ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

REGOLAMENTO DIDATTICO DEL CORSO

LM-11 [SCIENCE FOR THE CONSERVATION-RESTORATION OF CULTURAL HERITAGE]

Sede di Ravenna

INDICE

Corso di Laurea Magistrale in Science for the Conservation - Restoration of Cultural Heritage

ART. 1 REQUISITI PER L'ACCESSO AL CORSO

- Conoscenze richieste per l'accesso

Per essere ammessi al corso di laurea magistrale in Science for the Conservation - Restoration of Cultural Heritage occorre essere in possesso di una laurea o di un diploma universitario di durata triennale, ovvero di altro titolo di studio conseguito all'estero, riconosciuto idoneo.
Occorre, altresì, il possesso dei seguenti requisiti curriculari:

- avere conseguito la Laurea in una delle seguenti classi o possedere altro titolo di studio conseguito all'estero, riconosciuto idoneo:
  ex D.M. 270: Laurea Triennale L-43 -Tecnologie per la conservazione e restauro dei beni culturali ex. D.M. 509/99: Laurea Triennale 41 Tecnologie per la conservazione e restauro dei beni culturali Previgente ordinamento: D.U. "Tecnico per la diagnostica applicata al restauro e conservazione dei beni culturali".

Previgente ordinamento quadriennale:

BSc in Art Conservation
BSc in Art Restoration (of Cultural heritage)
BSc in Heritage/Historic preservation
BASc/BAS - Bachelor of Applied Science BSc in Science

In base all'accordo firmato dall' Alma Mater Studiorum - Università di Bologna e l' Art Institute of Nanjing (Cina), lo studente cinese proveniente dall'Institute sarà ammesso alla Laurea Magistrale solo se avrà superato l'anno propedeutico di studi organizzato e implementato congiuntamente con la Laurea Magistrale in Science for the Conservation - Restoration of Cultural Heritage.
L'ammissione al corso di laurea magistrale è subordinata, inoltre al superamento di una verifica dell'adeguatezza della personale preparazione che avverrà secondo le modalità definite nel punto modalità di ammissione.
È richiesta inoltre la conoscenza della lingua inglese di livello B2 secondo quanto prescritto dal "Quadro Comune Europeo" di riferimento per la conoscenza delle lingue. La relativa certificazione andrà allegata in sede di domanda. Qualora il candidato non fosse in possesso di tale certificazione il livello di conoscenza della lingua inglese verrà accertato, mediante colloquio, dalla commissione di ammissione.

- Modalità di ammissione

La verifica dell'adeguatezza della personale preparazione effettuata da parte di una Commissione potrà svolgersi tramite una valutazione del curriculum del candidato. Questa valutazione potrebbe essere seguita da un colloquio secondo modalità, criteri e procedure deliberati del Consiglio di Corso di Studio e rese note tramite pubblicazione sul Portale di Ateneo.
In mancanza del possesso dei requisiti richiesti, l'ammissione al Corso di laurea magistrale dipenderà da una valutazione preliminare di una Commissione che verifica il possesso delle conoscenze e competenze richieste, tramite colloquio.
La Commissione, nominata dal Consiglio di Corso di laurea magistrale fisserà un calendario, da settembre a dicembre, per lo svolgimento dei colloqui, che verrà pubblicato sul portale di Ateneo.

Qualora la Commissione ritenga sufficiente il livello delle conoscenze e competenze del laureato, esprime un giudizio di idoneità, che consente l'ammissione al Corso di Laurea Magistrale.

ART. 2 PIANI DI STUDIO INDIVIDUALI

È prevista la possibilità di presentazione di piani di studio individuali con le modalità, i criteri e i termini resi noti tramite il Portale di Ateneo.
I piani di studio individuali, approvati dal Consiglio di corso di studi, non possono comunque prescindere dal rispetto dell'ordinamento e delle linee guida definite dagli Organi competenti.
Qualora il piano di studio preveda la scelta di attività formative attivate presso corsi di studio a numero programmato, l'ammissione alle stesse deve essere previamente approvata anche dal Consiglio di corso di studio a numero programmato sulla base di criteri da questo preventivamente individuati.

ART. 3 MODALITÀ DI SVOLGIMENTO DELLE ATTIVITÀ FORMATIVE E TIPOLOGIA DELLE FORME DIDATTICHE

Il piano didattico allegato indica le modalità di svolgimento di ciascuna attività formativa e la relativa suddivisione in ore di didattica frontale, di esercitazioni pratiche o di tirocinio, nonché la tipologia delle forme didattiche.
Eventuali ulteriori informazioni ad esse relative saranno rese note annualmente sul Portale di Ateneo.

