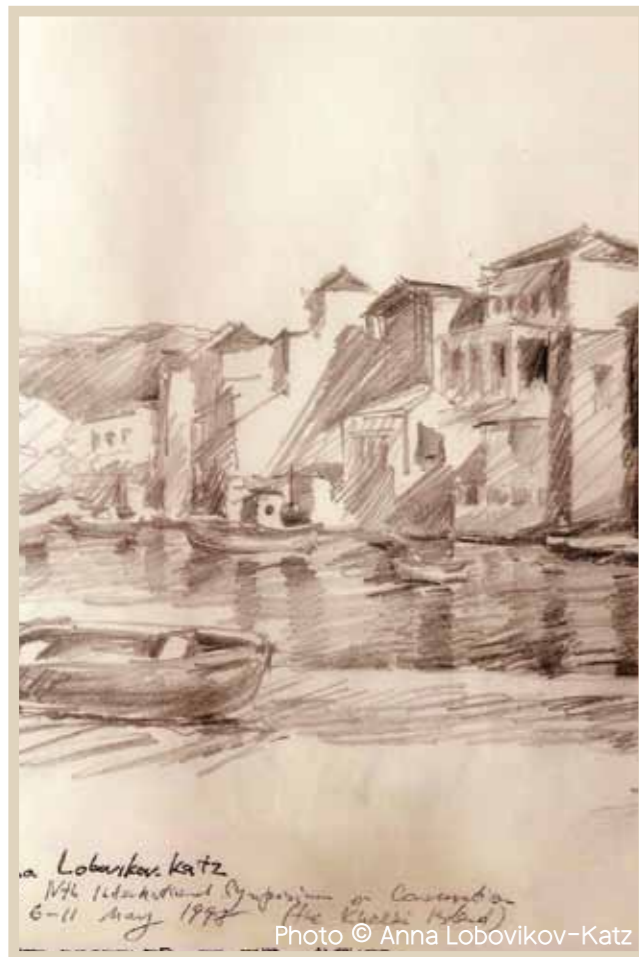


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## Guidelines

Module 1 is the first Module of the eLAICH Basic course. It should be studied first in the series of Modules and the “Adopt a site” unit.

Module 1 structure:

Duration of Module	3 hours
Number of topics	5
Location	Class*
Required equipment	Computer(s); projector; connection to Internet
Special comments	*Short walking tour of historic buildings in the vicinity of school is recommended upon studying Topic 1.5. “Documentation of cultural heritage”. It is recommended to contact local heritage authority for a guided tour, if available (see: Feedback - Contacts)

Module 1 comprises 5 Topics, which should be studied sequentially.

Recommended duration of study for each topic:

1.1. What is cultural heritage?	Part I	40 min
	Part II	25 min
1.2. Why should we preserve cultural heritage?		30 min
1.3. How should we preserve cultural heritage?		30 min
1.4. Monuments: social significance and conflict of values		15 min
1.5. Documentation of cultural heritage		30 min
Exercise 1A - Preserving cultural heritage		10 min

By the completion of Module 1 the basic awareness and understanding of its subjects should be achieved.

## Topic 1.1 What is cultural heritage?

### Table of contents

- 1.1. What is cultural heritage?
  - 1.1.1. General introduction
  - 1.1.2. Main types & categories of cultural heritage
    - 1.1.2.1. Intangible cultural heritage
    - 1.1.2.2. Tangible cultural heritage
  - 1.1.3. Built heritage components and scope

### Introduction

Topic 1.1. What is cultural heritage? is the first and introductory topic to Module 1 “Values and Awareness”. This presentation is the first part of Topic 1.1. It explains what is cultural heritage, what are its categories. It explains and gives examples of tangible and intangible heritage, movable and immovable heritage. It provides a basic introduction to the most widespread part of cultural heritage, which is the focus of ELAICH: built (or architectural) heritage – heritage which is around us, which is part of our everyday life, and explains and exemplifies the scope and the components of the built heritage.

### Guidelines

This topic is an integral part of the eLAICH Basic Course. It should be learned at the beginning, before studying other topics and Modules.

Topic 1.1. is provided in two power point presentations to be studied sequentially:

Part I, which includes:

- 1.1.1. General introduction
- 1.1.2. Main types & categories of cultural heritage
  - 1.1.2.1. Intangible cultural heritage
  - 1.1.2.2. Tangible cultural heritage and Part II, which includes
- 1.1.3. Built heritage components and scope.

By the completion of this topic the basic awareness and understanding of the current subject within the eLAICH Educational toolkit should be achieved.



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Recommended duration of topic	Part I 40 minutes Part II 25 minutes
Location	Class/ homework
Required equipment	Computer(s); Power Point projector; connection to Internet; pens or pencils; paper

## Topic 1.2 Why should we preserve cultural heritage?

### Table of contents

- 1.2. Why should we preserve cultural heritage?
  - 1.2.1. General introduction
  - 1.2.2. Values of the built heritage
  - 1.2.3. Values versus deterioration

### Introduction

This presentation of the topic 1.2. Why should we preserve cultural heritage? extends the basic introduction to the theme of value of cultural heritage, which was provided in the topic 1.1. What is cultural heritage? The topic 1.2. presents and explains a complex interaction between the “values” of built (or architectural) heritage and its deterioration, and therefore provides a basis for understanding of the reasons for preservation of cultural (built) heritage.

### Guidelines

This topic is an integral part of the eLAICH Basic Course. It should be learned after the studies of the previous topics have been completed.

By the completion of this topic the basic awareness and understanding of the reasons for preservation of cultural (built) heritage should be achieved.

Recommended duration of topic	30 minutes
Location	Class/ homework
Required equipment	Computer(s); Power Point projector; connection to Internet; pens, pencils; paper

## Topic 1.3 How should we preserve cultural heritage?

### Table of contents

- 1.3. How should we preserve cultural heritage?
  - 1.3.1 Conservation: theory and practice
  - 1.3.2 Contemporary interdisciplinary conservation
  - 1.3.3 Awareness

### Introduction

Topic 1.3. How should we preserve cultural heritage? is an introduction to the field of conservation of cultural (built) heritage. It contributes to a basic awareness of the metamorphoses undergone over time by the field of the conservation of cultural heritage. It provides the first general introduction to contemporary inter- and multi-disciplinary conservation of cultural heritage to be discussed systematically in further Modules - a field which comprises such different areas as arts, history, architecture, crafts, building technology and engineering, and scientific research in different fields e.g. chemistry, mathematics, physics, biology, engineering and nano-materials.

### Guidelines

This topic is an integral part of the eLAICH Basic Course. It should be learned after the studies of the previous topics have been completed. By the completion of this topic the basic awareness of contemporary inter- and multi-disciplinary conservation of cultural heritage should be achieved.



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Recommended duration of topic	30 minutes
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Location	Class/ homework
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Required equipment	Computer(s); Power Point projector; connection to Internet; pens or pencils; paper
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## Topic 1.4 Monuments: social significance and conflict of values

### Introduction

Monuments serve man's need for collective history. Monuments provide a wealth of knowledge and practices, both social and technical. Aesthetic value, an important human need, is also satisfied through monuments, as even the sight of most monuments is inspiring. Thus, raising awareness and encouraging active participation in the protection of cultural heritage should be promoted. Monument protection has many purposes, including tourism and socio-economic growth.

### Guidelines

This topic is an integral part of the eLAICH Basic Course. It should be learned after the studies of the previous topics have been completed.

By the completion of this topic the basic awareness of the current subject within the eLAICH Educational toolkit should be achieved.

Recommended duration of topic	15 minutes
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Location	Class
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Required equipment	Computer(s); Power Point projector; connection to Internet; pens or pencils; paper
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## Topic 1.5 Documentation of cultural heritage

### Table of contents

#### 1.5. Documentation of cultural heritage

- 1.5.1. Aims of documentation for conservation of cultural heritage
- 1.5.2. Role of study & documentation in conservation of cultural heritage
- 1.5.3. The selected examples of documentation techniques & results

### Introduction

Topic 1.5. Documentation of cultural heritage provides an overview of documentation and survey of cultural built heritage which is specifically targeted to facilitate its conservation. It explains why such documentation is needed, what is special about documentation for conservation purposes, and provides selected examples of the documentation of the historic buildings.

### Guidelines

This topic is an integral part of the eLAICH Basic Course. It should be learned after the studies of the previous topics have been completed.

By the completion of this topic the basic awareness and understanding of the study & documentation in conservation of cultural heritage should be achieved.

Recommended duration of topic 30 minutes

Location Class/ homework

Required equipment Computer(s); Power Point projector; connection to Internet; pens; pencils; erasers for pencil; paper

### Exercises

1A Preserving cultural heritage

## Advanced topics

### Teaching material

1.6 Conservation of the monuments of the Acropolis of Athens in compatibility with and revealing the values of the monuments

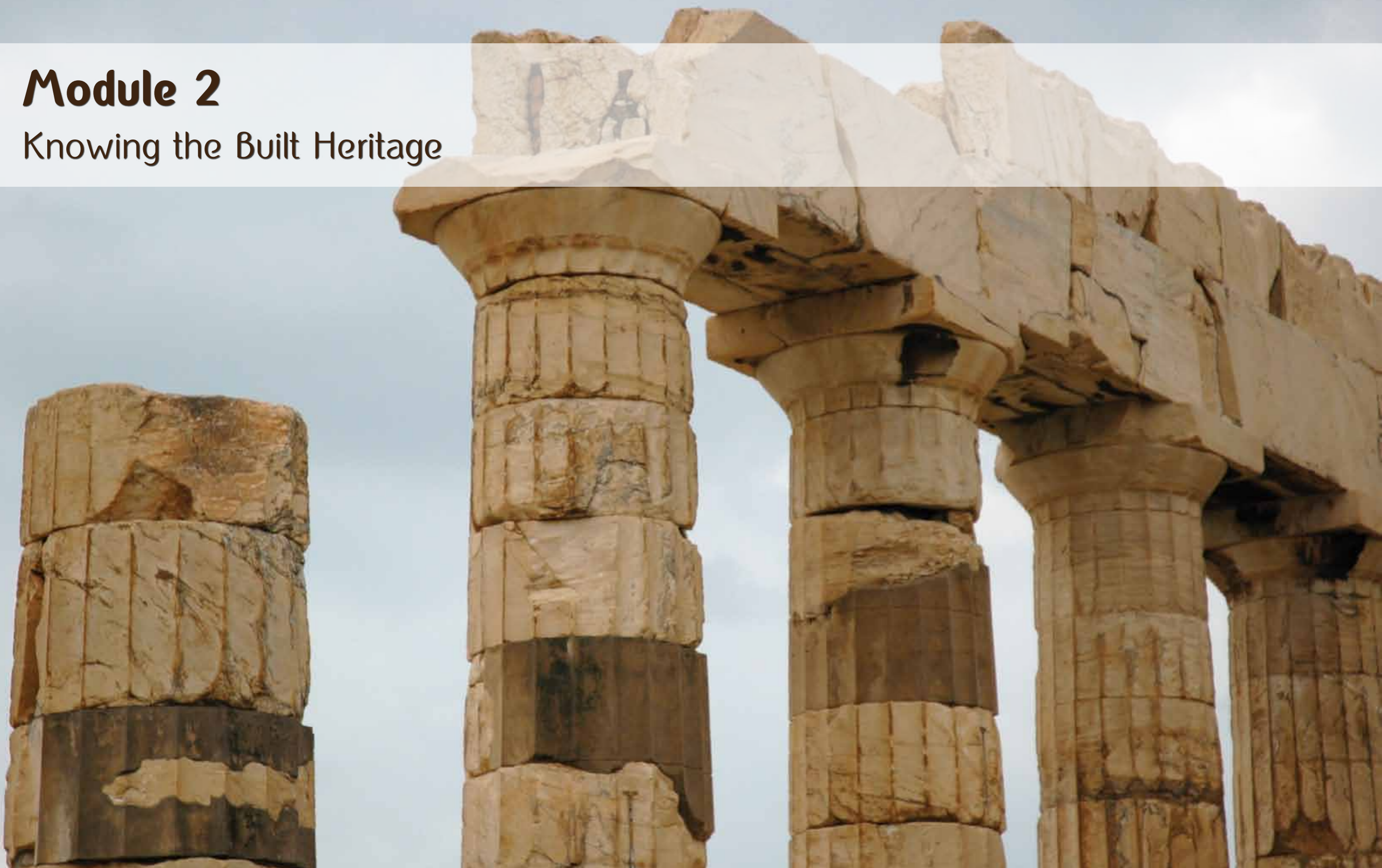


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# Module 2

## Knowing the Built Heritage



## Module 2

### Introduction

Module 2 “Knowing the built heritage” of the e-learning platform “eLAICH” follows the study of the introductory Module 1 “Values and awareness”.

The objective of Module 2 is to get eLAICH student acquainted with knowing the building, as well as the basic steps to be followed for its realization (understand the building, diagnose the building, understand the structural system, identify the materials and their role in the behavior of the structural systems, understand that the building is a “living organism” that changes throughout its lifetime, intervention on a building after an integrated diagnostic study has taken place).

Module 2 examines the basic elements, which constitute the architectural heritage, the problems threatening cultural heritage, as well as the way that protection of historic cities should be realized, respecting the particular historic, architectural and cultural characteristics of each city.

Module 2 introduces historical structural systems, their behavior under various loads and actions and the building materials used. Student gets acquainted with the most common damage observed in historic structures due to earthquakes and basic in situ investigation techniques used for the identification of the construction type of masonry.

Module 2 introduces the basic categories of historic building materials used for the construction of monuments throughout history. The main categories, stones, ceramics and mortars are described in detail, regarding their provenance, manufacturing-forming, basic properties and characterisation. Mosaics, one of the main historic decorative materials, are also examined.

Module 2 examines the methodology used for the investigation of earthquake response of historical structures. It also refers to the basic steps of the reverse engineering methodology that is required in order to design and manufacture earthquake resistant restoration mortars compatible with the historic building materials.

Module 2 is integrated by a set of laboratory exercises in demonstration format for better understanding of the theoretic lectures. These concern the study of the porous structure of materials, as well as of their compatibility in relation to water and soluble salts transport phenomena.



## Guidelines

Module 2 is the second Module of the eLAICH basic course. It should follow the study of the introductory Module 1 "Values and awareness".

Module 2 structure:

Duration of Module	4.5 hours
Number of topics	7 and 1 set of laboratory exercises in demonstration format
Location	Class
Required equipment	Computer; projector

Module 2 comprises 7 Topics, which should be studied sequentially, and 1 set of laboratory exercises.

Recommended duration of study for each topic:

Topic	Duration
<b>2.1</b> Knowing the building - Introduction	15 min
<b>2.2</b> Architectural Heritage - Strategic planning for protection	15 min
<b>2.3</b> The integration of art, material and structure in built heritage	15 min
<b>2.4</b> Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures	60 min
<b>2.5</b> Historic building materials: Stones, ceramics, mortars	60 min
<b>2.6</b> Historic materials of architectural surfaces: Mosaics	15 min
<b>2.7</b> Earthquake protection of monuments	45 min
<b>2.7.1</b> Earthquake response of historic structures	
<b>2.7.2</b> Earthquake resistant mortars	
<b>Exercise Set</b> The porous structure of materials and the study of their compatibility in relation to water and soluble salts transport phenomena	45 min
<b>2A</b> Demonstration of density - porosity measurements	
<b>2B</b> Study of the hygrometric behavior of building materials with infrared	
<b>2C</b> The use of infrared thermography to assess compatibility of building materials: The cases	
<b>2.8 Advance</b> Diagnostic study of the Hagia Sophia mosaics	

By the completion of Module 2 the basic awareness and understanding of its subjects should be achieved. More specifically, the expected output is: the acquired knowledge regarding the ways of approaching the building as far as diagnosis, identification of building materials and structural systems, decay and proper interventions are concerned

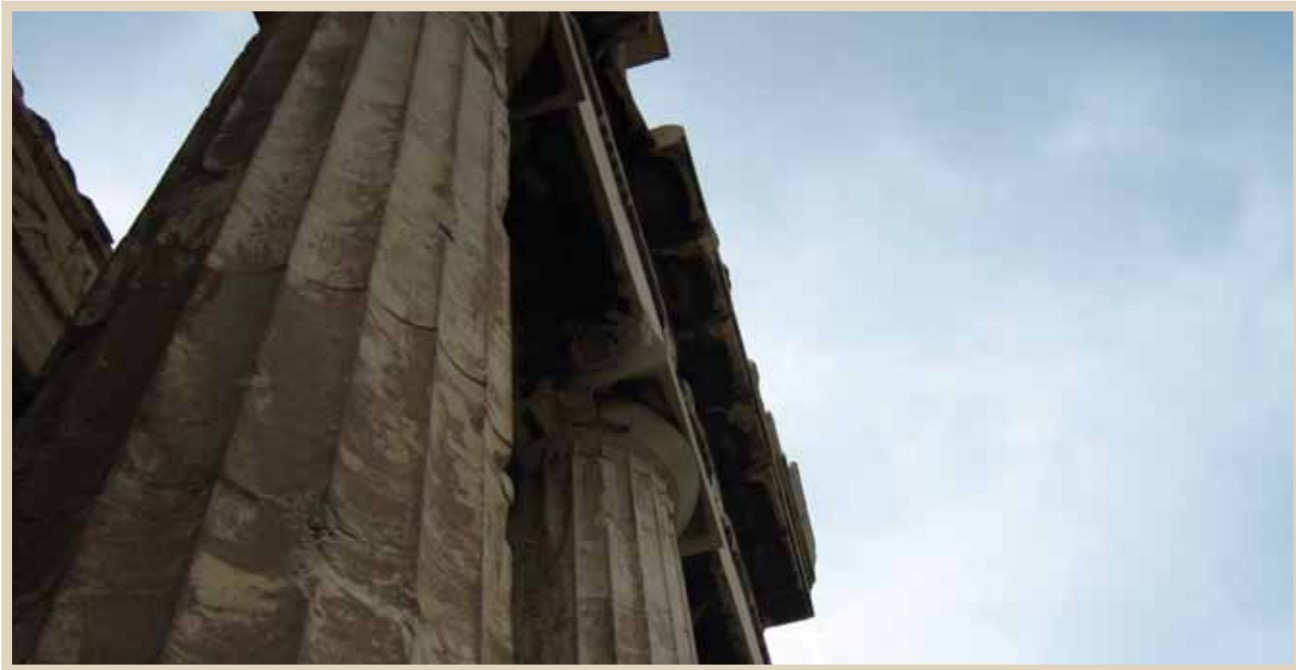
the awareness raising towards the respect and preservation of Historic Cities from a historic, architectural and cultural point of view. Students will be trained in observing the historic structures not only as pieces of Art but also as "living" organisms, subject to decay and damages that need to be studied and protected.

