



## Master's (2<sup>nd</sup> cycle) degree Course\* in **SCIENCE FOR THE CONSERVATION-RESTORATION OF CULTURAL HERITAGE (SCORE)**

### Introduction

The conservation and preservation of cultural heritage is an interdisciplinary field requiring close cooperation between conservator-restorers, archaeologists, (art) historians, collection managers and museum curators on the one hand, and **Conservation scientists** on the other. While the natural sciences, as well as engineering, play a crucial role in the proper selection of conservation materials, methods and strategies, scientific research in conservation is often conducted by scientists who originally come from outside the cultural heritage field. These scientists thus lack the affinity with the cultural heritage and conservation fields necessary to fully understand and communicate the significance, but also the consequences of their work, to non-technical colleagues.



In order to promote the synergy between the cultural heritage field, and the natural sciences and engineering, the University of Bologna launched a 2<sup>nd</sup> level Degree Course in **Science for the Conservation-Restoration of Cultural Heritage (SCoRe)**. The goal of SCORE is to develop the first generation of "true" **Conservation Scientists** at an international level.



### The Bologna Process

On 19 June 1999, the Ministries of higher education from 29 European countries met in Bologna to sign an important agreement. That document, known as the *Declaration of Bologna*, initiated an important and presently irreversible process to harmonize the various European systems of higher education: the Bologna Process. Among the objectives of the Bologna Process the adoption of a system founded upon a two-cycle system, that is a 1<sup>st</sup> and 2<sup>nd</sup> level was defined. Entrance to 2<sup>nd</sup> level cycle will require the completion of a 1<sup>st</sup> cycle of study, of whose duration cannot be less than three years.

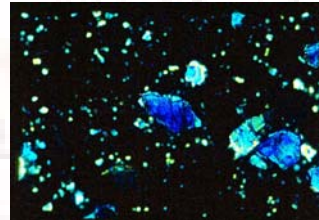


### Course objective

The course is aimed at the education and training of Conservation scientist, that is to say a scientist with further knowledge in conservation (ethics, history, cultural values, historical technologies, past and present conservation technologies and practice, specific scientific aspects, etc.) which enables him/her to contribute to the study and conservation of cultural heritage within an interdisciplinary team.

At the end of the course graduate conservation scientists will be able to:

- Study, investigate and monitor cultural heritage and its environment with respect to conservation and preservation.
- Define, develop and evaluate conservation concepts, materials, measures, methods and techniques and develop standards and guidelines.
- Provide diagnosis before, during and after conservation-restoration interventions.
- Conduct research on causes and mechanisms of deterioration and interpret scientific results for the benefit of the conservation of cultural heritage.
- Communicate the scientific principles of conservation and promote scientific research in conservation.
- Co-operate with other disciplines.



The obtainment of the Master's degree qualifies students to be enrolled into PhD studies of the Mathematical, Physical and Natural Science Faculty of the University of Bologna.



## Course syllabus

The syllabus has been developed internationally by taking into consideration the results achieved through the implementation of two European projects (CURRIC\* and UNICONS<sup>▼</sup>) specifically aimed at the development of post-graduate curricula for conservation scientists.

### Teaching methods include:

- ✓ Lectures
- ✓ Seminars
- ✓ Workshops
- ✓ Laboratory work
- ✓ Research project
- ✓ Field trips
- ✓ Internships/Stages (see external links below)

### Assessment Methods

- ✓ Coursework
- ✓ Exams
- ✓ Thesis Dissertation

Compulsory Courses		Compulsory Courses	
1 <sup>st</sup> Year	Credits (CFU)	2 <sup>nd</sup> Year	Credits (CFU)
<b>Analytical chemistry of organic materials</b>	6	<b>Computer science applications to cultural heritage</b>	6
✓ Module: Sample preparation		<b>Processes in conservation</b> (*)	10
<b>Biodeterioration and degradation of bioarchaeological materials</b>	9	✓ principles of conservation of metal objects	
✓ Module: Study, degradation and intervention on bioarchaeological materials		✓ principles of conservation of paintings	
✓ Module: Biodeterioration of stone materials and control methods of the biodeteriogens			
✓ Module: Molecular analysis of bioarchaeological materials			

\* R. Mazzeo, "CURRIC: a European project for postgraduate conservation training", ICCROM Newsletter, 30, pp.11, June 2004