ART. 4 FREQUENZA E PROPEDEUTICITÀ

L'obbligo di frequenza alle attività didattiche e indicato nel piano didattico allegato, così come le eventuali propedeuticità delle singole attività formative.

Le modalità e la verifica dell'obbligo di frequenza, ove previsto, sono stabilite annualmente dal Corso di Studio in sede di presentazione della programmazione didattica e rese note agli studenti prima dell'inizio delle lezioni tramite il Portale di Ateneo.

ART. 5 PERCORSO FLESSIBILE

Lo studente può optare per il percorso flessibile che consente di completare il corso di studio in un tempo superiore o inferiore alla durata normale secondo le modalità definite nel Regolamento Didattico di Ateneo.

Le attività formative previste dal percorso di studio, in caso di necessaria disattivazione, potranno essere sostituite, per garantire la qualità e la sostenibilità dell'offerta didattica.

ART. 6 PROVE DI VERIFICA DELLE ATTIVITÀ FORMATIVE

Il piano didattico allegato prevede i casi in cui le attività formative si concludono con un esame con votazione in trentesimi ovvero con un giudizio di idoneità.
Le modalità di svolgimento delle verifiche sono stabilite annualmente dal Corso di Studio in sede di presentazione della programmazione didattica e rese note agli studenti prima dell'inizio delle lezioni tramite il Portale di Ateneo.

ART. 7 ATTIVITÀ FORMATIVE A SCELTA DELLO STUDENTE

Il Corso di studio considera coerenti con il progetto formativo le attività formative individuate dal Consiglio di Corso di studio e previste nell'allegato piano didattico.

Se lo studente sceglie un'attività formativa diversa da quelle considerate coerenti, secondo i suddetti criteri predeterminati, deve fare richiesta al Consiglio di corso di studio nei termini previsti annualmente e resi noti tramite pubblicazione sul Portale di Ateneo.
Il Consiglio valuterà la coerenza della scelta con il percorso formativo dello studente.

ART. 8 CRITERI DI RICONOSCIMENTO DEI CREDITI ACQUISITI IN CORSI DI STUDIO DELLA STESSA CLASSE

I crediti formativi universitari acquisiti sono riconosciuti per non meno della metà e fino a concorrenza dei crediti dello stesso settore scientifico disciplinare.

Qualora, effettuati i riconoscimenti in base alle norme del presente regolamento, residuino crediti non utilizzati, il Consiglio di Corso di studio può riconoscerli valutando il caso concreto sulla base delle affinità didattiche e culturali.

Con riferimento ai corsi di studio erogati in lingua diversa dall'italiano, il riconoscimento è relativo ad insegnamenti impartiti o alle attività formative svolte in tale lingua.

Art. 9 Criteri di riconoscimento dei crediti acquisiti in Corsi di Studio di diversa classe, presso università telematiche e in Università estere

I crediti formativi universitari acquisiti sono riconosciuti dal Consiglio di Corso di studio sulla base dei seguenti criteri:

-analisi del programma svolto;

-valutazione della congruità dei settori scientifico disciplinari e dei contenuti delle attività formative in cui lo studente ha maturato i crediti con gli obiettivi formativi specifici del corso di studio e delle singole attività formative da riconoscere, perseguendo comunque la finalità di mobilità degli studenti.

Il riconoscimento è effettuato fino a concorrenza dei crediti formativi universitari previsti dall'ordinamento didattico del corso di laurea magistrale.

Qualora, effettuati i riconoscimenti in base alle norme del presente regolamento, residuino crediti non utilizzati, il Consiglio di Corso di studio può riconoscerli valutando il caso concreto sulla base delle affinità didattiche e culturali.

Con riferimento ai corsi di studio erogati in lingua diversa dall'italiano, il riconoscimento è relativo ad insegnamenti impartiti o alle attività formative svolte in tale lingua.

ART. 10 CRITERI DI RICONOSCIMENTO DELLE CONOSCENZE E ABILITÀ EXTRAUNIVERSITARIE

Possono essere riconosciute competenze acquisite fuori dall'Università nei seguenti casi:

- conoscenze e abilità professionali certificate ai sensi della normativa vigente in materia;

- conoscenze e abilità maturate in attività formative di livello post secondario alla cui realizzazione e progettazione abbia concorso l'Università.

La richiesta di riconoscimento sarà valutata dal Consiglio di Corso di studio tenendo conto delle indicazioni date dagli Organi Accademici e del numero massimo di crediti riconoscibili fissato nell'ordinamento didattico del corso di studio.

Il riconoscimento potrà avvenire qualora l'attività sia coerente con gli obiettivi formativi specifici del corso di studio e delle attività formative che si riconoscono, visti anche il contenuto e la durata in ore dell'attività svolta.