## Topic 2.1 Knowing the building

### Content of Topic 2.1

- 2.1.1** How do we approach protection of Cultural Heritage
- 2.1.2** How do we understand the building
- 2.1.3** How do we diagnose the building
  - Diagnostic study at the level of archaeological sites
  - Diagnostic study on architectural surfaces
  - Integrated management of documentation and diagnostic study at the level of Historic Cities
- 2.1.4** How do we understand the structural system
- 2.1.5** How do we classify historic building materials
- 2.1.6** How do materials affect the behavior of structural systems
- 2.1.7** How does the building change throughout its lifetime
- 2.1.8** How do we diagnose decay
- 2.1.9** How do we decide on whether or not to intervene on a building
- 2.1.10** How do we intervene on a building
- 2.1.11** How do we manage and use a historic building / site / monument / complex in compatibility with its values
- 2.1.12** Is it possible to keep Heritage alive without social awareness, without youth initiatives





### Introduction

The topic examines the basic steps in getting to know the building. These consist of understanding the building, diagnose the building, understand the structural system, identify the materials and understand the role they have in the behavior of the structural systems, understand that the building is a “living organism” that – like human beings – changes throughout its lifetime, and finally, intervention on a building after an integrated diagnostic study has taken place.

The study of the topic is suggested to be accompanied by topics 2.3. “The integration of art, material and structure in built heritage”, 2.4. “Historic structural systems – behaviour and typical damage.

Types of structural members and their effect on the behaviour of historic structures – Methods for the in situ investigation of historic structures”, 2.5. “Historic building materials: Stones, ceramics, mortars” of Module 2 “Knowing the built heritage”.

The expected output is the acquired knowledge regarding the ways of approaching the building as far as diagnosis, identification of building materials and structural system, decay and proper interventions are concerned.

### Guidelines

The topic should be learned after completing topics 1.1. “What is cultural heritage”, 1.2. “Why should we preserve it” and 1.3. “How should we do it” of Module 1 “Values and awareness”.

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector.

## Topic 2.2 Architectural heritage - Strategic planning for protection

### Content of Topic 2.2

- 2.2.1. What constitutes the architectural heritage
- 2.2.2. The values of cultural heritage
- 2.2.3. Problems and threats
- 2.2.4. Strategic planning for protection
- 2.2.5. Historical buildings – Architectural analysis and evaluation
- 2.2.6. Historical buildings – Conservation projects and evaluation of conservation
- 2.2.7. Protection of historic cities

### Introduction

The topic examines the elements which constitute the architectural heritage. Cultural heritage contains various different values, such as historic, scientific, aesthetic, economic, quality of life, preservation of cultural identity. There are various problems threatening cultural heritage, such as natural ageing, atmospheric pollution, functions of modern cities, natural disasters, human destruction, economic mutations. Protection of historic cities should be encountered along with development planning and upgrading of the quality of life. Additionally, the restoration and reuse should be in compatibility with the historic shell. Protection of historic cities should include documentation and evaluation before the implementation of any intervention. It is important to establish a permanent local organization disposing professional knowledge, combining a continual exchange of ideas with residents. This organization should respect the particular historic, architectural and cultural characteristics of each city.

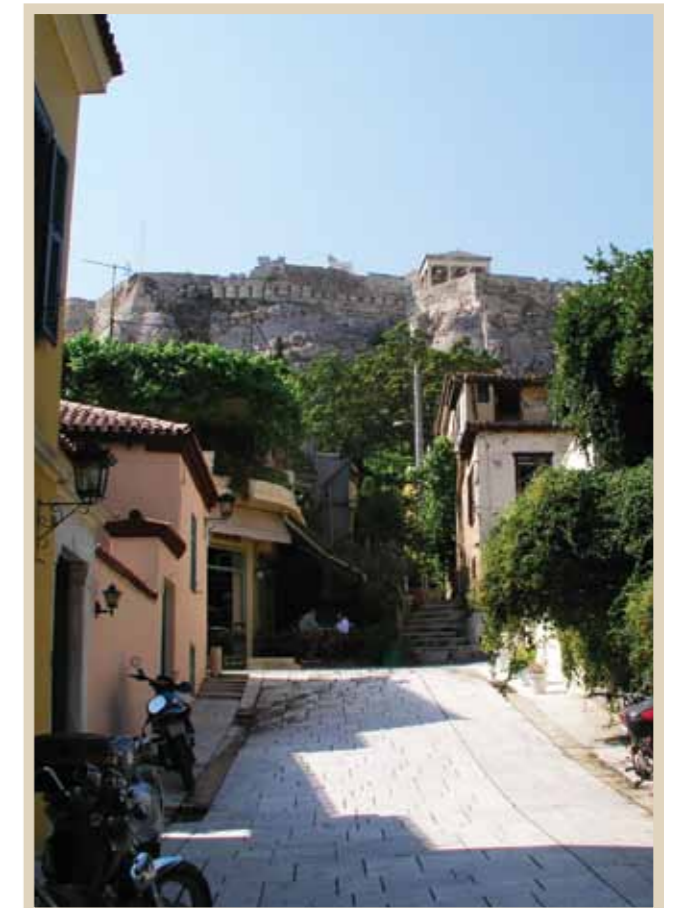
The study of the topic is suggested to be accompanied by topic 1.4. “Monuments: Social significance and conflict of values” of Module 1 “Values and awareness” and topic 2.1. “Knowing the building – Introduction” and 2.3. “The integration of art, material and structure in built heritage” of Module 2 “Knowing the built heritage”.

The expected output is getting students acquainted with the basic components of cultural heritage, as well as awareness raising towards the respect and preservation of Historic Cities from a historic, architectural and cultural point of view.

### Guidelines

The topic should be learned after Module 1 “Values and awareness” and after completing topic 2.1. “Knowing the building – Introduction” of Module 2 “Knowing the built heritage”.

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector.



## Topic 2.3 The integration of art, material and structure in built heritage

### Table of contents

- 2.3 The integration of art, material and structure in built heritage
  - 2.3.1. General introduction
  - 2.3.2. Case studies: columns, arches, vaults, cupolas, etc.

### Introduction

Buildings and other objects of the built heritage possess different values (see Module 1) and combine art, technology and material. Often structural elements whose primary role is to provide the building's stability, are artistically shaped. In such cases structural elements have a dual function: technological/structural and artistic/ architectural. The current presentation is an overview of this subject. It explains and illustrates through examples, this "dual" aesthetical-technological role of structural elements, and the vice versa structural role of some architectural elements. It is targeted at developing a basic understanding of the integrity and mutual influence of art, material and structure in the built heritage.

### Guidelines

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector.

## Topic 2.4 Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures

### Table of contents

- 2.4.1 Historical structural system - Historic Centre
- 2.4.2 Historical structural systems in Greece
- 2.4.3. The role of mortar
- 2.4.4. Important aspects for masonry structures
- 2.4.5. The earthquake
- 2.4.6. The use of timber
- 2.4.7. Diagnosis - The "medicine" of historic structures
- 2.4.8. References

### Introduction

The topic aims at getting students acquainted with the basic information about historical structural systems, as well as their behavior under various loads and actions. The materials used to construct historic structures are mentioned, the ways those materials are combined to form masonry are presented. Then, the basic mechanical properties of masonry (in compression, in tension) are explained. A simple description of the phenomenon of the earthquake is given. Subsequently, the more common damages observed in historic structures due to earthquakes are explained and examples are given (in photographs). One of the ways invented by old Constructors to protect their structures from earthquakes (namely, timber reinforcement) is presented. The role of timber reinforcement is explained. The significance of documentation of the structural system is underlined and two of the in situ investigation techniques, namely radar and endoscopy, which allow for the identification of the construction type of masonry, are presented. The application of those two techniques constitutes the subject of the laboratory exercise of the students.

The study of the topic is suggested to be accompanied by topics 2.1. "Knowing the building - Introduction", 2.5. "Historic building materials: Stones, ceramics, mortars" and 2.7. "Earthquake protection of monuments" of Module 2 "Knowing the built heritage".

The expected output is getting students acquainted with basic concepts, such as historic structure, structural system, building materials, construction types of masonry, mechanical behavior in compression, tension, shear, behavior under seismic actions, etc. Thus, they will be trained in observing the historic structures not only as pieces of Art (aesthetically attractive) but also as "living" objects that are subject to damage, to deterioration, etc. and, hence, as objects that are in need of documentation, interpretation of their behavior and of interventions for their protection.

### Guidelines

The topic should be learned after Module 1 "Values and awareness" and after completing topic 2.1. "Knowing the building - Introduction" of Module 2 "Knowing the built heritage".

The teaching activity comprises a PowerPoint presentation, as well as audio material. The location of the activity is class and the required equipment is a computer and a projector.



## Topic 2.5 Historic building materials: stones, ceramics, mortars

### Table of contents

Historic materials

**2.5.1** Stones

**2.5.2** Ceramics

**2.5.3** Mortars

### Introduction

The topic examines the basic categories of historic building materials used for the construction of monuments throughout history. It examines their evolution and their selection criteria. The main categories, stones, ceramics and mortars are described in detail, regarding their provenance, manufacturing, basic properties and characterisation.

The study of the topic is suggested to be accompanied by topic 2.1. "Knowing the building - Introduction", topic 2.3. "The integration of art, material and structure in built heritage", topic 2.4. "Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures", topic 2.6. "Historic materials of architectural surfaces: Mosaics" of Module 2 "Knowing the built heritage".

The expected output is the acquired knowledge regarding the properties that a material should have in order to be selected to be used as a building material, as well as the identification of the basic building materials and their properties.

### Guidelines

The topic should be learned after completing topic 2.1. "Knowing the building - Introduction", topic 2.3. "The integration of art, material and structure in built heritage", topic 2.4. "Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures" of Module 2 "Knowing the built heritage".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector.



## Topic 2.6 Historic materials of architectural surfaces: mosaics

### Table of contents

**2.6.1** Definition of mosaics

**2.6.2** Tesserae

**2.6.3** Layers and construction materials

**2.6.4** Decay of mosaics

**2.6.5** Conservation of mosaics

**2.6.6** Diagnostic study of mosaics

### Introduction

The topic examines one of the main historic decorative materials, mosaics. Mosaics are architectural surfaces covered by a decorative layer consisting of tesserae (small pieces of colored glass, stone or other materials) that are attached to the surface by use of a mortar. Mosaics are subjected to various environmental factors, especially those exposed at the exterior of a building. The conservation of mosaics can vary in extent, from minimum to complete removal of the mosaic, conservation of the tesserae in lab, replacement of the bedding mortar and reattachment to the surface. The respective processes are demonstrated in the current presentation.

The study of the topic is suggested to be accompanied by topic 2.1. "Knowing the building - Introduction" and 2.5. "Historic building materials: Stones, ceramics, mortars" of Module 2 "Knowing the built heritage".

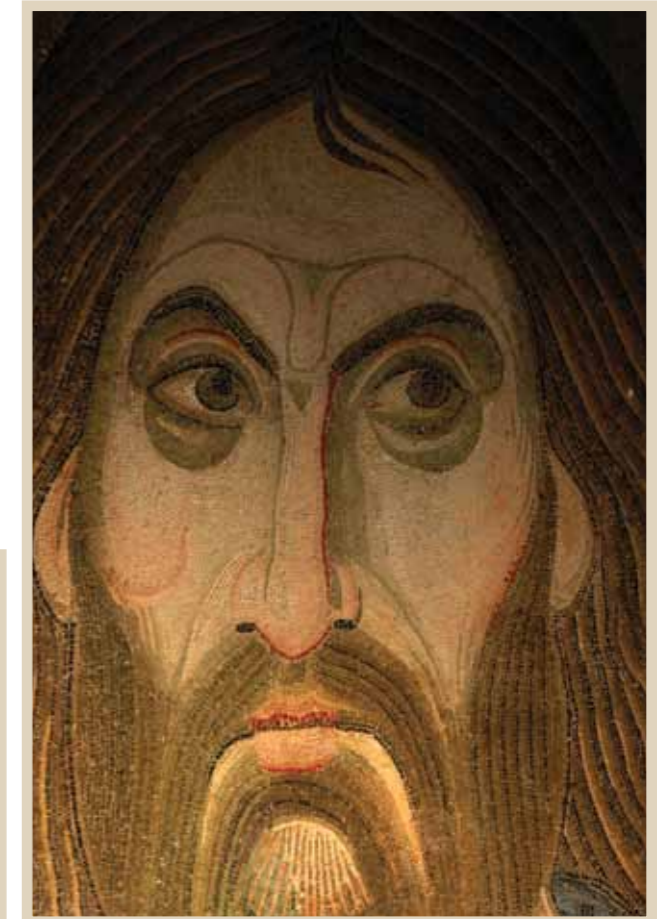
The expected output is getting students acquainted with the basic characteristics of the mosaics, the decay appearing to them as well as the applied conservation processes.



### Guidelines

The topic should be learned after topic 2.1. "Knowing the building - Introduction" and topic 2.5. "Historic building materials: Stones, ceramics, mortars" of Module 2 "Knowing the built heritage".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector.



## Topic 2.7 Earthquake protection of monuments

### Topic 2.7.1 Earthquake response of historical structures

#### Table of contents

- Methodology for the Investigation of Earthquake Response of Historical Structures
- Vibration surveys
- Finite Element Modeling
- Basic Properties of Materials Used in Numerical Modeling
- Stabilization and Retrofit (Improvement of Earthquake Performance)
- Monitoring the structure
- Dynamic response of Hagia Sophia
- Modeling the dynamic response of a real structure

#### Introduction

The topic deals with the methodology used for the investigation of earthquake response of historical structures. It refers to the empirical assessment of structural performance, the implementation of stabilization and retrofit for the improvement of the earthquake performance of historic structures and the installation of a structural strong motion network for the provision of data for the dynamic response of the real historic structure.

The study of the topic is suggested to be accompanied by topics 2.4. "Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures", 2.5. "Historic building materials: Stones, ceramics, mortars", 2.7.2. "Earthquake resistant mortars" of Module 2 "Knowing the built heritage".

The expected output is the acquired knowledge for the efficient integrated study of earthquake response of historic structures.

#### Guidelines

The topic should be learned after completing topic 2.4. "Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures" and 2.5. "Historic building materials: Stones, ceramics, mortars" of Module 2 "Knowing the built heritage".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector.



## Topic 2.7.2 Earthquake resistant mortars

#### Table of contents

The concept of Reverse Engineering

**Step 1:** Characterization of the historic mortars

**Step 2:** Selection of raw materials and compositions

**Step 3:** Preparation of restoration mortars

**Step 4:** Assessment of the restoration mortars' properties

**Step 5:** Optimization based on mortars' characteristics

**Step 6:** Pilot in-situ application on the masonry scale

**Application:** Historic Masonry in Hagia Sophia

#### Introduction

The topic discusses the basic steps of the reverse engineering methodology that is required in order to design and manufacture earthquake resistant restoration mortars compatible with the historic building materials and demonstrates how such mortars are applied in pilot masonries used to study their dynamic behavior

The study of the topic is suggested to be accompanied by topics 2.4. "Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures", 2.5. "Historic building materials: Stones, ceramics, mortars", and 2.7.1. "Earthquake response of historic structures" of Module 2 "Knowing the built heritage".

#### Guidelines

The topic should be learned after completing topic 2.4. "Historic structural systems - behavior and typical damages / Types of structural members and their effect on the behavior of historic structures / Methods for the in situ investigation of historic structures" and Topic 2.5. "Historic building materials: Stones, ceramics, mortars" of Module 2 "Knowing the built heritage".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector.