▼ "Guidelines for Post Graduated Education and training in Conservation Science (for cultural heritage)", funded by the EU Alfa programme



<b>Mineralogical and petrographical characterization of natural and artificial stone</b>	8	<b>Principles of collections and site management</b>	6
✓ Module - Historical and contemporary artificial and natural stone materials		✓ Module: Museology	
✓ Module - Ancient ceramic materials			
<b>Physical methods of examining cultural property</b>	10	<b>Thesis project</b>	3
✓ Module: Elemental analysis of museum objects			
✓ Module: X-ray Digital Radiography and Computed Tomography for Cultural Heritage			
✓ Module: Nuclear Magnetic Resonance for Cultural Heritage			
✓ Module: Acoustic Methods for Cultural Heritage			
<b>Environmental impact on materials, deterioration and ageing</b>	6	<b>Research project (final examination)</b>	30
✓ Module: Preventive conservation			
<b>Ancient metallurgy</b>	6	<b>Free choice courses</b>	
✓ Module: History of metal technology			
<b>Chemical methods of examining cultural property</b>	6	<i>Suggested:</i> <b>Principles of conservation of stone and architectural surfaces (*)</b>	8
✓ Module: Artists' pigments analysis			
<b>Natural and synthetic polymers in conservation</b>	6		
<i>Total credits 1<sup>st</sup> year</i>	<b>57</b>	<i>Total credits 2<sup>nd</sup> year</i>	<b>63</b>
<b>TOTAL CREDITS</b>			<b>120</b>

(\*) The laboratory sessions will be taught into the newly established restoration laboratories of the Archaeology Museum in Classe (Ravenna)



## Study Hours

The course is full-time and is delivered on an intensive 5-day-a-week basis. A part from the courses on Processes in conservation, that will be taught by expert conservator-restorers at the newly established restoration laboratories of the Archaeology Museum in Classe, the others are implemented at the Degree course premises located in Via Guaccimanni 42, Ravenna.

## External Links

The teaching programme involves field trips to museums, archaeological sites, conservation labs, on-site visits to on-going projects.

The fourth semester, which is mainly devoted to the students' implementation of the experimental thesis, will be carried out in one of the university science laboratory, cultural heritage institutions, museums, etc located both in Italy, Europe and China. To this purpose specific agreements with the hosting Institutions have been signed by the University of Bologna.

The Departments involved into the Master programme have close links with networks (such as CHARISMA: <http://www.charismaproject.eu/>), practicing conservators, conservation scientists, museums and heritage organisations both in Italy (such as the **Opificio delle Pietre Dure** in Florence), Europe (such as the **National Gallery** in London and the **Centre de Recherche et de Restauration des Musées de France** – Louvre Museum in Paris) and Far East Asia (such as the **Art Institute of Nanjing** in China).

## Why choose this course?

A profound knowledge of the composition and structure of cultural heritage represents an essential prerequisite to carry out research in art history or archaeology as well as to plan and undertake conservation-restoration procedures. In particular, decisions on proper preservation actions undeniably require an assessment of the foreseeable evolution of degradations. To gain the deepest insight into nature and properties of artwork materials conservation scientists will benefit from access to research tools of the highest level and to the most skilled research in conservation teams able to take advantage of the outstanding possibilities of the macro- and micro-analytical tools of advanced material science. There are many and varied opportunities for employment across the heritage sector, as well as within forensic and analytical science.



ALMA MATER STUDIORUM  
UNIVERSITY OF BOLOGNA - RAVENNA CAMPUS (Italy)  
Mathematical, Physical and Natural Sciences Faculty

## Information

**University of Bologna – Degree course Science for the Conservation-  
Restoration of Cultural Heritage**

via Guaccimanni 42, 48100 Ravenna (Italy)  
tel. +39 0544 937156 fax +39 0544 937159

[website under construction](#)

**Master's Degree Course Director** : prof. Rocco Mazzeo  
e-mail: [rocco.mazzeo@unibo.it](mailto:rocco.mazzeo@unibo.it)

**Course secretariat:**  
e-mail: [polora.tecore@unibo.it](mailto:polora.tecore@unibo.it)

The Master's Degree course is kindly supported by:



**Fondazione Flaminia**  
[www.fondazioneflaminia.it](http://www.fondazioneflaminia.it)



**Fondazione Ravenna Antica**  
<http://www.ravennantica.it/>