ART. 11 TIROCINIO CURRICULARE

Il Corso di Studio prevede, su richiesta dello studente, la possibilità di svolgere un tirocinio curriculare, finalizzato alla preparazione della prova finale/ tesi di laurea o comunque collegato ad un progetto formativo mirato ad affinare il suo processo di apprendimento e formazione, secondo
le procedure stabilite dal Regolamento generale tirocini di Ateneo per lo svolgimento dei tirocini o dai programmi internazionali di mobilità.

Tali esperienze formative della durata massima di 12 mesi, che dovranno concludersi entro la data del conseguimento del titolo di studio, potranno essere svolte prevedendo l'attribuzione di crediti formativi:

- nell'ambito di quelli attribuiti alla prova finale;
- per attività di tirocinio previsto dal piano didattico;
- per attività a scelta dello studente configurabili anche come tirocinio;
- per attività aggiuntive i cui crediti risultino oltre il numero previsto per il conseguimento del titolo di studio.

ART. 12 MODALITÀ DI SVOLGIMENTO DELLA PROVA FINALE

- Caratteristiche della Prova finale

La prova finale per il conseguimento della laurea magistrale consiste nella redazione e nella discussione pubblica di una tesi di laurea, sperimentale o teorica, elaborata in modo originale dallo studente su un argomento coerente con gli obiettivi del corso di studio, sotto la guida di un relatore. La dissertazione deve dimostrare la padronanza degli argomenti, capacità critica, l'attitudine a operare in modo autonomo e una capacità di comunicazione di buon livello.

- Modalità di svolgimento della prova finale

Il lavoro di tesi ha lo scopo di verificare l'esperienza acquisita dallo studente e le attività svolte durante il periodo di formazione in un laboratorio di ricerca o in un istituto equivalente. L'esame orale finale valuterà anche la capacità degli studenti di disegnare progetti e sfruttare i risultati finali in modo autonomo e la capacità dello studente di presentare chiaramente e discutere i propri risultati.

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La Commissione Paritetica docenti-studenti ha espresso parere favorevole sulla coerenza dei crediti assegnati alle singole attività formative e gli specifici obiettivi formativi programmati, ai sensi dell'articolo 12 comma 3 del DM 270/04.

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

TEACHING REGULATIONS OF THE MASTER DEGREE

LM-54 [SCIENCE FOR THE CONSERVATION-RESTORATION OF CULTURAL HERITAGE]

Ravenna Campus

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Second Cycle Degree Programme in Science for the Conservation-Restoration of cultural heritage

ART. 1 ADMISSION REQUIREMENTS

- Access requirements

Admission to the 2nd cycle degree program is subject to the possession of a 1st cycle degree, or other suitable qualification obtained abroad.

Moreover, admission to the 2nd cycle degree program is also subject to the possession of the following curricular requirements:

A) The possession of a 1st cycle degree in one of the following classes or other suitable qualification obtained abroad:
   - ex Italian Ministerial Decree no. 270/04: 1st cycle degree L-43 Technologies for the Preservation and Restoration of the Cultural Heritage;
   - Italian Ministerial Decree no. 509/99: 1st cycle degree 41 Technologies for the Preservation and Restoration of the Cultural Heritage;

- Previous degree programme system: University Diploma in Diagnostic technician for the restoration and conservation of the cultural heritage;

- Previous four-year degree programme system:

   - BSc in Art Conservation
   - BSc in Art Restoration (of Cultural heritage);
   - BSc in Heritage/Historic preservation;
   - BASc/BAS - Bachelor of Applied Science;
   - BSc in Science

In line with the agreement signed by Alma Mater Studiorum – University of Bologna and the Art Institute of Nanjing (China), Chinese students from the Institute will be admitted to the Second Cycle Programme only after having completed the preparatory study year run jointly with the Second Cycle Degree Programme in Science for the conservation-restoration of cultural heritage.

Admission to the master's degree programme is also subject to the assessment of students' personal knowledge which will take place according to the procedure defined in the paragraph "assessment of personal knowledge".

English language knowledge at B2 level (European classification) is required for the admission to the Degree programme. If no certification is held, language skills will be assessed by the Admission Board.

- Assessment of personal knowledge

The assessment of personal competencies and skills is carried out by an Admission Board through the analysis of the candidate's curriculum. An interview may follow the assessment of the curriculum, the methods, criteria and procedures of which are resolved by the Degree Programme Board and published on the University Portal.

If the above requirements are not met, admission to the 2nd Cycle Degree Programme is subject to a preliminary assessment by a Board; candidates will be interviewed to check their possession of the required competencies and skills.