Photo © Anna Lobovikov-Katz

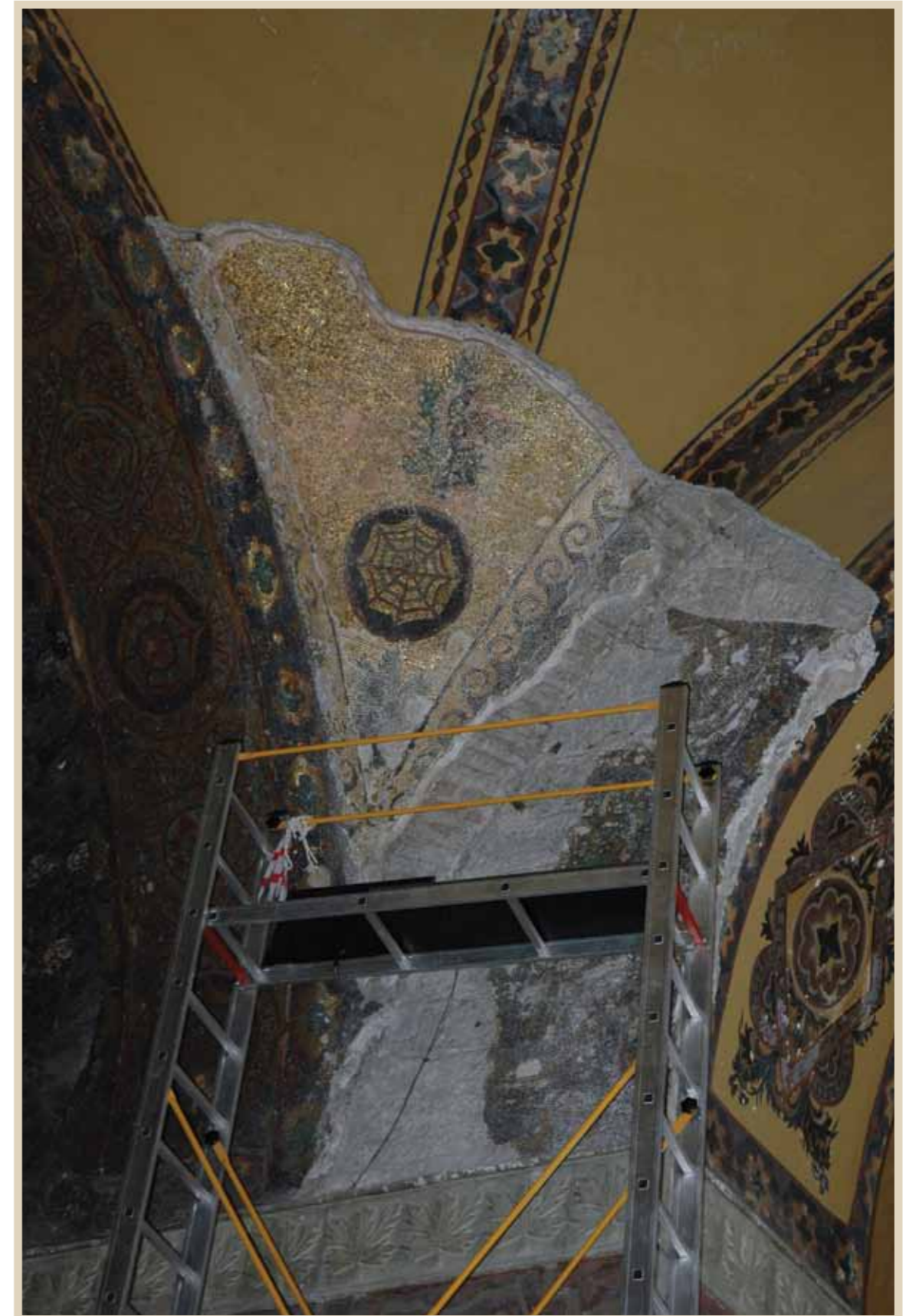
## Exercise set - The porous structure of materials and the study of their compatibility in relation to water and soluble salts transport phenomena

Exercise set	
Laboratory	The porous structure of materials and the study of their compatibility in relation to water and soluble salts transport phenomena
Exercise 2A	Demonstration of density - porosity measurements
Exercise 2B	Study of the hygrometric behavior of building materials with infrared thermography
Exercise 2C	The use of infrared thermography to assess compatibility of building materials: The cases of the Hagia Sophia and the Venetian Fortifications of Herakleion

### Advanced topics

#### Teaching material

##### 2.8 Diagnostic study of the Hagia Sophia mosaics





# Module 3

## Decay and Environment



## Module 3

### Introduction

Module 3 of the e-learning platform “eLAICH” provides a general vision of decay and environment in the field of Cultural Heritage Conservation.

During this Module students will understand that:

- CH is fragile
- Decay is often the result of an interaction between air pollution and other environmental factors, and CH
- Environmental parameters and components that impinge on CH are affected both by diverse human activities, and by natural sources;
- What can be done to reduce the effect of environment? **Preventive Conservation.**

With this Module 3, students will be able to recognize the main environmentally induced decay phenomena encountered in monuments.

Key topics are the following:

- Atmospheric pollution (mostly sulphur dioxide, nitrogen oxides, ozone and soot,) responsible for the decay of cultural heritage
- Natural atmospheric compounds like seasalt affecting cultural heritage (mechanisms, assessment and possible preventive treatments)
- How to assess the interaction of the atmospheric environment with CH (simple tests to evaluate the local environmental quality and to analyze the surface alteration of building stones and of the CH items)
- Decay phenomena: definition; classification; decay factors; monument pathology and macroscale; environmental effects and microscale
- Diagnostic study: you will study real cases and analyze the cause of the problem and the preventive conservation solution.



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### Guidelines

Module 3 is the third Module of the eLAICH Basic course. It should be studied the third in the series of Modules and “Adopt the site” unit.

Module 3 structure:

Duration of Module	4 hours
Number of topics	6
Location	Class *
Special characteristics of location	None
Required equipment	Computer(s); projector; connection to Internet
Special comments	* It is recommended to contact local environmental authority for information about the situation in your city.

Module 3 comprises 6 Topics, which should be studied sequentially.

Recommended duration of study for each topic:

Topic	Duration
<b>3.1</b>	Introduction- Awareness of the influence of environmental in monument decay. 10 min
<b>3.2</b>	Atmosphere and gas pollutants 30 min
<b>3.3</b>	Atmosphere and particles 30 min
<b>3.4</b>	Phenomena and mechanisms of decay 60 min
<b>3.5</b>	Preventive Conservation 50 min
<b>3.6</b>	Diagnosis of Decay: Methodology, criteria and techniques - Non destructive and instrumental laboratory techniques for diagnosis of decay and assessment of conservation 60 min

## Topic 3.1 Introduction - Awareness of the influence of environment on monument decay

### Table of contents

- CH is fragile
- The atmosphere has significant effects on health, ecosystem, visibility and on monuments.

### Introduction

Topic 3.1 of the e-learning platform “eLAICH” provides an introduction about the environment and its influence in the field of Cultural Heritage (CH) Conservation.

This topic is focused on developing an awareness of the students about the influence of the environment in monument decay:

The students will understand that:

- CH is fragile
- The atmosphere has significant effects on health, ecosystem, visibility and the monuments.

With this topic 3.1, students will be able to begin studies about decay and the environment.

Key topics are the following:

- Atmospheric pollution (mostly sulphur dioxide, nitrogen oxides, ozone and soot,) are responsible for the decay of cultural heritage
- Natural atmospheric compounds like seasalt affecting cultural heritage (mechanisms, assessment and possible preventive treatments)



### Guidelines

Topic 3.1 is the first topic of Module 3 in the ELAICH Basic course. It should be studied first in the series of Topics of Module 3.

Topic 3.1 structure:

Duration of Topic	10 min
Location	Class *
Special characteristics of location	None
Required equipment	Computer(s); projector; connection to Internet
Special comments	* It is recommended to carry out the initial test before beginning the topic.

Topic 3.1 comprises 3 activities, which should be carrying out sequentially:

1. Initial test
2. Video “Open your eyes”
3. Introduction about atmospheric pollutants and their effects on health, ecosystem, visibility and monuments. A presentation to be used by teachers.

## Topic 3.2 Atmosphere and gas pollutants

### Table of contents

- Decay is often the result of an interaction between air pollution, other environmental factors and CH.
- Environmental parameters and components that impinge on CH are affected both by diverse human activities and by natural sources.
- Atmosphere and the gas pollution effects:
  - Sulphur Dioxide
  - Nitrogen Oxides, NOx and Ozone O<sub>3</sub>



Photo © Anna Lobovikov-Katz

### Introduction

Topic 3.2 of the e-learning platform “eLAICH” provides information about the atmosphere and gas pollutants and its influence in the field of Cultural Heritage (CH) Conservation.

Student will understand that

- Decay is often the result of an interaction between air pollution, other environmental factors and CH
- Environmental parameters and components that impinge on CH are affected both by diverse human activities and by natural sources

With this topic 3.2, students will be able to understand the influence of gas pollutants in Monuments

Key topics are the following:

- Atmospheric pollution (mostly sulphur dioxide, nitrogen oxides and ozone) responsible for the decay of cultural heritage
- How to assess the interaction of the atmospheric environment with CH (simple tests to evaluate the local environmental quality)



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### Guidelines

Topic 3.2 is the second topic of Module 3 in the eLAICH Basic course. It should be studied the second in the series of Topics of Module 3.

Topic 3.2 structure:

Duration of Topic	30 min
Location	Class *
Special characteristics of location	None
Required equipment	Computer(s); projector; connection to Internet
Special comments	It is recommended: <ul style="list-style-type: none"> <li>• To carry out the multiple choice questionnaires after the topic is studied.</li> <li>• To use the advanced materials titled “Environment for this Module”.</li> <li>• To extend the exercise with the rain water analysis of the exercise in advanced materials.</li> </ul>

Topic 3.2 comprises 2 activities, which should be carried out sequentially

1. Introduction to atmosphere and gas pollutants is a presentation to be used by teachers
2. After the presentation, student must do the multiple choice questionnaires

## Topic 3.3 Atmosphere and particles

### Table of contents

- Decay is often the result of an interaction between air pollution and other environmental factors, and CH
- Environmental parameters and components that impinge on CH are affected both by diverse human activities, and by natural sources
- Atmosphere and the particles effects
- Natural sources of particles: soil dust and sea salt
- Impact of fine dust on health
- What is the effect on monuments????
- Soiling by particles of Michelangelo's Sistine Chapel in Vatican
- Influence of indoor atmospheric particles on works of art

## Introduction

Topic 3.3 of the e-learning platform “eLAICH” provides information about the atmosphere and particles and its influence in the field of Cultural Heritage (CH) Conservation.

Student will understand that

- Decay is often the result of an interaction between air pollution and other environmental factors, and CH
- Environmental parameters and components that impinge on CH are affected both by diverse human activities, and by natural sources

With this topic 3.3, students will be able to understand the influence of atmospheric particles in Monuments.

Key topics are the following:

- Atmospheric pollution due to particles responsible for the decay of cultural heritage
- How to assess the interaction of the atmospheric environment with CH (simple tests to evaluate the local environmental quality)



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## Guidelines

Topic 3.3 is the third topic of Module 3 in the ELAICH Basic course. It should be studied as third in the series of Topics of Module 3.

Topic 3.3 structure:

Duration of Topic	30 min
Location	Class *
Special characteristics of location	None
Required equipment	Computer(s); projector; connection to Internet
Special comments	<p>It is recommended:</p> <ul style="list-style-type: none"> <li>• To carry out the multiple choice questionnaires after the topic.</li> <li>• To use the advanced materials titled “Environment for this Module”.</li> <li>• To extend the exercise with the atmospheric particle measurement of the exercise in advanced materials.</li> </ul>

Topic 3.3 comprises 2 activities, which should be carried out sequentially:

1. Introduction about atmospheric particulate and gaseous pollutants; this is a presentation to be used by teachers.
2. After the presentation, the students must do the multiple choice questionnaires.

## Topic 3.4 Phenomena and mechanisms of decay

### Table of contents

- 3.4.1. Decay phenomena
- 3.4.2. Decay factors
- 3.4.3. Approach to the study of decay
- 3.4.4. General categories of common surface decay patterns
- 3.4.5. Gypsum formation
- 3.4.6. Development of the decay phenomena in depth
- 3.4.7. Capillary rise of salt solutions
- 3.4.8. Salt crystallisation
- 3.4.9. Degradation of joint mortars
- 3.4.10. Incompatible materials
- 3.4.11. Decay from mechanical factors
- 3.4.12. Decay from biological factors

### Introduction

The topic deals with decay pathology. It aims at the explanation of the main decay phenomena and factors causing decay, through the presentation of characteristic examples (e.g. gypsum formation, surface crusts, salt crystallisation, degradation of joint mortars, incompatible materials, decay from mechanical factors, decay from biological factors).

The study of the topic is suggested to be accompanied by topic 3.6 regarding diagnosis of decay and in particular the non-destructive and instrumented laboratory techniques used to accomplish it. Additionally, it is proposed to follow the study of Module 2 “Knowing the built heritage” and especially topic 2.1 “Knowing the building - Introduction” and topics 2.4 “Historic structural systems - behaviour and typical damage.

Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures”, topic 2.5 “Historic building materials: Stones, ceramics, mortars” and topic 2.6 “Historic materials of architectural surfaces: Mosaics”. Further study could include advanced topic 2.8 “Diagnostic study of the Hagia Sophia mosaics”

The expected output is the recognition of the main decay phenomena and the acquired knowledge regarding the anticipated damage of materials on building - monument scale.

### Guidelines

The topic should be learned after completing topics 2.1 “Knowing the building - Introduction”, topic 2.4 “Historic structural systems - behaviour and typical damage. Types of structural members and their effect on the behaviour of historic structures - Methods for the in situ investigation of historic structures”, topic 2.5 “Historic building materials: Stones, ceramics, mortars” and topic 2.6 “Historic materials of architectural surfaces: Mosaics”. The topic should be accompanied by topic 3.6 “Diagnosis of decay: Methodology, criteria and techniques”

The teaching activity comprises a powerpoint presentation. The duration of the activity is one academic hour.

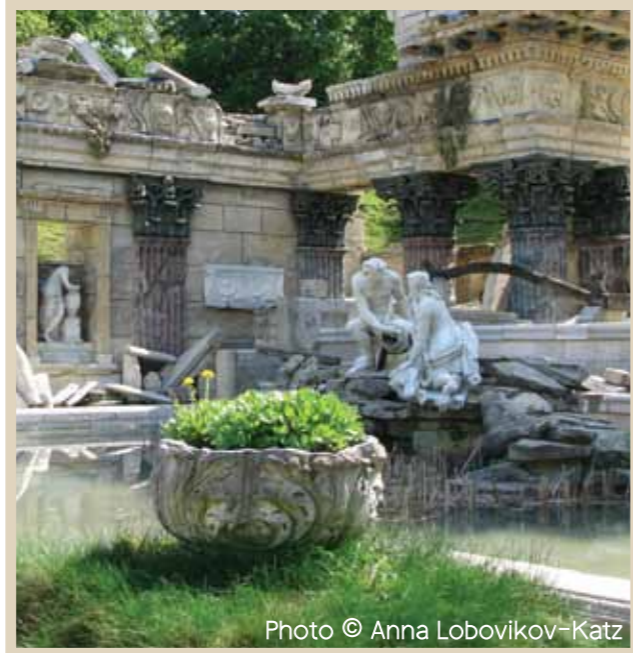


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## Topic 3.5 Preventive conservation

### Table of contents

- What can be done to reduce the effect of environment? Preventive Conservation.
- The Case of Correr Museum, Venice, Italy
- The Case of the Metropolitan Museum of Art in New York, USA
- The Case of Wawel Castle in Cracow, Poland

### Introduction

Topic 3.5 of the e-learning platform “eLAICH” provides information about Preventive conservation in the field of Cultural Heritage.

Student will understand that:

- What can be done to reduce the effect of environment? **Preventive Conservation**

With this topic 3.5, students will be able to understand the meaning of Preventive Conservation.

Key topics are the following:

- Natural atmospheric compounds like seasalt affecting cultural heritage (mechanisms, assessment and possible preventive treatments)
- Diagnostic study: you will study real cases and analyze the cause of the problem and the preventive conservation solution.

### Guidelines

Topic 3.5 is the fifth topic of Module 3 in the ELAICH Basic course. It should be studied as the third in the series of Topics of Module 3.



Topic 3.5 structure:

Duration of Topic	50 min
Location	Class *
Special characteristics of location	None
Required equipment	Computer(s); projector; connection to Internet
Special comments	It is recommended to use the advanced materials entitled: <ul style="list-style-type: none"> <li>• Learning to see</li> <li>• Learning to analyze environmental influences</li> <li>• It is recommended to carry out the multiple choice questionnaires after the topic.</li> </ul>

Topic 3.5 comprises one presentation about preventive conservation with three real cases to be used by the teachers:

- The Case of Correr Museum, Venice, Italy
- The Case of the Metropolitan Museum of Art in New York, USA
- The Case of Wawel Castle in Cracow, Poland

After the presentation, the student must do the multiple choice questionnaires.

## Topic 3.6 Diagnosis of Decay: Methodology, criteria and techniques

### - Non destructive and instrumental laboratory techniques for diagnosis of decay and assessment of conservation

#### Table of contents

<b>3.6.1.</b>	Diagnosis of decay - Methodology of diagnostic study
<b>3.6.1.1.</b>	Documentation
<b>3.6.1.2.</b>	Monitoring of the acting environmental factors
<b>3.6.1.3.</b>	In situ macroscopic observations for material's decay state and type and structure's pathology
<b>3.6.1.4.</b>	In situ NDT - Decay mapping (environmental impact assessment)
<b>3.6.1.5.</b>	Building material's characterization and study of their provenance
<b>3.6.1.6.</b>	In lab study of decay products and mechanisms (microscopic scale)
<b>3.6.1.7.</b>	Correlation of intrinsic and extrinsic factors on the monument scale
<b>3.6.1.8.</b>	Working hypothesis on the prevalent acting environmental factors and decay mechanisms
<b>3.6.1.9.</b>	Parametric analysis - Simulation of the phenomena under accelerated ageing (comparison of various scenarios)
<b>3.6.1.10.</b>	Diagnosis
<b>3.6.2.</b>	Non-destructive techniques for decay diagnosis
<b>3.6.2.1.</b>	Non-destructive techniques
<b>3.6.2.2.</b>	Validation of non-destructive techniques by laboratory techniques
<b>3.6.2.3.</b>	Integration of non destructive techniques

#### Introduction

The topic deals with the integrated diagnostic methodology and the examination of the techniques used (non destructive and instrumental laboratory techniques). It aims at the study of documentation, in-situ measurements with non-destructive techniques, characterization of decay products in the laboratory using analytical techniques, correlation of intrinsic and extrinsic factors on the monument scale, leading to a working hypothesis regarding the acting environmental decay factors and the prevailing decay mechanisms. The expected output is the acquired knowledge regarding the integrated diagnosis of the decay of monuments, which is the prerequisite for any effective conservation, protection or restoration intervention.

#### Guidelines

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is one academic hour.

#### Exercises

		Related topics of Basic Course
3A	Introduction- Awareness of the influence of environment on monument decay Initial Test	3.1
3B	Atmosphere and gas pollution exercise Online Test (multiple choice questionnaires) Questionnaire 3.2	3.2
3C	Online Test (multiple choice questionnaires) Questionnaire 3.3	3.3
3D	Online Test (multiple choice questionnaires) Questionnaire 3.4	3.4
3E	Online Test (multiple choice questionnaires) Questionnaire 3.5	3.5
3F	Decay in lab and on monument scale • Salt decay in lab: Salt crystallization	
3G	Decay in lab and on monument scale • From salt decay in lab to exercise salt decay pathology on the monument: The case of the Medieval City of Rhodes	

## Advanced Topics

#### Teaching material

3.7	Environment	3.2-3.3
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#### Exercises

3H	Off-line Exercise: Acid Rain and Atmospheric Particles in my City!	3.2-3.3
3I	Activity D-1. Learning to see	
3J	Activity D-2. Learning to analyse environmental influence	

# Module 4

## The Conservation Processes, Materials and Techniques



# Module 4

## Introduction

Have you ever wondered what is happening behind scaffolding covering a historic building? What do conservators do? What guiding principles affect their choice of materials and methods to use?

Module 4 introduces you to the actual conservation work which is undertaken in order to maintain a historical building or archaeological site in good condition and/or to improve its chances of survival in good condition. This will include the approach as well as the steps involved, which are always tailored to the needs of the specific building or site in need of conservation.

In this Module you will learn that actual conservation work (technically called “remedial treatments”) involves a “hands-on” intervention, which can only take place after the building, its materials, technology and deterioration problems have been studied, documented and understood (see Modules 1, 2 and 3). You will discover that in this phase of the project, the person who carries out conservation work – the conservator – adds something to the building (e.g. an adhesive, a coating or a mortar), or removes something from the building (e.g. dirt or weeds).

All these actions are carefully planned beforehand and performed according to a well-thought-out sequence and to specific guiding principles. For example it is very important that materials applied by conservators (e.g. mortars) work well together with the original materials – they must be compatible – or that what is done must not prevent future conservation work from being carried out if and when necessary. Care must be paid to what is removed and what is added, not to compromise the “true” nature of the building – its

authenticity.

You will learn that the use of wrong conservation materials or methods, even if done with the best intentions, can in fact be harmful to the building and may even cause further damage to occur.

## Conservation is much more than just sticking pieces together...

Let's discover it together!

## Guidelines

By now you should already be aware that built heritage is vulnerable, and a collective effort is needed to preserve it. Module 4 should be undertaken after Modules 1, 2 and 3. All Modules are linked to Module 4, and a very strong link exists with Module 5, since the issues of preventive conservation and monitoring are integral parts of the Conservation Process.

Module 1 structure:

Duration of Module	4 hours 15 minutes
Number of topics	5
Location	Preferably a classroom but many of the activities can be performed anywhere you prefer
Special characteristics of location	None
Required equipment	Computer(s); Power Point projector; connection to Internet; pens or pencils; paper to write or copies of the exercise sheets (if applicable)
Special comments	none

Each topic should be tackled according to the following sequence: 1. read the Introduction and Guidelines beforehand, 2. view the Power Point presentation 3. do the exercise, 4. check the online feedback provided.

Module 4 comprises 5 Topics, which should preferably be followed in sequence. of students. We encourage you to engage students in discussions after completing each exercise and to use the conclusions of the discussions as rounding up (instructions provided with exercises).

Tips for teachers: you may decide to choose individual topics and integrate them in your lectures. All exercises provided with each topic can be carried out with teams

Recommended duration of study for each topic:

- 4.1 What is wrong?...Prevention is better than cure! 60 min
- 4.2 What can be done? 60 min
- 4.3 How should it be done? Guiding principles in conservation 60 min
- 4.4 The Do's and Don'ts 60 min
- 4.5 Requirements for compatible materials and conservation interventions 15 min

## Topic 4.1 What's wrong?... Prevention is better than cure!

### Table of contents

- 4.1.1 our built heritage is fragile
- 4.1.2 threats to our built heritage...in a nutshell (natural and human causes of deterioration)

### Introduction

Just like doctors who look at symptoms to start understanding the illness of a patient, or detectives who look for clues to solve a crime, one of the very first things that conservators do to evaluate the condition of a heritage site is to look very carefully at the building (e.g. how it is built, its materials, etc.), and the effects produced by deterioration (e.g. type, extent, distribution, etc.). This is technically defined as "visual observation". The effects of deterioration (e.g. cracks, missing or detaching pieces, etc.) are carefully identified, recorded using photographs and mapped (drawn) graphically to visualise their extent and distribution (see Module 1). This is only the very first stage of an investigative process, which also includes other examinations, which you have already encountered in Modules 2 and 3.

**The main objective of the investigative process is to try to get to the origin of the problem/s (i.e. the causes of deterioration), so that this/these can be removed or at least reduced before intervening directly on the heritage site.** There is no point in cleaning or repairing a building before making sure that the roof is not leaking and that the drainage system functions properly. It is also better to reduce pollution caused by car exhaust instead of repeatedly cleaning buildings overlooking a "busy" street. This is very much like a doctor advising her/his patients to stop eating a specific food that gives her/him an allergy, instead of prescribing medicines which would only cure the symptoms of her/his allergy. Addressing the causes of deterioration before intervening directly on the building is the most efficient way of ensuring the long-term preservation of the structure. This will prolong the effects of any conservation treatment required,

reducing the need of intervening often on the building, with an evident gain even from an economic point of view. As often said by doctors to patients "Prevention is much better than cure!"



### Guidelines

This first topic of Module 4 has strong connections with Modules 2 and 3, and you may wish to go through those Modules beforehand.

Topic 4.1 structure:

Recommended duration of topic	60 minutes as follows: Power Point presentation (15 minutes) Exercise (25 minutes) plus discussion (20 minutes) - if done in class or in a group - or read online feedback (pdf) (20 minutes)
Location	Preferably a classroom but you may do it as individual task or as homework (online feedback is available)
Special characteristics of location	None
Required equipment	Computer(s); Power Point projector; connection to Internet; pens or pencils; paper to write or copies of the exercise
Special comments	none

This topic must be tackled according to the following sequence: 1. read the Introduction and Guidelines of the topic beforehand, 2. view the Power Point presentation, 3. carefully read the Introduction and Guidelines for the exercise, 4. do the exercise, 5. proceed to the discussion (if you are in a group) or check the online feedback provided and summarize the main points learnt through the exercise.

## Topic 4.2 What can be done?

### Table of contents

- 4.2.1 the conservation approach
- 4.2.2 the hands-on conservation intervention - steps and treatments:
  - treatment proposal
  - treatment trials
  - documenting the conservation intervention
  - structural works
  - cleaning
  - consolidation
  - mortar repairs and pointing
  - protection

## Introduction

The heritage site may need strengthening, broken pieces may need fixing back again, dirty surfaces may need to be cleaned or harmful chemical changes may need to be stopped. In this section you will learn that a conservation project includes a number of hands-on treatments – for example cleaning or consolidation – carried out by conservators. All conservation hands-on treatments need to be carefully planned well in advance. You have already seen that each heritage site is unique and so are its problems. Different problems require different solutions and any conservation treatment needs to be tailored to the specific needs of the heritage site.

For this reason, a conservation project entails a concerted effort by a diversified range of professionals to understand the heritage site in the first place, its values, its history and materials, what damage has occurred and what problems the site might develop in the future. The long-term preservation of the heritage site can only be attained by reducing the causes of deterioration, promoting the appropriate use of the site, choosing the appropriate conservation materials and methods and setting up a suitable maintenance plan. Let's talk about the conservation hands-on treatments in more detail...

## Guidelines

Topic 4.2 structure:

Recommended duration of topic	60 minutes as follows: Power Point presentation (25 minutes) Exercise (20 minutes) plus discussion (15 minutes) – if done in class or in a group
Location	Preferably a classroom and as group work, but you may do it as individual task or as homework
Special characteristics of location	None
Required equipment	Computer(s); Power Point projector; connection to Internet
Special comments	none

This topic must be tackled according to the following sequence: 1. read the Introduction and Guidelines of the topic beforehand, 2. view the Power Point presentation, 3. carefully read the Introduction and

Guidelines for the exercise, 4. do the exercise, 5. If you are in a group compare and discuss your answers with those of your classmates and summarize the main points learnt through the exercise.

## Topic 4.3 How should it be done? Guiding principles in conservation

### Table of contents

- 4.3.1 risks involved in conservation interventions
- 4.3.2 guiding principles in conservation
- 4.3.3 respecting authenticity
- 4.3.4 some properties of conservation materials
  - reversibility,
  - stability,
  - compatibility
- 4.3.5 testing conservation materials

### Introduction

While carrying out conservation hands-on treatments, conservators usually **add materials** (such as chemicals, cleaning agents, water, adhesives, etc.) or **take materials away** (such as dirt, old damaged repairs, vegetation). Both actions entail some risks and need to be planned and carried out carefully.

**Adding** conservation/restoration materials can cause further problems in the future if materials are not chosen well. A wrong conservation material may react chemically with the original materials or alter their physical properties (for example colour). Some changes may occur in the short term and can be seen straight away. Other changes, however, might become evident only in the long term, and are therefore more difficult to predict.

For this reason materials applied by conservators need to have “particular” characteristics. For example they need to be compatible – that is work well together with the original materials in the short and long term – and reversible – that is easy to remove – to ensure that no permanent damage is done and that future

applications are not hindered.

**Removing** materials, like dirt for example, from an architectural surface can also be damaging since some of the original material may be taken away in the process. Once the material has been removed, it cannot be placed back. Cleaning, in fact, is not a reversible treatment and requires a very careful approach.

Conservators can choose from a wide range of conservation materials and methods for each treatment. This gives them the versatility to design an efficient but also safe treatment for each different case.

One should always keep in mind, however, that the best conservation project is the one in which conservators do “as much as needed but as little as possible.”

## Guidelines

Topic 4.3 structure:

Recommended duration of topic	60 minutes as follows: Power Point presentation (30 minutes) Exercise (20 minutes) plus discussion (10 minutes) - if done in class or in a group
Location	Preferably a classroom and as group work, but you may do it as individual task or as homework
Special characteristics of location	None
Required equipment	Computer(s); Power Point projector; connection to Internet
Special comments	none

This topic must be tackled according to the following sequence: 1. read the Introduction and Guidelines of the topic beforehand, 2. view the Power Point presentation, 3. carefully read the Introduction and Guidelines for the exercise, 4. do the exercise and check the online feedback, 5. If you are in a group compare and discuss your answers with those of your classmates and summarize the main points learnt through the exercise.

## Topic 4.4 Do's and don'ts

### Table of contents

4.4.1 What to do and what to avoid in conservation... In a nutshell

### Introduction

“Do's and Don'ts” is the concluding topic of Module 4, and is meant to summarise concepts already introduced in the previous three topics.

The conservation strategy of a heritage site - including hands-on treatments - is very much based on the careful study of each specific site and its problems. It is set up case by case, and entails a concerted effort of a multidisciplinary team. It is therefore not ever possible to give precise indications on which materials

to use or on how treatments should be carried out.

It is, however, possible to give general indications on what should be done and what should not be done, and this is what this topic “Do's and don'ts” is all about.

## Guidelines

Topic 4.4 structure:

Recommended duration of topic	60 minutes as follows: Power Point presentation (15 minutes) Exercise (30 minutes) plus discussion (15 minutes) - if done in class or in a group
Location	Preferably a classroom and as group work, but you may do it as individual task or as homework
Special characteristics of location	None
Required equipment	Computer(s); Power Point projector; connection to Internet
Special comments	none

This topic must be tackled according to the following sequence: 1. read the Introduction and Guidelines of the topic beforehand, 2. view the Power Point presentation, 3. carefully read the Introduction and Guidelines for the exercise, 4. do the exercise and check the online feedback, 5. If you are in a group compare and discuss your answers with those of your classmates and summarize the main points learnt through the exercise.



## Topic 4.5 Requirements for compatible materials and conservation interventions

### Introduction

The topic examines the basic requirements for compatible materials and conservation interventions. In the past, incompatible conservation interventions and the use of incompatible materials has caused significant defects and enhanced the decay of monuments. Nowadays, it is imperative before any intervention is performed on a historic building / monument, to follow the guidelines of the Venice Charter that aim to avoid or minimize the possibility of an inappropriate and/or long-term dangerous intervention. In this framework, the most common interventions (cleaning, consolidation, restoration materials) applied on monuments as part of an integrated protection plan should adhere to the basic principles of compatibility with the historic materials and reversibility.

The study of the topic is suggested to be accompanied by topic 4.6. "Criteria and methodology for cleaning - pilot applications and case studies", 4.7. "Criteria and methodology for consolidation - pilot applications and case studies", 4.8. "Reverse engineering for compatible and performing restoration materials - case studies" of Module 4 "The conservation processes, materials and techniques".

Recommended duration of topic	15 minutes
Location	Class
Special characteristics of location	None
Required equipment	Computer; projector

### Exercises

4A	What are the threats to Khan esh-Shawarda in the Old City of Acre?
4B	"What can be done?"
4C	"Choose the mortar mix"
4D	"Following the conservator's steps"

The expected output is the acquired knowledge regarding the proper materials and conservation interventions to be applied in compatibility and reversibility terms.

### Guidelines

The topic should be learned after completing topic 1.3. "How should we do it" of Module 1 "Values and awareness", topic 2.1. "Knowing the building - Introduction" of Module 2 "Knowing the built heritage", topic 3.4. "Phenomena and mechanisms of decay", topic 3.6. "Diagnosis of decay: Methodology, criteria and techniques - Non destructive and instrumental laboratory techniques for diagnosis of decay and assessment of conservation" of Module 3 "Decay and environment".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is a quarter of an academic hour.

Related topics of Basic Course

- 4.1 What's wrong?...Prevention is better than cure!
- 4.2 What can be done?
- 4.3 How should it be done?
- 4.4 Do's and Don'ts

## Advanced topics

### Teaching material

## Topic 4.6 Criteria and methodology for cleaning - pilot applications and case studies

### Introduction

The topic examines cleaning, one of the major types of conservation interventions applied on the built heritage. The definition of cleaning and the reasons why cleaning is applied are explained. The general methodology and application criteria of cleaning interventions, along with the ways that we use in order to approach a historic building and apply cleaning are also pointed out. For a better understanding of the theoretical background of cleaning, the case study of the National Archaeological Museum is presented. Examples of pilot cleaning application on marble surfaces diagnosed by different and characteristic decay patterns are displayed, whereas representative results of analytical and NDT techniques applied for the assessment of cleaning methods are demonstrated. Finally, the methodological approach for building pathology representation and control, as well as conservation interventions durability control, are indicated through the National Archaeological Museum case study.

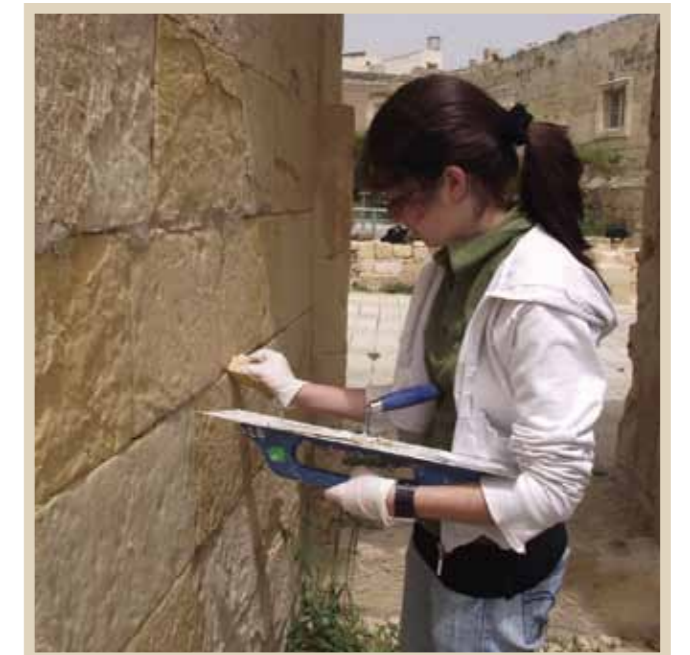
The study of the topic is suggested to be accompanied by topic 4.5. "Requirements for compatible materials and conservation interventions" of Module 4 "The conservation processes, materials and techniques".