The Board, appointed by the Degree Programme Board, will establish a calendar for the interviews to be held between September and December, which will be published on the University Portal.

Candidates will be allowed to enroll to the Second Cycle Degree Programme, whether the Admission Board considers their knowledge and competences adequate.

ART. 2 INDIVIDUAL STUDY PLANS

Students will be allowed to present individual study plans according to the methods, deadlines and criteria published on Unibo web site. The individual study plans, approved by the Degree Programme Board, must be compliant with the teaching regulations and the guidelines defined by the competent bodies.

If students choose teaching activities that are activated in degree programmes with restricted access, the choice must also be authorized by the concerned Degree programme boards, based on criteria previously defined.

ART. 3 IMPLEMENTATION OF LEARNING ACTIVITIES AND TYPES OF TEACHING ACTIVITIES

The enclosed teaching plan indicates all the learning activities and their division into hours of classroom teaching, practical exercises, or internship, as well as the type of teaching methods.

Any further information will be published annually on the University website.

ART. 4 ATTENDANCE AND PREPARATORY ACTIVITIES

Compulsory attendance of teaching activities is indicated in the attached teaching plan, together with any preparatory activities involved in the individual learning activities.

The methods of compulsory attendance and any verification thereof are laid down annually in the study programme during the presentation of the teaching plan and are notified to the students prior to the start of the programme on the University website.

ART. 5 FLEXIBLE STUDY PLAN

Students can opt for flexible study plans, which allows to complete the 2nd cycle degree course in a longer or lesser time with respect to the normal number of years, according to the rules defined within the University Teaching Regulation.

The teaching activities of the study program can be replaced, in case of forced deactivation, by other activities, in order to guarantee quality and sustainability of the educational courses on offer.

ART. 6 ASSESSMENT OF LEARNING ACTIVITIES

The attached teaching plan indicates all cases in which the learning activities end with an exam, marked with a score out of 30, or by a simple “pass” when the necessary competencies have been acquired. The assessment methods are laid down annually by the Degree Programme during the presentation of the teaching plan and notified to the students prior to start of the program on the University website.

ART. 7 ELECTIVE LEARNING ACTIVITIES

The Degree Programme Board considers all the learning activities defined by the Degree Programme Board and listed in the annexed Teaching Plan consistent with the teaching project.
If a student intends to attend one learning activity that is not included in the previewed list, she/he must submit a request to the Degree Programme Board within the deadlines and conditions published on UniBo web portal.

The Board shall verify the coherence of the request with the student's own study plan.

ART. 8 CRITERIA FOR THE RECOGNITION OF CREDITS ACQUIRED IN DEGREE PROGRAMS IN THE SAME CLASS

The acquired university credits are recognized from a half up to the number of credits indicated for the same subject group laid down in the degree program teaching regulations, in compliance with the relative subject area and the type of learning activities.

If, after having evaluated and accepted the credits according to the provisions of this regulation, there remain unused residual credits, the Degree Programme Board may also accept their validity, after assessing each specific case on the basis of teaching and cultural affinities.

Recognition refers to course units delivered or learning activities undertaken in English.

ART. 9 CRITERIA FOR THE RECOGNITION OF CREDITS ACQUIRED WITHIN DEGREE PROGRAMS IN DIFFERENT CLASSES, FROM TELEMATIC UNIVERSITIES OR INTERNATIONAL DEGREE PROGRAMS

The acquired credits are recognized by the Degree Programme Board according to the following criteria:

- analysis of the course contents

- assessment of the coherence of the scientific-disciplinary fields and the contents of the learning activities in which the student has acquired the credits with the specific learning outcomes of the study programme and the individual learning activities to be recognized, in any case pursuing the aim of promoting student mobility.

The credits are recognized up to the maximum number of university credits provided for the program, as laid down in the degree program teaching regulations.

If, after having recognized the credits according to the provisions of this regulation, there are unused residual credits, the Degree Programme Board may recognize them by assessing the specific case in coherence with the teaching and cultural affinities.

Only teaching or training activities held in English may be recognized.

ART. 10 CRITERIA FOR THE RECOGNITION OF EXTRA-UNIVERSITY COMPETENCIES AND SKILLS

Competencies acquired outside the university may be recognized in the following cases:

- professional knowledge and skills certified under the terms of the applicable laws;

- competences and skills acquired in post-graduate learning activities run or planned by the University.

The request for recognition shall be assessed by the Degree Programme Board considering the indications of the academic bodies and the maximum number of recognizable credits laid down in the study program Teaching Regulations.

This recognition is subject to the activities being coherent with the specific learning outcomes of the study program and the learning activities which are recognized, also in consideration of the contents and duration in hours of the implemented activity.