The expected output is the acquired knowledge regarding the proper cleaning materials and techniques to be applied for the protection of monuments.

### Guidelines

The topic should be learned after completing topic 2.1. "Knowing the building - Introduction" of Module 2 "Knowing the built heritage", topic 3.4. "Phenomena and mechanisms of decay", topic 3.6. "Diagnosis of decay: Methodology, criteria and techniques - Non destructive and instrumental laboratory techniques for diagnosis of decay and assessment of conservation" of Module 3 "Decay and environment", topic 4.5. "Requirements for compatible materials and conservation interventions" of Module 4 "The conservation processes, materials and techniques".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is a quarter of an academic hour.



## Topic 4.7 Criteria and methodology for consolidation - Pilot applications and case studies

### Introduction

The topic examines consolidation, one of the major types of conservation interventions applied on the built heritage. The definition of consolidation and the aim of its application are explained. Selection criteria and the basic types of consolidation materials are also pointed out. Moreover, the advantages of advanced particle modified consolidants are presented, along with the assessment methodology of consolidation materials. For the better understanding of the theoretical background of consolidation, the case study of Medieval City of Rhodes is presented. Examples of pilot application of consolidation materials are displayed, whereas representative results of analytical and NDT techniques applied on site for the assessment of consolidants are demonstrated.

The study of the topic is suggested to be accompanied by topic 4.5. "Requirements for compatible materials and conservation interventions" of Module 4 "The conservation processes, materials and techniques".

The expected output is the acquired knowledge regarding the proper consolidation materials and techniques to be applied for the protection of monuments.

### Guidelines

The topic should be learned after completing topic 2.1. "Knowing the building - Introduction" of Module 2 "Knowing the built heritage", topic 3.4. "Phenomena and mechanisms of decay", topic 3.6. "Diagnosis of decay: Methodology, criteria and techniques - Non destructive and instrumental laboratory techniques for diagnosis of decay and assessment of conservation" of Module 3 "Decay and environment", topic 4.5. "Requirements for compatible materials and conservation interventions" of Module 4 "The conservation processes, materials and techniques".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is a quarter of an academic hour.



## Topic 4.8 Reverse engineering for compatible and performing restoration materials – Case studies

### Introduction

The topic examines the implementation of the reverse engineering methodology for the production of compatible restoration mortars simulating the original ones, and at the same time providing earthquake protection to the monuments. The methodology comprises characterization of the historic mortars, selection of raw materials and compositions, preparation of restoration mortars, assessment of the restoration mortars' properties, optimization of the technical characteristics of the fresh mortars with the criteria of the "water content" and "workability", assessment of the mortars during their setting and hardening, optimization based on mortars' characteristics and pilot in-situ application on the masonry scale. Finally, a pilot application is presented at the historic masonry in Hagia Sophia.

The study of the topic is suggested to be accompanied by topic 2.7. "Earthquake protection of monuments" and topic 4.5. "Requirements for compatible materials and conservation interventions" of Module 4 "The conservation processes, materials and techniques".

The expected output is the acquired knowledge regarding the proper compatible restoration materials to be applied for the earthquake protection of monuments.

### Guidelines

The topic should be learned after completing topic 2.1. "Knowing the building - Introduction" and topic 2.7. "Earthquake protection of monuments" of Module 2 "Knowing the built heritage", topic 3.4. "Phenomena and mechanisms of decay", topic 3.6. "Diagnosis of decay: Methodology, criteria and techniques - Non destructive and instrumental laboratory techniques for diagnosis of decay and assessment of conservation" of Module 3 "Decay and environment", topic 4.5. "Requirements for compatible materials and conservation interventions" of Module 4 "The conservation processes, materials and techniques".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is a quarter of an academic hour.



# Module 5

## Monitoring and Maintenance



# Module 5

## Introduction

**Have you ever thought what happens to a historic building after the conservation process finishes? Do you think that everything is done and no further attention has to be paid to the building or the archaeological site?**

**Consider Cultural Heritage as your body: if you are ill, you need a proper cure but...after that don't you check and monitor your state of health?! The same for Cultural Heritage!**

Whenever people speak about conservation or restoration, they always think about the practical interventions involving for example the cleaning and the consolidation of the architectural and decorative surfaces (such as stones, frescoes, mosaics and so on).

For many years the attention was mainly devoted to the intervention itself without thinking of what happens after the conservation process.

Only recently more importance has been given to the control of the state of conservation of artifacts after their restoration: this is the only way to prevent damages which otherwise would be very difficult to restore or even impossible to repair. This control can be called Monitoring and it is very useful for the correct Maintenance of the building or the archaeological site. In this sense, several parameters linked to the nature of the materials (chemical composition, physical characteristics, etc.) and the environment should be measured, tested and checked over time.

The Module 5 will introduce you to the concepts of Monitoring and Maintenance as fundamental parts of a conservation project. At the same time, it provides some useful issues of Preventive Conservation which can be applied also after the conservation treatments (in particular those learnt from Module 4).

Follow us and you will discover how to take care of a historical building or an archaeological site also after the conservation treatments!

## Guidelines

Module 5 should be undertaken after Modules 1, 2, 3 and 4. You should have understood from previous Modules the values of Cultural Heritage, the constituent materials, the actions of the environment, the degradation phenomena and the guiding principles in conservation ...and many other important topics!

If you have done it, go forward with Module 5!

For the basic course, this Module is structured into 2 hours of theoretical lessons and 2 hours of practical exercises. In this way you can directly perform some easy but fundamental experiments and understand much more the importance of controlling and testing the state of health of our Cultural Heritage.



Module 5 structure:

Duration of Module	4 hours (basic)
Number of topics	4
Location	Class
Special characteristics of location	None
Required equipment	Computer; projector; internet connection; specific equipment for simple laboratory sessions (see the lists on Off-line exercises: Hands on materials).
Special comments	Topic 5.1 associates class lesson (through ppt presentations) with simple laboratory exercises which will help students to better understand the importance of studying and monitoring Cultural Heritage surfaces after conservation treatments as well. The exercises and the activities are fully described (see 5.A-5.E: Hands on materials). Some of them require the preparation of the samples few days prior the laboratory session (for further details see 5.A-5.C). For the basic course, do only exercises 5.A and 5.B; if you are interested in doing other exciting exercises, do also 5.C, 5.D and 5.E and enjoy being a junior scientist!



Module 5 comprises 4 Topics, which should be studied sequentially.

Topics and Recommended duration of study for each topic (for Basic Course) are fully reported in the following table:

Topics	Format	Duration (only for Basic Course)	B/A <sup>1</sup>
<b>5.1 To Monitor or not to Monitor, that is the question!</b>	ppt	10 min	B, A
5.1.1 How to monitor Cultural Heritage artifacts after the conservation treatments	ppt	30 min	B, A
5.1.2 Non destructive testing and quality control on monuments for monitoring the decay state and the compatibility of conservation interventions. (by NTUA- prof. Tonia Moropoulou)	ppt		A
5.1.3 Let's see some examples of monitoring:	videos		B, A
• Monitoring & Water: the case of Venice	video	5 min	B, A
• Monitoring the colour	video	5 min	B, A
<b>5A</b> Hands on materials (1): let's immerse it completely into water and...	off-line exercise	70 min	B, A
<b>5B</b> Hands on materials (2): how can we measure the colours?	off-line exercise	30 min	B, A
<b>5C</b> Hands on materials (3): macro and micro observations	off-line exercise		A
<b>5D</b> Hands on materials (4): what the contact angle can tell us	off-line exercise		A
<b>5E</b> Hands on materials (5): rising damp experiment	off-line exercise		A
<b>5.2 What does Maintenance mean?</b>	ppt	10 min	B, A
5.2.1 How Maintenance can be performed: ordinary vs extraordinary maintenance	ppt	10 min	B, A
5.2.1 Let's see some examples of maintenance:	videos		B, A

Topics	Format	Duration (only for Basic Course)	B/A <sup>1</sup>
• A project of Maintenance: the case of the Ghirlandina Tower (UNESCO) in Modena (Italy)	video	5 min	B, A
• The case of concrete artifacts	video	5 min	B, A
• The ongoing programmed maintenance plan for the city of Venice, by INSULA <a href="http://www.venicebackstage.org/en/600/insula-un-futuro-per-venezia/">http://www.venicebackstage.org/en/600/insula-un-futuro-per-venezia/</a>	video		A
<b>5.3 Preventive Conservation...also after the Conservation process</b>	ppt	15 min	B, A
5.3.1 Let's see examples of preventive conservation:	videos and ppt		
• Graffiti and anti-graffiti systems in Bologna (Italy)	video	5 min	B, A
• Graffiti and anti-graffiti systems: the case of Saint Mark's Square in Venice	ppt	10 min	B, A
• Petra in danger: How the success of Petra as a tourist site is further endangering it. <a href="http://vimeo.com/12722853">http://vimeo.com/12722853</a>	video		A
<b>5.4 Let's test what you remember of Module 5: Quiz &amp; crosswords</b>	on-line exercises	30 min	B, A

<sup>1</sup> B = basic, A = advanced

## Topic 5.1 To monitor or not to monitor, that is the question!

### Table of contents

Topics	Format (only for Basic Course)	Duration	B/A <sup>2</sup>
<b>5.1 To Monitor or not to Monitor, that is the question!</b>	ppt	10 min	B, A
<b>5.1.1</b> How to monitor cultural heritage artifacts after the conservation treatments	ppt	30 min	B, A
<b>5.1.2</b> Non destructive testing and quality control on monuments for monitoring the decay state and the compatibility of conservation interventions (by NTUA- prof. Tonia Moropoulou)	ppt		A
<b>5.1.3</b> Let's see some examples of monitoring:	videos		B, A
• Monitoring & Water: the case of Venice	video	5 min	B, A
• Monitoring the colour	video	5 min	B, A
<b>5A</b> Hands on materials (1): let's immerse it completely into water and...	off-line exercise	70 min	B, A
<b>5B</b> Hands on materials (2): how can we measure the colours?	off-line exercise	30 min	B, A
<b>5C</b> Hands on materials (3): macro and micro observations	off-line exercise		A
<b>5D</b> Hands on materials (4): what the contact angle can tell us	off-line exercise		A
<b>5E</b> Hands on materials (5): rising damp experiment	off-line exercise		A

<sup>2</sup> B = basic, A = advanced

### Introduction

The topic 5.1 introduces you to the concept of Monitoring as a fundamental part of a conservation project.

Monitoring means to evaluate a series of parameters which can describe the state of conservation of the artifacts. Of course, this evaluation has to be done on restored artifacts as well, since it allows to control the efficiency of the intervention over time.

From the theory to the practice?! It is necessary to know the behaviours of different materials, to set the specific environmental conditions and to project a Monitoring Plan over time. As a matter of fact, some processes are very quick (for example the deposition of dust on the surfaces), some others are slower (such as the chemical transformations due to acid rains). In this context, it is crucial to define and select suitable parameters and easy methods for monitoring over time not only the artifacts but also the stability and efficiency of the products used during the conservation process.

### Guidelines

The first topic of Module 5 is strictly related to Modules 2, 3 and 4 and you should have undertaken these Modules beforehand.

During this topic, you will follow theoretical lessons and then perform practical exercises which will introduce you to simple but important experimental tests on materials and conservation products.

### Topic 5.1 structure:

Recommended duration of topic	2 hrs and 30 minutes as follows: Ppt presentation (45 minutes), laboratory experiments (1 hour and 30 minutes), videos (15 minutes)
Location	Classroom
Special characteristics of location	None
Required equipment	Computer; projector; specific equipment for simple laboratory sessions (see the lists on Off-line exercises: Hands on materials).
Special comments	Topic 5.1 associates class lesson (through ppt presentations) with simple laboratory exercises which will help students to better understand the importance of studying and monitoring cultural heritage surfaces after conservation treatments as well. The exercises and the activities are fully described (see 5.A-5.E: Hands on materials). Some of them require the preparation of the samples few days prior the laboratory session (for further details see 5.A-5.C). For the basic course, do only exercises 5.A and 5.B; if you are interested in doing other exciting exercises, do also 5.C, 5.D and 5.E and enjoy being a junior scientist!

## Topic 5.2 What does maintenance mean?

### Table of contents

Topics	Format	Duration (only for Basic Course)	B/A <sup>3</sup>
<b>5.2 What does Maintenance mean?</b>	ppt	10 min	B, A
<b>5.2.1</b> How Maintenance can be preformed: ordinary vs extraordinary maintenance	ppt	10 min	B,A
<b>5.2.2</b> Let's see some examples of maintenance:	videos		B, A
• A project of Maintenance: the case of the Ghirlandina Tower (UNESCO) in Modena (Italy)	video	5 min	B, A
• The case of concrete artifacts	video	5 min	B,A
• The ongoing programmed maintenance plan for the city of Venice, by INSULA <a href="http://www.venicebackstage.org/en/600/insula-un-futuro-per-venezia/">http://www.venicebackstage.org/en/600/insula-un-futuro-per-venezia/</a>	video	5 min	B, A

### Introduction

The topic 5.2 introduces you to the concept of Maintenance. This can be considered as the combination of all the techniques and the actions which might be carried out to maintain or bring an artifact back to its original intended function.

How you ever cleaned and tidied up your room or helped your mother in domestic works? What do you normally do: do you wait until your room is so disordered and dirty that you can't move in and you can't find anything...or do you clean and tidy a little bit a day/a week?

This is the main difference between doing an extraordinary or an ordinary action: this action can be called Maintenance.

The Maintenance becomes, thus, a programmed operation, which should be thought and planned before, during and, especially, after the Conservation process.

### Guidelines

The second topic of Module 5 is strictly related to Modules 2, 3, 4 and topic 5.1 and you should have undertake these Modules beforehand.

<sup>3</sup> B = basic, A = advanced

### Topic 5.2 structure:

Recommended duration of topic	35 minutes as follows: Ppt presentation (20 minutes) Videos (15 minutes)
Location	Class
Special characteristics of location	None
Required equipment	Computer; projector
Special comments	None

## Topic 5.3 Preventive conservation...also after the conservation process

### Table of contents

Topics	Format	Duration (only for B a s i c Course)	B/A <sup>4</sup>
<b>5.3 Preventive Conservation...also after the Conservation process</b>	ppt	15 min	B, A
<b>5.3.1</b> Let's see examples of preventive conservation:	videos and ppt		
• Graffiti and anti-graffiti systems in Bologna (Italy)	video	5 min	B, A
• Graffiti and anti-graffiti systems: the case of Saint Mark's Square in Venice	ppt	10 min	B, A
• Petra in danger: How the success of Petra as a tourist site is further endangering it. <a href="http://vimeo.com/12722853">http://vimeo.com/12722853</a>	video		A

<sup>4</sup> B = basic, A = advanced

## Introduction

The topic 5.3 focuses on the importance of Preventive Conservation also after the conservation process... that is to say that even if our cultural heritage is restored and in a good state of preservation, we can performed some interventions, even simple, able to preserve cultural heritage from the decay by slowing the decay speed or keeping away the materials from degrading agents.

We will see together some example of preventive conservation, in particular some actions/solutions which can be chosen to fight against smearing (i.e. the non-artistic graffiti!!). This kind of prevention is due to a particular degradation, which is not linked to environmental factors (as seen during Module 3): it is an example of anthropic degradation...a degradation caused by humans!

In this sense, Prevention is seen as Education as well!

## Guidelines

This topic is strictly related to the concepts of monitoring and maintenance (Topic 5.1 and 5.2), as well as the issue of "prevention is better than cure" explained in Module 4 (Topic 4.1). You might have gone through those Modules beforehand.



## Topic 5.3 structure:

Recommended duration of topic	30 minutes as follows: Ppt presentation (25 minutes) Videos (5 minutes)
Location	Class
Special characteristics of location	None
Required equipment	Computer; projector.
Special comments	None

## Topic 5.4 What do you remember of Module 5? Let's test it!

### Table of contents

Topics	Format	Duration (only for Basic Course)	B/A <sup>5</sup>
5.4 Let's test what you remember of Module 5: Quiz & crosswords	on-line exercises	30 min	B, A

<sup>5</sup> B = basic, A = advanced

## Introduction

**What do you remember of the topics discussed during Module 5? Can you explain the most important issues presented in the Module?**

Yes?! Well, let's test the knowledge you acquired!

No?! Don't worry and don't be shy: you can do the quiz and then discuss the results in class!

## Guidelines

The last part of Module 5 should be done after Topics 5.1-5.2-5.3, since it presents some quizzes to test the acquired knowledge.

The multiple-choice test should be done in class and then discussed among students; otherwise it can be done as homework, but also in this case the discussion is strongly recommended.

The crosswords can be done online as homework, but-again- it is preferably a small discussion about the results achieved.

## Topic 5.4 structure:

Recommended duration of topic	30 minutes as follows: Quiz & crosswords, plus discussion in class- or online feedback
Location	Preferably in the classroom but you might do it as homework (online feedback is available)
Special characteristics of location	None
Required equipment	Computer; projector; internet connection
Special comments	The final test (multiple choice quiz) and the crosswords should be corrected and commented all together or in small groups - otherwise, it might be done as an individual task/homework (online feedback is available)

## Exercises

		Related topics of Basic Course
5A	Hands on materials (1): let's immerse it completely into water and... off-line exercise	5.1
5B	Hands on materials (2): how can we measure the colours? off-line exercise	5.1

## Advanced topics

### Teaching material

- 5.5 Non Destructive Testing and Quality Control on monuments for monitoring the decay state and the compatibility of conservation interventions

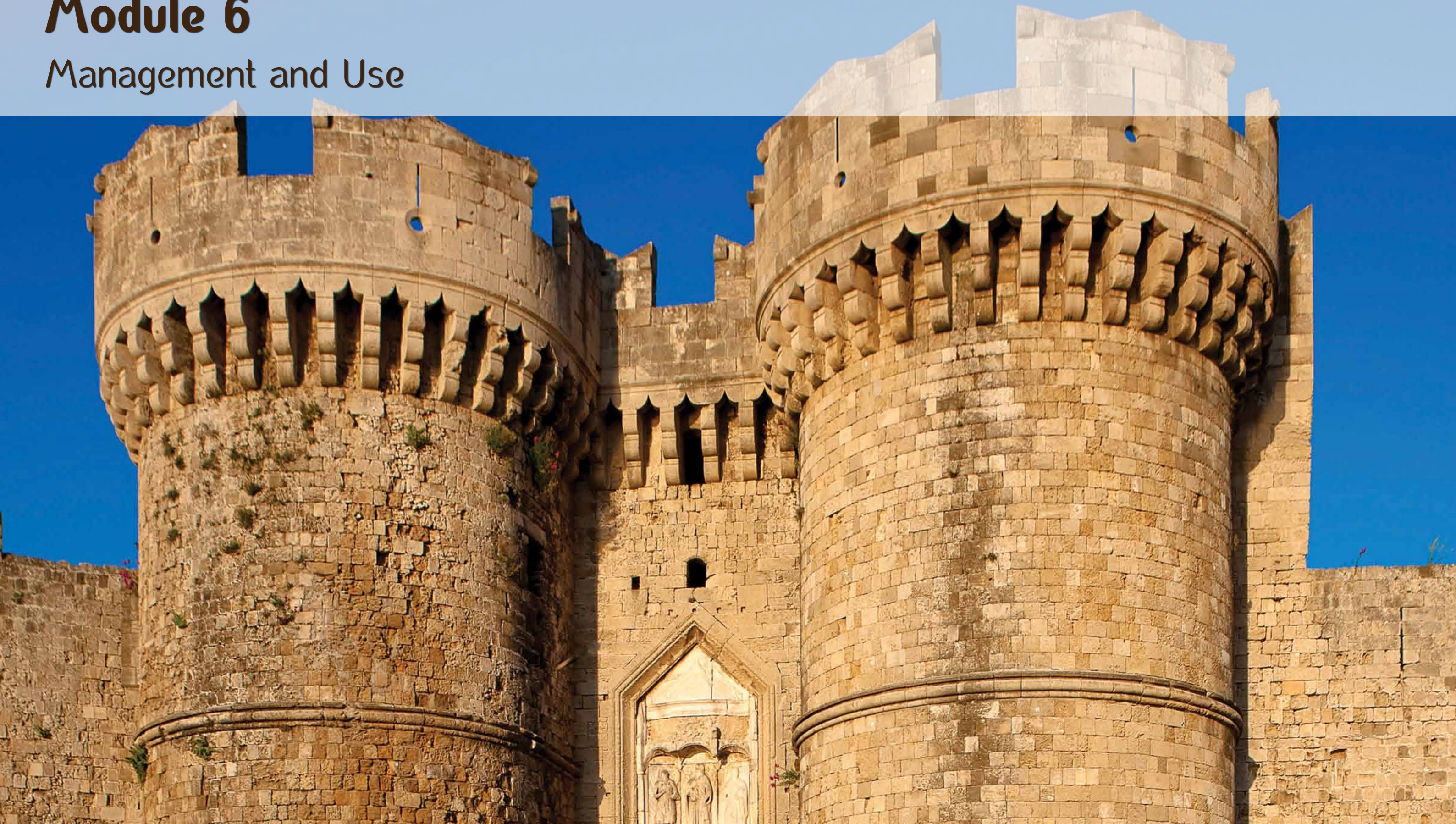
### Exercises

		Related topics of Basic Course
5C	Hands on materials (3): macro and micro observations off-line exercise	5.1
5D	Hands on materials (4): what the contact angle can tell us off-line exercise	5.1
5E	Hands on materials (5): rising damp experiment off-line exercise	5.1



# Module 6

## Management and Use



# Module 6

## Introduction

Module 6 “Management and Use” of the e-learning platform “eLAICH” is the concluding Module, following the logical steps in Cultural Heritage protection, as these are represented by the preceding Modules. Specifically, as demonstrated in Module 1, first one needs to be aware of what cultural heritage is and what values it represents. The next step is to understand the built heritage (Module 2), though study of the building / monument and its components. This is a prerequisite before one understands the decay of the monument and the interactions with its environment (Module 3), so that a complete picture of the “decay state” of the structure is obtained. Only after this is accomplished, can the appropriate conservation processes, materials and techniques be designed and selected (Module 4) to fulfill the specific requirements for conservation of the particular monument. However, protection of Cultural Heritage is a continuous process, thus, even after conservation interventions are implemented, monitoring and maintenance (Module 5) are required, not only to assess the effectiveness of the protection interventions and materials, but also, often more importantly, to evaluate how decay of the monument proceeds with time, so as to necessitate further future protection interventions. Management of all these actions is crucial for cultural heritage protection, and Module 6 presents the integrated management and use at the level of actual sites and complexes.

The objective of Module 6 is to get eLAICH student acquainted with how sustainability of cultural heritage is compatible with the sustainable development of modern society, both of which are only accomplished with integrated management and use of all available technological, financial and social resources.

Module 6 examines how strategic planning of

protection interventions, management of tourist influx, management of local socioeconomic resources and management of the environment can be valuable tools for a sustainable preservation of monuments, historic building, archaeological parks, historic cities and complete historic sites, ensuring urban and socioeconomic development while protecting and enhancing cultural identity. The role of innovative technologies and strategic planning methodologies for the preservation of Cultural Heritage is demonstrated by a number of projects in this Module and at levels ranging from the preservation of historic buildings up to the sustainable development of islands with significant cultural heritage.



## Guidelines

Module 6 is the last Module of the eLAICH basic course and it should follow the study of the all previous Modules. It is intended to demonstrate how to “get the big picture”, that is understanding how to integrate cultural heritage protection with the needs of modern society.

Recommended duration of topic	4 hours
Number of topics	8
Location	Class
Required equipment	Computer; projector

Module structure and recommended duration of study:

Topic	Duration
6.1. Tourism and monuments	15 min
6.2. Archaeological parks	30 min
6.3. Preservation of Historic Cities	15 min
6.4. Innovative technologies and strategic planning methodologies of cultural heritage preservation	15 min
6.5. Protection and rehabilitation of historic city of Acre	25 min
6.6. The megalithic temples of Malta - World Heritage Sites studies and conservation	45 min
6.7. Environmental management for preserving Venice	35 min
6.8. Keeping Heritage alive - The case of the Medieval City of Rhodes and the Aegean island of Halki - International Youth initiatives	60 min

Module 6 comprises 8 Topics, which can be studied out of sequence as they refer to selected Case Studies. Each topic should be studied according to the following sequence: 1. read the Introduction and Guidelines beforehand, 2. view the Power Point presentation 3. Search the internet or the school library for any additional information on the historic site / city mentioned in the topic

Tips for teachers: You may select individual topics and integrate them in your lectures, based on the type of cultural heritage that is available at local or national

level (e.g. monuments, archaeological sites, historic cities, etc.). In this way, students are encouraged to relate to examples they have experienced themselves. If possible, a school visit could be organized at a similar local site (e.g. Historic City), where students can compare what has been accomplished locally with the Case Studies mentioned in Module 6. Alternatively, local or national Case Studies can be assigned to groups of students, to search through bibliography and prepare a short report on the actions taken regarding their management and use.

## Topic 6.1 Tourism and monuments

### Table of contents

- 6.1.1 The phenomenon of tourism
- 6.1.2 Cultural tourism
- 6.1.3 International organisations and Charters' development facing negative impact of mass tourism
- 6.1.4 Tourist development endangering local reception societies
- 6.1.5 Circuits versus cultural routes
- 6.1.6 The case of Greece
- 6.1.7 Cultural properties: basic elements of the touristic image of Greece
  - 6.1.7.1 The Athens Acropolis and its monuments
  - 6.1.7.2 Archaeological Site of Delphi
  - 6.1.7.3 Archaeological Site of Olympia
- 6.1.8 The need of a management plan
  - 6.1.8.1 The New Acropolis Museum – a typical example for Greece
- 6.1.9 Tourism contributing at a steady pace to the integration of cultural heritage in economy
- 6.1.10 Demand for a sustainable and responsible cultural tourism

### Introduction

The topic deals with the phenomenon of tourism with emphasis in cultural tourism and its impact on monuments. Cultural tourism is an alternative form of tourism, which is developed in order to face the negative impact of massive and uncontrolled tourist influx on monuments and sites. Various international organisations are facing the negative impact of mass tourism and specific Tourism Charters have been developed in this direction. Especially in the case of Greece, culture is regarded as the wealth of the country. The need of a management plan for the protection and organizing of the visits at monuments and sites is considered to be indispensable for facing the negative impact of mass tourism. Introduction: Tourism is contributing to the integration of cultural heritage into the economy and the integration of cultural heritage in European economic policies is responding to this target.

The study of the topic is suggested to be accompanied by topic 1.4 “Monuments: Social significance and conflict of values” of Module 1 “Values and awareness”, as well as the other topics comprised in Module 6

“Management and use”.

The expected output is the understanding of the need for a sustainable and responsible cultural tourism, eliminating this way the negative consequences of tourism towards monuments and sites.



### Guidelines

The topic should be learned after Module 1 “Values and awareness”. The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is a quarter of an academic hour.

## Topic 6.2 Archaeological parks

### Table of contents

- The birth of archaeology as a discipline
- “Material traces”
- Archaeological parks and archaeology of landscape
- Planning an archaeological park
- A case study: Velia (Italy)
- Didactic activities
- The fruition

### Introduction

The topic 6.2 “Archaeological parks” introduces you to the importance of a proper management and use of the archaeological parks.

Since they are part of the “material traces” related to ancient sites of life, the archaeological areas need to be preserve and protected.

It is very important to plan properly the archeological parks considering the strict relationship between the material traces and the environment, the creation of special visits thematic paths and didactic activities.

### Guidelines

The second topic of Module 6 is strictly related to the previous Modules and you should have undertake these Modules beforehand.

During this topic, you will follow a theoretical lesson about the management of archaeological parks by prof.Arch. Ruggero Martines (Italy)



Topic 6.2 structure:

Recommended duration of topic	Ppt presentation (30 minutes)
Location	Classroom
Special characteristics of location	None
Required equipment	Computer; projector; specific equipment for simple laboratory sessions
Special comments	None



## Topic 6.3 Preservation of historic cities

### Table of contents

- Requirements for a planning process
- Cultural context
- Planning process
- Historic evolution of the City
- SWOT analysis
- Main proposals
- Conclusions

### Introduction

The current presentation describes the efforts for preserving historic cities, as shown in the case of Nafplion - Greece. Historic cities start with two essential capitals: first their built and natural environment and second their socio - cultural values and any planning process should take these into account. The planning process is then described step-by-step. A SWOT analysis reveals the strengths and weaknesses of this plan, after which the main proposals are presented.

The study of the topic is suggested to be accompanied by topic 1.4 "Monuments: Social significance and conflict of values" of Module 1 "Values and awareness", as well as the other topics comprising Module 6 "Management and use".

The expected output is the understanding of the need for a sustainable development of historic cities focusing on the needs of the local communities as well as preserving cultural heritage.

### Guidelines

The topic should be learned after Module 1 "Values and awareness".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is a quarter of an academic hour.



## Topic 6.4 Innovative technologies and strategic planning methodologies of cultural heritage preservation

### Table of contents

- 6.4.1 New strategies for the preservation of European Cultural Heritage
- 6.4.2 Exploiting innovative technologies and strategic planning methodologies for the preservation of Cultural Heritage
- 6.4.3 Demonstration of integrated projects
  - 6.4.3.1 Strategic Planning of Environmental Management as a tool for a Sustainable Preservation of Historic Cities
    - a) The case of the Medieval City of Rhodes
    - b) The case of the Venetian Fortifications of Heraklion
  - 6.4.3.2 Strategic Planning of Conservation Interventions on Historic Buildings
    - The Mela Palace in Athens' urban centre

### Introduction

The current presentation examines how strategic planning of protection interventions and environmental management can be a valuable tool for a sustainable preservation of historic cities and cultural heritage, ensuring urban development while enhancing the cultural identity. Innovative technologies and strategic planning methodologies for the preservation of Cultural Heritage are presented in key integrated projects at two levels. At the first level of strategic planning of environmental management as a tool for a sustainable preservation of historic Cities, the cases of the Medieval City of Rhodes and the Venetian Fortifications of Heraklion are presented. At the second level of strategic planning of conservation interventions on historic buildings the case of the Mela Palace in Athens' urban centre is presented

The study of the topic is suggested to be accompanied by topic 1.4 "Monuments: Social significance and conflict of values" of Module 1 "Values and awareness", as well as the other topics comprising Module 6 "Management and use".

The expected output is the understanding of how innovative technologies and strategic planning

methodologies are utilized to ensure effective preservation of cultural heritage.



### Guidelines

The topic should be learned after Module 1 "Values and awareness".

The teaching activity comprises a PowerPoint presentation. The location of the activity is class and the required equipment is a computer and a projector. The duration of the activity is a quarter of an academic hour.

## Topic 6.5 Protection and rehabilitation of historic city of Acre

### Table of contents

- 6.5.1 The General Approach to Protecting the Cultural Heritage of Acre
- 6.5.2 Understanding Buildings in Acre
- 6.5.3 Diagnosing Archaeological Sites and Historic Buildings in Acre
- 6.5.4 Understanding the Structural System of Buildings in Acre
- 6.5.5 Classifying Historic Buildings in Acre
- 6.5.6 Changes in the Acre Buildings throughout their Lifetime
- 6.5.7 Causes of Decay of Buildings in Acre
- 6.5.8 Intervening in the Acre Buildings

### Introduction

The topic 6.5 “Protection and rehabilitation of historic city of Acre” introduces you to the approach to protecting the cultural heritage of a city, understanding the buildings, diagnosing the archaeological sites and historic buildings, their structural systems, classifying buildings, changes which take place in the life of a building, cases of decay and interventions which have taken place in Acre. Acre (or Akko) is a city of 26,3000 people which is one of the oldest continuously inhabited sites in the region which may date back 3,600 years.



## Topic 6.6: The megalithic temples of Malta - World Heritage Sites studies and conservation

### Table of contents

- 6.6.1 Age and location
- 6.6.2 Conservation challenges
- 6.6.3 The way forward
  - Scientific Committee
- 6.6.4 Studies carried out over the years
  - Materials
  - Environment
  - Other studies
- 6.6.5 Protection for the temples
- 6.6.6 What do the sites look like now?
- 6.6.7 Managing the sites

### Introduction

The current presentation concerns the megalithic which led to the decision to shelter the temples from prehistoric temples of Malta, including the studies adverse environmental factors.

## Topic 6.7 Environmental management for preserving Venice

### Table of contents

- Venice in numbers
- The traditional building method in Venice
- Venice: the sinking city
- Damages and defences in the the past
- How to solve these complicated problems now? Sustainable solutions for a complicate environment
- A more responsible use of the city from tourists and habitants
- Buildings maintenance
- What about the city?
- What about outside the city?

### Introduction

The topic 6.7 “**Environmental management for preserving Venice**” introduces you to the delicate case of the city of Venice.

A unique city like Venice deserves a special care, that means a proper environmental management and a correct use of its Cultural Heritage (the palaces, the canals, the bridges, the islands...the city itself!). Every year more than 9 millions tourists visit Venice, thousands of cruise boats cross the St. Mark's Basin, numerous buildings foundation need maintenance, many “acqua alta” occur...all these events should be considered for preserving Venice and its lagoon , which were inserted in the UNESCO World Heritage sites in 1987.

### Guidelines

This topic of Module 6 is strictly related to the previous Modules, and in particular to Module 5 (see the Topic 5.3: Preventive Conservative) and you should have undertake these Modules beforehand.

Topic 6.7 structure:

Recommended duration of topic	Ppt presentation (35 minutes)
Location	Classroom
Special characteristics of location	None
Required equipment	Computer; projector; specific equipment for simple laboratory sessions
Special comments	None



## Topic 6.8 Keeping heritage alive - The case of the Medieval City of Rhodes and the Aegean island of Halki - International youth initiatives

### Table of contents

- 6.8.1 Keeping heritage alive
- 6.8.2 Pilot project for Halki's revitalisation
- 6.8.3 Pilot Project for the reveal, recognition and preservation of the Historic City of Rhodes

### Introduction

The topic deals with Historic Cities acting as pilot open labs for research and education towards monuments' revitalisation. It aims at the understanding of the importance of keeping heritage alive through the active participation of local societies and especially youth, which leads to cultural development and socio-economic integration.