Art. 11 INTERNSHIP

At the request of the student, the Degree Program may, following the procedures laid down in the University Regulations concerning internships and international mobility programmes, authorize an internship for the purposes of preparing the dissertation or in any case linked to a project aiming to develop learning and academic skills.

These learning experiences shall not exceed 12 months and shall be completed by the date of graduation; learning credits may be awarded for these activities:

- included in the quota for the final examination;

- for the internship activities laid down in the course structure diagram;

- for elective activities counting towards the internship;

- for additional activities if the number of credits exceeds the one required for graduation.

ART. 12 FINAL EXAMINATION

- **Final examination characteristics**

The final examination consists in the public discussion, in front of a Final Examination Board, of a thesis written in English and in the discussion of the related experimental work on a specific subject coherent with the master's degree programme learning outcomes, under the supervision of a lecturer.
The dissertation shall demonstrate critical abilities and communication skills and provide elements of originality.

- **Final examination criteria**

The Board must ascertain the experience acquired by students and the activities carried on in a research laboratory or equivalent institutions.

The final examination also evaluates the student's ability to design research projects, as well as describe and discuss clearly and autonomously the results obtained in the research project.

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The Faculty- Student Joint Committee gave a favorable opinion on the consistency of the credits assigned to each teaching activity and its learning outcomes pursuant to Art. 12, par. 3, of Ministerial Decree 270/04.

Anno Accademico **2024/2025**
Scuola **Scienze**
Classe **LM-11-CONSERVAZIONE E RESTAURO DEI BENI CULTURALI**
Corso **8537-SCIENCE FOR THE CONSERVATION - RESTORATION OF CULTURAL HERITAGE**

Primo Anno di Corso

Gruppo: Compulsory academic activities

TAF: **Ambito:**

Cfu min: **Cfu max:**
Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
8537 000 000 87588 - 0 - ADVANCED MATERIALS FOR CULTURAL HERITAGE		CHIM/12		6	30/0/12/0	No	Voto
Ambito: 252 - Scienze e tecnologie per la conservazione e il restauro			B				
Obiettivi: At the end of the course, the student will acquire knowledge on new materials employed in cultural heritage for conservation and restoration (consolidants, protectives, cleaning agents). In addition, the student will acquire knowledge concerning analytical approach for the material characterization as well as for their assessment in conservation practices.							
Obiettivi inglese: At the end of the course, the student will acquire knowledge on new materials employed in cultural heritage for conservation and restoration (consolidants, protectives, cleaning agents). In addition, the student will acquire knowledge concerning analytical approach for the material characterization as well as for their assessment in conservation practices.							
8537 000 000 69859 - 0 - AIR POLLUTION CHEMISTRY	CON	CHIM/12		6	36/0/0/0	No	Voto
Ambito: 252 - Scienze e tecnologie per la conservazione e il restauro			B				
Obiettivi: At the end of the course the student will acquire the basic knowledge of atmospheric chemical interactions on cultural properties resulting from past and present airborne pollution; connections between atmospheric composition, its historical evolution into a polluted environment as well as temporal trends will be discussed. Special focus will be given to the main gaseous pollutants and to ambient particulate matter as well as to their physico-chemical characterization in indoor and outdoor conditions. Gas-to particle reactions, oxidation processes in the atmosphere and their influence on the surfaces exposed will be described.							
Obiettivi inglese: At the end of the course the student will acquire the basic knowledge of atmospheric chemical interactions on cultural properties resulting from past and present airborne pollution; connections between atmospheric composition, its historical evolution into a polluted environment as well as temporal trends will be discussed. Special focus will be given to the main gaseous pollutants and to ambient particulate matter as well as to their physico-chemical characterization in indoor and outdoor conditions. Gas-to particle reactions, oxidation processes in the atmosphere and their influence on the surfaces exposed will be described.							

8537 000 000 37478 - 0 - ANALYTICAL CHEMISTRY OF ORGANIC MATERIALS	CON	CHIM/01	6	30/0/12/0	No	Voto

Ambito: 252 - Scienze e tecnologie per la conservazione e il restauro B

Obiettivi: At the end of the course the student will acquire knowledge on analytical techniques based on chromatography and mass spectrometry for the characterization of organic materials in cultural heritage, including sample pre-treatment procedures and critical aspects of data interpretation. At the end of lessons and informatic laboratory concerning data processing, the student knows how to choose and apply the most appropriate method for performing the statistical analysis.

Obiettivi inglese: At the end of the course the student will acquire knowledge on analytical techniques based on chromatography and mass spectrometry for the characterization of organic materials in cultural heritage, including sample pre-treatment procedures and critical aspects of data interpretation. At the end of lessons and informatic laboratory concerning data processing, the student knows how to choose and apply the most appropriate method for performing the statistical analysis.