The study of the topic is suggested to be accompanied by topics 1.1. "What is cultural heritage", 1.2. "Why should we preserve it", 1.3. "How should we do it" and 1.4. "Monuments:

social significance and conflict of values" of Module 1 "Values and awareness" and preferably is suggested to follow their study.

The expected output is the acquired knowledge and the sensitization of youth towards their participation in monuments' revitalisation, protection and preservation through the presentation of successful paradigms.

### Guidelines

The topic should be learned after completing topics 1.1. "What is cultural heritage", 1.2. "Why should we preserve it", 1.3. "How should we do it" and 1.4. "Monuments: social significance and conflict of values" of Module 1 "Values and awareness".

The teaching activity comprises a PowerPoint presentation, enriched with characteristic case studies for better understanding. The duration of the activity is one academic hour.



# Adopt a Site



# Adopt a Site

## Introduction

The “Adopt a site” unit is the concluding unit in the ELAICH learning process. It is based on knowledge and understanding acquired and developed through all 6 Modules. The “Adopt a site” unit enables the eLAICH student to apply his/her knowledge and understanding on many of the eLAICH topics from all Modules, focusing on deterioration of building materials used on a historic building/site.

The “Adopt a site” unit comprises three types of activities:

- Application of knowledge from the eLAICH lessons on a historic site
- Development of basic ability of understanding of a historic site, recording its characteristics and undertaking basic analysis
- Collecting data about a historic site which might help its preservation by conservation experts and conservators.

The “Adopt a site” unit is a package which will enable you to undertake these activities as the final work by the students in each eLAICH course. The final work might be submitted by the school to a relevant conservation/heritage authority at the completion of the eLAICH course.

## Guidelines

The “Adopt a site” unit enables study on a historic site, through a set of guidelines which should be studied and applied sequentially:

- *Guidelines for choosing a site*
- *Principles of study and documentation of a historic site for eLAICH students*
- *Guidelines for the in-situ study of a (part of) historic site for eLAICH students*

These guidelines were developed specially for eLAICH while taking into consideration the absence of a previous background in cultural heritage of the eLAICH students and the content of the eLAICH Basic Course.

An example of an output of an eLAICH on-site study is provided as well.

## Adopt a site unit structure:

The Adopt a site unit consist of a **preparation phase** and actual **study of a historic site**.

### Preparation phase:

**Step 1:** Choosing a historic site for the in-situ study. Note: This activity is non-educational. It should be undertaken by school administration in cooperation of a heritage/ conservation authority. It should be undertaken in accordance with the document: **Guidelines for choosing a site.**

**Step 2:** Learning about Principles of study and documentation on a historic site.

This activity should be held in class, by means of the power point presentation: **Principles of study and documentation of a historic site for eLAICH students.**

**Location:** class

**Duration:** 30 minutes

**Equipment:** Computer(s); Power Point projector; connection to Internet; pens or pencils; paper

**Step 3:** before getting to a historic site, students and their teacher should familiarize themselves with expected results of the planned study on site through an example of such results by a past eLAICH course (power point presentation).

**Location:** class

**Duration:** 30 minutes

**Equipment:** Computer(s); Power Point projector; connection to Internet; pens or pencils; paper

### Study of a historic site:

Study of a historic site should be held in accordance with the document: **Guidelines for the in-situ study of a (part of) historic site for eLAICH students.** It is recommended that the teacher and students become acquainted with these Guidelines before getting to the

site.

Guidelines include description of the purposes of the study, method and expected output; and include organisational instructions; list of equipment; recommended timetable.

**Location:** historic site

**Duration:** 6 hours

**Equipment:** according to the document: **Guidelines for the in-situ study of a (part of) historic site for eLAICH students**

### Recommendation:

Information on a historic site collected during the study on site might be after the outdoor activity processed in class, according to the optional chapter of the **Guidelines for the in-situ study of a (part of) historic site for eLAICH students.** Duration of this activity could be flexible and decided upon by the school, due to specific educational background of the students. It is not included in time duration of the Basic Course.

## Principles of study and documentation of a historic site for eLAICH students



## Example of study and documentation of a historic site



## Guidelines for choosing a site

These criteria should be applicable at a historic site where eLAICH students would study, investigate, take photographs/ measurements and records, in order to produce their central “off-line exercise” during the eLAICH course.

**Important note 1:** site should be safe for students and teachers; suitable facilities and a shelter should be provided near the working area in case of difficult weather conditions.

**Important note 2:** it is recommended that the school administration choose a site for their students' in-situ study in the framework of eLAICH in cooperation with a conservation/ heritage authority/ organization which is responsible for the historic site(s) in the school area.

**Two groups of aspects should be present at a site: “Positive” (1) and “Negative” (2).**

### 1. “Positive” = Values

It is recommended that the site possesses not only historic values, but also architectural/artistic (aesthetic) values.

In addition, other values might be present, e.g. social, religious values, the significance of the site within the local culture, etc.

### 2. “Negative” = Deterioration

The site should also provide a suitable “collection” of deterioration patterns and provide rich in-situ material for the study of deterioration of structure and materials. At the same time, the deterioration phenomena should not be at a very high level of difficulty, acknowledging the beginner's profile of the students.

\*by the term “site” in the framework of the ELAICH project is understood any object of built heritage, e.g. building, structure (bridge, aqueduct, terrace, etc), group of buildings, garden, etc. “Site” doesn't limit the scale and size of an object; however, in the ELAICH project the “ELAICH site”'s physical borders should be realistically outlined according to the tasks and context of ELAICH, e.g. it could mean a specific building of a historic town, or a small portion of its wall, where the ELAICH students would study, investigate, take measurements and records, rather than the entire town, as it might be defined by the conservation status of the town or its presence on the World Heritage list.

## Guidelines for the in-situ study of a (part of) historic site for eLAICH students

### Preface

The “Adopt a site” unit is the concluding unit in the ELAICH learning process. It is based on knowledge and understanding acquired and developed through all 6 Modules. The “Adopt a site” unit enables the eLAICH student to apply his/her knowledge and understanding of many eLAICH topics from all Modules, focusing on deterioration of building materials used on a historic building/site.

The “Adopt a site” unit comprises three types of activities:

- Application of knowledge from the eLAICH lessons on a historic site
- Development of basic ability of understanding of a historic site, recording its characteristics and undertaking basic analysis
- Collecting data about a historic site which might help its preservation by conservation experts and conservators

The “Adopt a site” unit is a package which will enable students to undertake these activities as their final work in each eLAICH course.

### Guidelines for the in-situ study of a (part of) historic site for eLAICH students

includes descriptions of the purposes of the study, method and expected output; and include organisational instructions; list of equipment; and a recommended timetable.

**Duration of study on-site:** 6 hours

### General Recommendations:

- School administration should choose in advance a historic site for the on-site study, in accordance with the document “Guidelines for choosing a site” and in cooperation with a heritage authority/organisation.
- It is recommended that the teacher and students become acquainted with Guidelines for the in-situ study of a (part of) historic site before going to the site.
- It is recommended to learn a little about the historic site before going to the site.
- The school might decide to undertake all on-site activities at the same historic site, year after year. In this case, the school could contribute to monitoring the site.
- Information on the historic site collected during the study on site might be processed in class after the outdoor activity, according to the optional chapter of the Guidelines for the in-situ study of a (part of) historic site for eLAICH students. Duration of this activity could be flexible and decided upon by the school, due to the specific educational background of the students. It is not included in the time duration of the Basic Course.
- The final work might be submitted by the school to a relevant conservation/heritage authority at the completion of the eLAICH course.
- It is recommended to undertake all activities with the advice of and in cooperation with the heritage authority/organisation.

**Please print this document and bring it with you to the site.**



Photo © Anna Lobovikov-Katz

## Contents of study on site

### Objectives:

This in-situ survey project is intended to reinforce and apply the theoretical knowledge accumulated during the previous teaching sessions in the framework of eLAICH through the in-situ survey and analysis of a historic site, which is focused on the deterioration of building materials used on a (portion of a) historic building/site. The second aim of this work is to collect data, to understand it, and to organize the results of your analysis and conclusions in a way understandable by other people.

### What should you do:

You are requested to observe, record, and analyse the defined portion of a historic site, focusing on deterioration of building materials used on a historic building/site, and to organize the results of your analysis in a way understandable for other people.

### Introduction:

#### Dear eLAICH students:

Your work on site will include collecting and analysing data. Some data may be analysed directly on site, and some should be processed in the classroom. In order to perform a proper conservation survey you can undertake different activities according to guidelines.

### Important general recommendations:

- Accuracy: In this work you will have to be as accurate as possible, both in graphic and verbal description.
- During the in-situ exercise you will need to use the knowledge you have acquired through the ELAICH classes related to various conservation issues, such as: types of deterioration, degrees of deterioration, possible causes of decay, different building materials, different types of structures and their elements, etc.
- Please keep in mind that you are not a professional conservation expert (that would need a much longer period of study). However, you may make a real contribution to preservation of cultural heritage – you just need to look, see and describe. You may not know what type of deterioration you've just discovered, but if you describe it accurately, you may help a conservation expert/ historic site manager in preserving your cultural heritage.

### Guidelines for observation and analysis:

#### Important note:

You are requested to examine and document the texture and color of stone, mortars, etc. as accurately as possible. Please pay attention even to slight differences in color, texture, thickness of layer, etc.

It is recommended to summarize the preliminary analysis performed in-situ, such as:

- a. What is the location of each specific type of deterioration? (Each type of deterioration of a certain visual appearance.)
- b. What is special about this location (e.g. close to the ground / roof / close to the water source / unique location / recurring feature in different sections of the building which are characterised by . . . , etc.)
- c. Is a building material unique for your section (e.g. - specific stone color, texture, shape or deterioration type appears only in the section where your team is working? (Collaborate with other teams consulting data collected by them.)
- d. What might be the causes of deterioration which you discovered?
- e. What do you think should be performed as part of a "monitoring" process?  
What should be done to prevent future decay, as part of "preventive conservation"?
- f. In consultation with your ELAICH local conservation expert, create a legend shared for all teams. In case you cannot get the consultation - try to compare it to the material studied in the eLAICH Modules; you might find Glossaries on the Deterioration and Conservation of Stone, available on the Internet, helpful. There should be a separate legend for

- Types of building materials
- Types of deterioration
- Grades (degrees) of deterioration

#### Please note:

After studying the historic site, you might need to process the data gathered on the site in class. It is recommended to integrate the data of different teams, and this integration should start at the site: share what you found on your portion of the historic site with teams studying other parts of the site. It is recommended to present findings and conclusions at the end of the course. It is recommended to process data directly on site as much as possible. A laptop would be helpful, if available - it would enable you to write comments, and attach relevant photographs.

### Collecting data on site:

You will have to collect data in two forms:

- Verbal description
- Graphic (visual) material

#### Verbal description:

Written description should follow Important general recommendations, Guidelines for observation and analysis (above) as well as take into consideration themes and issues addressed in the Guidelines for each type of mapping (below). They should be written on site.

### Graphic (visual) material

can be of several types:

- Photographic survey
- Sketches or even precise drawings
- Measurements might be undertaken as well

The level of educational activities aimed at collecting and processing graphic material might differ regarding the choice of specific type(s) of recording techniques due to the specific educational background of your team/ group/ school. There might be three optional levels of recording in your work, the difficulty in increasing order:

- Level "A"** Photographs taken by eLAICH students;
- Level "B"** Sketches made by eLAICH students;
- Level "C"** Measurements to be elaborated in precise drawings to be produced by eLAICH students.

**Level "A"** is the basic level, which doesn't demand any sketching ability or background of students.

**Level "B"** is based on basic sketching ability or background of students.

**Level "C"** is the advanced level, which includes producing simple precise drawings by the students, and taking measurements on site.

We assume that the most widely applied might be Level "A" or Level "B", while Level "C" might be applicable at schools where precise drawing (drafting) is taught. However, the decision is to be made by the participating school, taking into consideration the specific background of students in graphic representation.

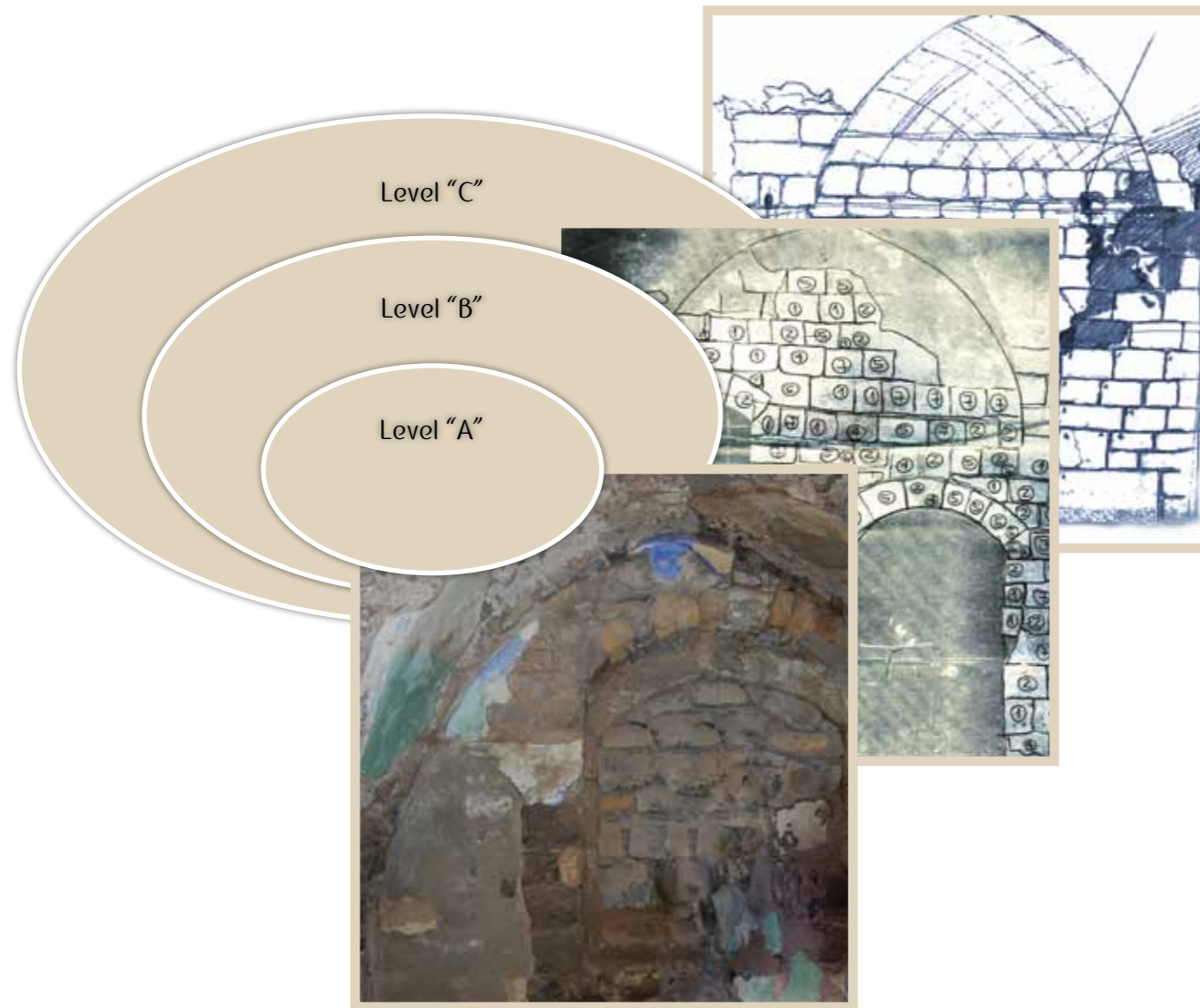


Photo © Anna Lobovikov-Katz



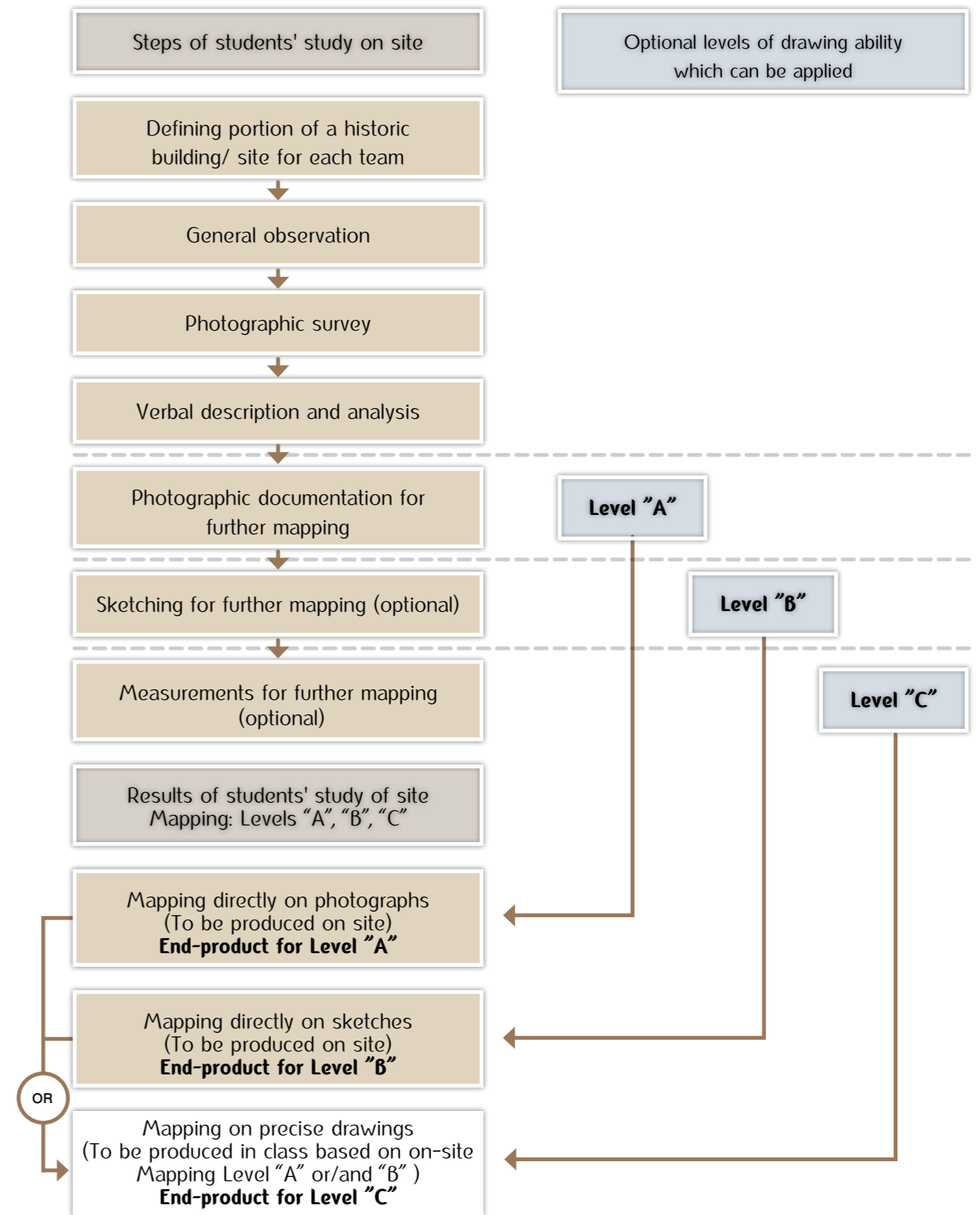
**Collecting graphic (visual) material:**

It should be clarified that these levels are “enclosed”, i.e. students producing simple precise drawings (advanced Level “C”) also need to make sketches (Level “B”) and/or photographs (Level “A”) in order to produce these precise drawings, etc..