8537 000 000 99567 - 0 - BIOLOGY FOR BIOARCHAEOLOGICAL MATERIALS AND CULTURAL HERITAGE (10 CFU)		BIO/08	10	36/0/42/0	No	Voto

Ambito: 1183 - Discipline delle scienze della terra e della natura B

Obiettivi: Module 1: The course aims to provide the knowledge and technical-scientific skills necessary for 3D data acquisition and reconstruction of human skeleton and mummified remains retrieved from archaeological contexts, in order to create 3D digital models useful for further specific analysis, 3D printing, enhancement and exhibition. At the end of the course, students will learn to use software for post-processing surface data and optimizing digital models for 3D printing, and they will learn principles for the digital reconstruction of osteoarchaeological materials.

Module 2: The course aims to provide the scientific skills to understand the radiocarbon ‘clock’ (14C) and the expertise to interpret and build chronologies of archaeological sites, which are objects of our cultural heritage. At the end of the course, the students will have acquired basic knowledge of accurate calibration of the radiocarbon time scale (IntCal), reliable extraction of collagen from prehistoric bones and accurate AMS radiocarbon results. Moreover, they will be able to contextualize the series of events in an archeological site using the Bayesian Model in the OxCal program.

Obiettivi inglese: Module 1: The course aims to provide the knowledge and technical-scientific skills necessary for 3D data acquisition and reconstruction of human skeleton and mummified remains retrieved from archaeological contexts, in order to create 3D digital models useful for further specific analysis, 3D printing, enhancement and exhibition. At the end of the course, students will learn to use software for post-processing surface data and optimizing digital models for 3D printing, and they will learn principles for the digital reconstruction of osteoarchaeological materials.

Module 2: The course aims to provide the scientific skills to understand the radiocarbon ‘clock’ (14C) and the expertise to interpret and build chronologies of archaeological sites, which are objects of our cultural heritage. At the end of the course, the students will have acquired basic knowledge of accurate calibration of the radiocarbon time scale (IntCal), reliable extraction of collagen from prehistoric bones and accurate AMS radiocarbon results. Moreover, they will be able to contextualize the series of events in an archeological site using the Bayesian Model in the OxCal program.

8537 000 000 90842 - 0 - CHEMISTRY FOR RESTORATION (8 CFU)		CHIM/12	8	36/0/24/0	No	Voto

Ambito: 252 - Scienze e tecnologie per la conservazione e il restauro B

Obiettivi: At the end of the course the student will be acknowledged about the chemical constitution and degradation behaviors of different heritage and restoration materials such as paintings (pigments, binding media, varnishes), metal/alloys and restoration materials (consolidants, fillers, protective coatings).

Obiettivi inglese: At the end of the course the student will be acknowledged about the chemical constitution and degradation behaviors of different heritage and restoration materials such as paintings (pigments, binding media, varnishes), metal/alloys and restoration materials (consolidants, fillers, protective coatings).

8537 000 000 99568 - 0 - ENVIRONMENTAL IMPACT ON MATERIALS, DETERIORATION AND AGEING (9 CFU)		FIS/07	9	42/0/24/0	No	Voto

Ambito: 1144 - Attivita' formative affini o integrative C

Obiettivi: At the end of the course the student will acquire:
- basic information on the environmental risk to cultural property caused by physical, chemical, biological and natural factors;
- basic information about environmental impact on the constituent materials in works of art;
- methodologies for assessing the microclimate in indoor and outdoor environment for a sustainable protection of cultural artefacts and providing criteria and methodologies for assessing the environmental risk and vulnerability of cultural heritage at local, regional and national scale, including the impact of climate change;
- criteria and methods to plan strategies for preventive conservation and to present examples of application to museums, archives and library.

Obiettivi inglese: At the end of the course the student will acquire:
- basic information on the environmental risk to cultural property caused by physical, chemical, biological and natural factors;
- basic information about environmental impact on the constituent materials in works of art;
- methodologies for assessing the microclimate in indoor and outdoor environment for a sustainable protection of cultural artefacts and providing criteria and methodologies for assessing the environmental risk and vulnerability of cultural heritage at local, regional and national scale, including the impact of climate change;
- criteria and methods to plan strategies for preventive conservation and to present examples of application to museums, archives and library.

8537 000 000 99564 - 0 - PHYSICAL METHODS OF EXAMINING CULTURAL PROPERTY (7 CFU)	FIS/07	7	30/0/24/0	No	Voto

Ambito: 1144 - Attivita' formative affini o integrative C

Obiettivi: At the end of the course the student will acquire:
- basic knowledge of X-ray Digital Radiography and 3D Computed Tomography applied to Cultural Heritage
- basic knowledge of Ion Beam Analytical (IBA) techniques, in particular PIXE (Particle Induced X-ray Emission), PIGE (Particle Induced Gamma-ray Emission) and RBS (Rutherford Backscattering Spectrometry
- basic knowledge of Nuclear Magnetic Resonance necessary to understand and correctly apply NMR techniques (Relaxometry, Diffusometry, Profiling and MRI) to the diagnostics of porous materials of interest to Cultural Heritage, with particular attention to portable NMR devices for in situ measurements.

Obiettivi inglese: At the end of the course the student will acquire:
- basic knowledge of X-ray Digital Radiography and 3D Computed Tomography applied to Cultural Heritage
- basic knowledge of Ion Beam Analytical (IBA) techniques, in particular PIXE (Particle Induced X-ray Emission), PIGE (Particle Induced Gamma-ray Emission) and RBS (Rutherford Backscattering Spectrometry
- basic knowledge of Nuclear Magnetic Resonance necessary to understand and correctly apply NMR techniques (Relaxometry, Diffusometry, Profiling and MRI) to the diagnostics of porous materials of interest to Cultural Heritage, with particular attention to portable NMR devices for in situ measurements.

8537 000 000 99570 - 0 - STONE MATERIALS CHARACTERIZATION	GEO/06	8	36/0/24/0	No	Voto

Ambito: 1183 - Discipline delle scienze della terra e della natura B

Obiettivi: At the end of the course the student will acquire knowledge of the main types of natural stones of ancient and modern employment. The student will be able to: -recognize the most common minerals and their physical properties; -identify and classify the most important rock types employed in historical and modern buildings; -be acquainted with main pottery classes and artificial stones (bricks, mortar); -define the mineralogical and geochemical composition and deterioration products of ceramic and stone materials; -be acquainted with petrographic methods used for the characterization of stone materials.

Obiettivi inglese: At the end of the course the student will acquire knowledge of the main types of natural stones of ancient and modern employment. The student will be able to: -recognize the most common minerals and their physical properties; -identify and classify the most important rock types employed in historical and modern buildings; -be acquainted with main pottery classes and artificial stones (bricks, mortar); -define the mineralogical and geochemical composition and deterioration products of ceramic and stone materials; -be acquainted with petrographic methods used for the characterization of stone materials.

Secondo Anno di Corso

Gruppo: Compulsory academic activities

TAF: Ambito:

Cfu min: Cfu max:

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
8537 000 000 B2142 - 0 - CHEMOMETRICS FOR CULTURAL HERITAGE		CHIM/12		6	36/0/0/0	No	Voto

Ambito: 252 - Scienze e tecnologie per la conservazione e il restauro B

Obiettivi: At the end of the course, the student will acquire basic knowledge on chemometric methods for the analysis of data obtained from analytical investigations of cultural heritage. In particular, the student will acquire knowledge on multivariate methods for the evaluation and management of single point analysis and hyperspectral imaging analysis (HSI) data matrices. The student will also acquire new skills on the use of software for computation and will practice on real case studies.

Obiettivi inglese: At the end of the course, the student will acquire basic knowledge on chemometric methods for the analysis of data obtained from analytical investigations of cultural heritage. In particular, the student will acquire knowledge on multivariate methods for the evaluation and management of single point analysis and hyperspectral imaging analysis (HSI) data matrices. The student will also acquire new skills on the use of software for computation and will practice on real case studies.

8537 000 000 B2143 - 0 - PROCESSES IN CONSERVATION L-ART/04 6 30/0/12/0 No Voto

Ambito: 183 - Formazione interdisciplinare B

Obiettivi: The course is aimed at illustrating the role played by scientific examinations for the investigation of different works of art. The course follows an “answer to question” structure by considering the most frequent questions conservator-restorers are used to ask to conservation scientists along the overall duration of a conservation-restoration project. A broad range of questions are answered and are strictly related with key conservation issues such as material constitution, execution technique, state of conservation and treatments’ evaluation.

To this purpose the possibility offered by the application of both destructive and/or non-destructive techniques to each specific question is presented, discussed and explained by making reference to real case studies. As the students will realize many can be the answers given to a specific question and they are strictly connected with the usefulness, availability, destructiveness/non-destructiveness of each scientific method.

Obiettivi inglese: The course is aimed at illustrating the role played by scientific examinations for the investigation of different works of art. The course follows an “answer to question” structure by considering the most frequent questions conservator-restorers are used to ask to conservation scientists along the overall duration of a conservation-restoration project. A broad range of questions are answered and are strictly related with key conservation issues such as material constitution, execution technique, state of conservation and treatments’ evaluation.