**Figure 1:** Types of graphic material according to Levels A, B, C.

On each level, depending of what you choose, you will have to mark the data which you will collect on site:  
 for Level “A” you will do it on photographs - on site;  
 for Level “B” - on sketches - on site;  
 for Level “C” you will work either on photographs or on sketches - on site; later you will elaborate it in precise drawings which need to be prepared in class.



**Figure 2:** Steps of students' study on a historic site

## Guidelines for each type of mapping:

### Graphic documentation - general comments:

Graphic documentation (sketch) of the building portion should be "direct" without any perspective distortion and as accurate as possible.

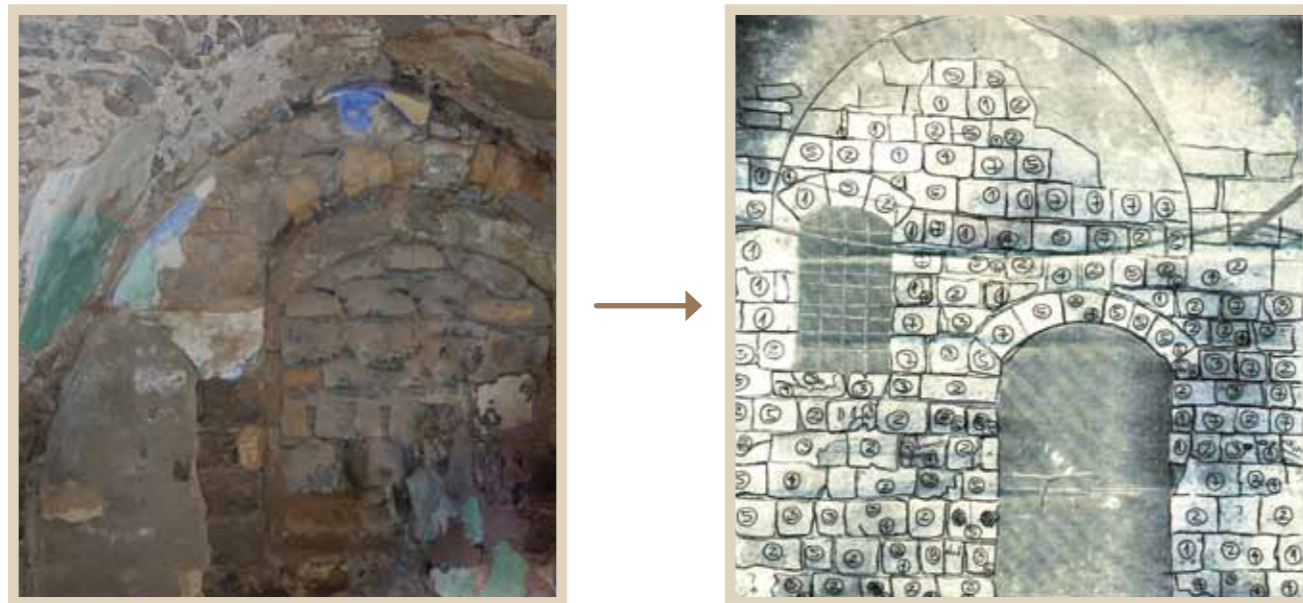
Graphic description, guidelines according to each type of mapping:

#### 1. Graphic material - Precise geometrical sketch (Level "B")

First you will prepare on site sketch - graphic documentation of the portion of the building/wall "as is", without any marks and notes (geometrical data), provided with a relevant title (e.g. northern wall, ground level). We name it "geometrical" because it bears only geometrical data and no information on

types of building material, or their physical condition. Note: It's recommended to prepare photocopies of the geometrical sketch (for Level "B" and "C") of a relevant portion of a site (1) as soon as it is ready on site (make x3 copies for each team) and to perform mapping during the in-situ session (see "Graphic material" - 2, 3, 4, in "Guidelines to each type of mapping") on these photocopies and not on the original drawing. Otherwise copies should be prepared "manually" by use of copy paper/ by hand on transparent paper. If you work on photographs (Level "A") you might want to prepare a large size photocopy (black and white would suffice) before you start to mark different types of data on it.

Here below is an example of a photograph used instead of sketch. You can see that different visual information is marked directly on the photograph.



**Figure 3:** Example of on-site analysis (Level "A")

From students' work in the course "Documentation of historic building and sites" Faculty of Architecture and Town Planning, Technion, (supervised by Anna Lobovikov-Katz) 2011.

Work by Yanai Apelbaum, Zahi Zafrani, Ronit Negrea, Daniel Koppel, Ori Roll;

#### 2. Graphic material - Types of building materials

This should include graphic documentation of existing types of building materials, texture, color, and other data, such as cracks and cavities. You will mark them on your precise "geometrical" sketch/ photograph (see example from a previous ELAICH course).

#### 3. Graphic material - Types of material deterioration

This should include graphic documentation of different types of deterioration graphically defined as precisely as possible, provided with a relevant title, and accordingly to a legend identical to all teams, as agreed on site.

This mapping may be accompanied by written remarks regarding cracks, crusts, stains with an indication of their color and thickness, as well as other deterioration phenomena located on site. You may write down these remarks directly on the (photocopy of) your sketch/ photograph.

#### 4. Graphic material - Grades (Degrees) of Deterioration

This should include graphic documentation of the building portion which you have drawn on site, with grades of deterioration graphically defined as precisely as possible, provided with a relevant title, and accordingly to three main degrees:

"a" good state (relatively smooth stone surface of the façade, plane preserved);

"b" medium deterioration (stone surface of the facade plane preserved, however large cavities evident);

"c" severe deterioration (stone surface severely disrupted, with regress from the original façade plane clearly evident).

#### 5. Photographic survey

Photographic documentation should be targeted, and illustrate your comments. Photographs usually provide general views of your part of a site, and also focus on specific features and details - architectural, deterioration - types, grades, etc.

The photographic survey cannot be replaced by sketches. The photographic survey documents your different findings and conclusions on all 4 preceding

themes graphically analysed by means of "mapping".

### Expected output:

An illustrated report which would include data collected on site, organized according to these guidelines, and your conclusions regarding main topics presented in these guidelines (e.g. Important general recommendations; Guidelines for observation and analysis; Guidelines for mapping).

Recommended structure of report:

- Historical note about the site
- Overall photographic view
- Analytical (written) notes and conclusions, with systematically arranged photographs, as per guidelines above
- Mapping (according to "Mapping" section of this document)
  - For Level "A": on photographs
  - For Level "B": on freehand sketches
  - For Level "C": precise drawings produced in class after the data is collected on site by means of photographs or sketches, and measurements produced on site
- Field book: all sketches, schemes of measurements and notes taken on site. They should be scanned and arranged in a systematic manner, and explained and followed by captions, e.g. "north wall, ground floor, central window".

**Important note:** Mapping is an important and valuable way of presenting data and enabling its preliminary analysis. However, if you have difficulties in producing mapping, you might do an extended version of a systematic photographic survey and documentation, while trying to answer the questions posed in the "Mapping" section of this document, e.g. try to present data on grades of deterioration in a systematic way (in a table) with clear representation of each grade with proper photographs. The same approach can be used regarding building materials types, and deterioration types.

## Organisation of study on site:

### Technical recommendations:

**A. It's recommended to prepare photocopies of the geometrical sketch or photograph (1) as soon as it is ready on site (make x3 copies for each team) and to perform mapping during the in-situ session (see "Graphic material" - 2, 3, 4, in "Guidelines to each type of mapping") on these photocopies and not on the original drawing. Otherwise copies should be prepared "manually" by use of copy paper/ by hand on transparent paper.**

**B. If available, a laptop on site would be helpful.**

### Equipment:

- Board A4/ A3
- Paper A4/ A3 (e.g. paper for printer)
- Pencils 2B, B, HB
- Eraser for pencil
- Masking tape to attach paper to board
- Measuring tape: 5M
- Level
- Camera for taking photographs
- Laptop (recommended)

### Work in teams:

You are requested to organize *in advance*, so that all students will be divided into small teams of three participants each.

### Roles/specialisations of team members:

**"Artist"** - a team member responsible for drawing and sketching on site.

Team member with graphic/artistic abilities, responsible for sketching.

Function: Accurate graphic description of building portion.

Note: if only Level "A" is undertaken, "Artist" may be replaced by photographer.

**"Writer"** - a team member in charge of writing/taking notes of measurements. Person with verbal abilities to describe and to analyse.

Function: a precise verbal description of the building properties and problems and recording of the measurements.

**"Surveyor"** - a team member in charge of surveying/ taking dimensions including general measuring and more detailed measurements of specific stones.

Function: to take measures and to read them out to the "Artist" and "Writer".

In the most cases, two team members must take measurements and the third team member will write them down.

We assume that everyone is a photographer today, and there's no need to define a special team member responsible for taking photographs. However, photography should proceed in accordance with specific aims, discussed and defined by a joint effort of all team members.

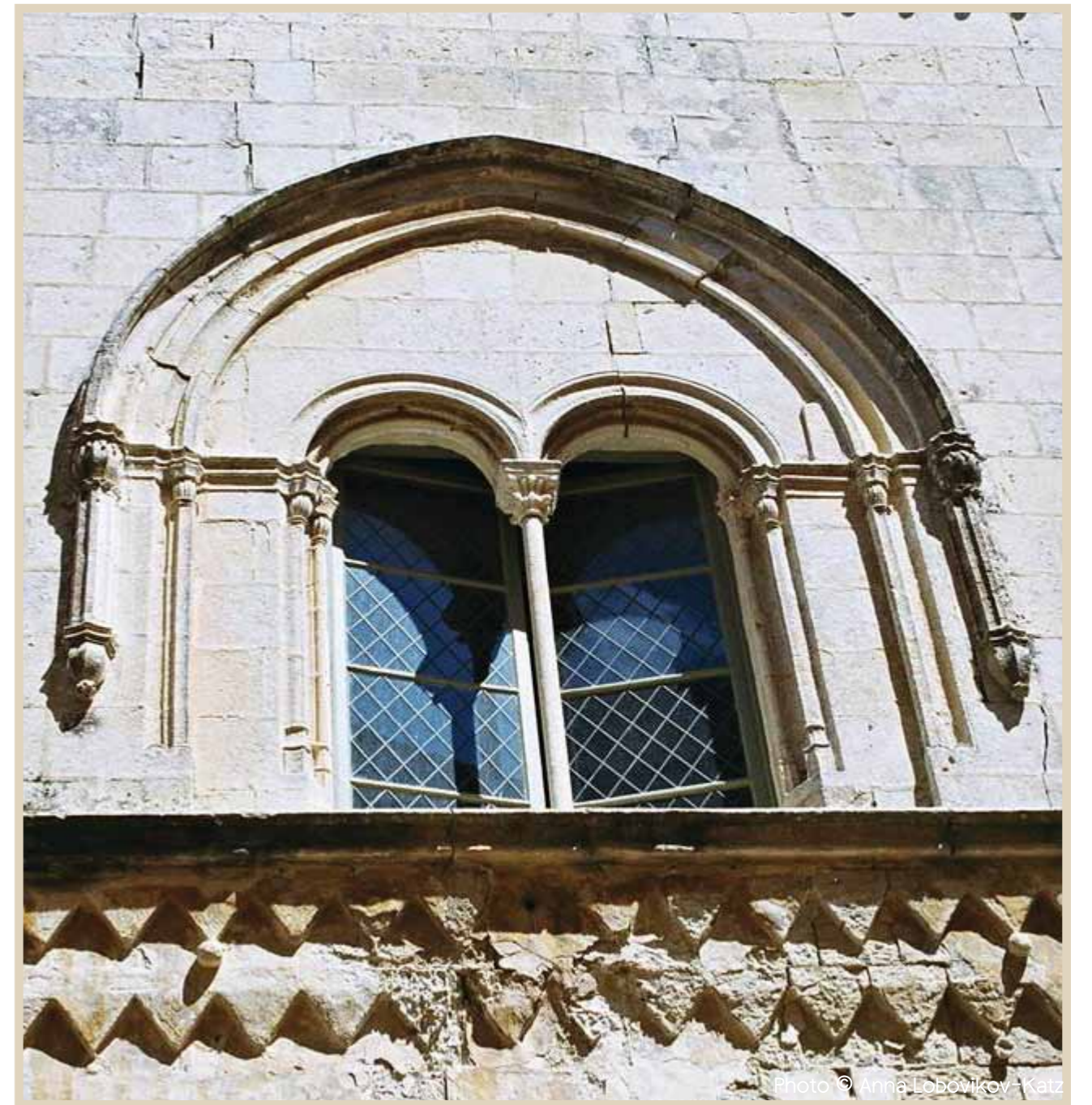


Photo © Anna Lobovikova-Katz

**Time schedule:**

Recommended total duration of the in-situ session - 6 hours.

**Recommended schedule for study on site:**

*Schedule example:* study on site starts at 9:00

## Part 1

Duration	Activity	Result
20 min	Meeting with local conservation representative	Initial introduction to the historic site
40 min	Setting appropriate location for each group of students by supervisors	Clarify borders of building section under the responsibility of each team
2 hours 10:00-12:00	<p>Consultation / guidance by local conservation representative Guidance of the content and methods</p> <p>Organization of work within the team and division of team roles (see above guidelines for specified functions of team members)</p> <p>Getting started (according to the defined "Level"):                      graphic "geometric" documentation                      photographic documentation                      text/notes/verbal description                      basic measurements                      (see "guidelines for each type of work")</p> <p>Completing graphic documentation of the fundamental measurements of the building section by each team</p>	<p>Start of graphic documentation, general photographs, descriptive notes and measurements</p> <p>Graphic documentation and basic measurements by each team</p> <p>First part in situ results:                      appropriate "direct" graphic documentation (please avoid perspective distortion, be accurate as possible), basic measurements</p>
20 min 12:00-12:20	Lunch Break	

## Part 2

Duration	Activity	Result
3 hours	<p>To complete measurements</p> <p>To complete mapping of deterioration types</p> <p>To complete mapping of deterioration grades</p> <p>To complete analysing deterioration state (written comments and notes)</p> <p>Analysis of preservation state of the building - cracks, cavities, etc. (please write comments)</p> <p>Recommendation/s for preventive conservation of the site - to prepare shared recommendations by all teams after the end of the fieldwork</p>	<p>Completion of data collection needed for the description, survey and documentation of each building section by student teams. Cooperation between different teams in order to combine relevant data, according to guidelines of tutors:                      It is recommended that one of the teams develops a template, to be used by all teams.</p> <p>Unified legend for all teams should include:                      building materials                      mapping of deterioration types                      mapping of deterioration grades                      textual documentation of decay phenomena                      photographic documentation of the above                      Conclusions for recommended monitoring prepared jointly by all teams</p> <p>Conclusions for "preventive conservation" - shared recommendations prepared jointly by all teams</p>

You may find the examples of work by students in past ELAICH courses helpful.

**Enjoy your study!**