To this purpose the possibility offered by the application of both destructive and/or non-destructive techniques to each specific question is presented, discussed and explained by making reference to real case studies. As the students will realize many can be the answers given to a specific question and they are strictly connected with the usefulness, availability, destructiveness/non-destructiveness of each scientific method.

8537 000 000 37485 - 0 - CHEMICAL METHODS OF EXAMINING CULTURAL PROPERTY CON CHIM/12 6 30/0/12/0 No Voto

Ambito: 252 - Scienze e tecnologie per la conservazione e il restauro B

Obiettivi: At the end of the course the student will acquire knowledge concerning the non destructive and microdestructive methods for the analyses of cultural heritage materials. The student will be able to: - be acquainted with the non destructive and micro destructive methods used for the characterization of pigments, binding media and degradation products on different cultural heritage supports; - be acquainted with the most advanced sample preparation techniques used for the preparation of cross sections; be able to define a suitable analytical protocol for the investigation of artistic materials.

Obiettivi inglese: At the end of the course the student will acquire knowledge concerning the non destructive and microdestructive methods for the analyses of cultural heritage materials. The student will be able to: - be acquainted with the non destructive and micro destructive methods used for the characterization of pigments, binding media and degradation products on different cultural heritage supports; - be acquainted with the most advanced sample preparation techniques used for the preparation of cross sections; be able to define a suitable analytical protocol for the investigation of artistic materials.

8537 000 000 60750 - 0 - FINAL EXAMINATION 12 0/0/0/0 No

Ambito: 1018 - Per la prova finale E

Obiettivi: At the end of the final examination, the student will be able to work autonomously, present and discuss profitably and clearly the results of an original experimental or theoretical research project developed and implemented in a specific science for conservation topic.

Obiettivi inglese: At the end of the final examination, the student will be able to work autonomously, present and discuss profitably and clearly the results of an original experimental or theoretical research project developed and implemented in a specific science for conservation topic.

8537 000 000 37494 - 0 - PROJECT 3 6/0/69/0 No Giudizio

Ambito: 0000 - Nessun Ambito F

Obiettivi: At the end of the activity the student will be able to develop a research study in the field of science for conservation-restoration of cultural heritage to be further developed and implemented in view of the final examination. In particular the student will be able to perform a bibliographical research, put the research in a wider cultural context and propose a plan of actions needed for the implementation of his experimental research thesis.

Obiettivi inglese: At the end of the activity the student will be able to develop a research study in the field of science for conservation-restoration of cultural heritage to be further developed and implemented in view of the final examination. In particular the student will be able to perform a bibliographical research, put the research in a wider cultural context and propose a plan of actions needed for the implementation of his experimental research thesis.

Gruppo: Free-choice academic activities

TAF: D Ambito: 1008 - A scelta dello studente

Cfu min: 9 Cfu max: 9 Num. Esami: 1 Num. Idoneità: 0
La Scuola garantisce che, ai fini del rispetto del limite massimo di 12 esami/5 idoneità i CFU a scelta saranno acquisibili con 1 esami e 0 idoneità

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.

Gruppo: Preparation for the Final examination

TAF: E Ambito: 1018 - Per la prova finale

Cfu min: 18 Cfu max: 18
Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
8537 000 000 86282 - 0 - PREPARATION ABROAD FOR THE FINAL EXAMINATION OR INTERNSHIP ABROAD FOR THE PREPARATION FOR THE FINAL EXAMINATION			E	18	0/0/450/0	No	Giudizio

Ambito: 1018 - Per la prova finale

Obiettivi: At the end of the activity, the student has acquired data and/or information for the final examination in the field of science for conservation-restoration of cutural heritage. The activities will be performed in a private or public institution abroad and will be aimed at collecting either information or experimental data (developing analytical protocols or testing consolidated scientific techniques for the study of artistic-historical objects).

Obiettivi inglese: At the end of the activity, the student has acquired data and/or information for the final examination in the field of science for conservation-restoration of cutural heritage. The activities will be performed in a private or public institution abroad and will be aimed at collecting either information or experimental data (developing analytical protocols or testing consolidated scientific techniques for the study of artistic-historical objects).

8537 000 000 86283 - 0 - PREPARATION FOR THE FINAL EXAMINATION OR INTERNSHIP FOR THE PREPARATION FOR THE FINAL EXAMINATION			E	18	0/0/450/0	No	Giudizio

Ambito: 1018 - Per la prova finale

Obiettivi: At the end of the activity, the student has acquired data and/or information for the final examination in the field of science for conservation-restoration of cutural heritage. The activities will be performed in a private or public institution in Italy and will be aimed at collecting either information or experimental data (developing analytical protocols or testing consolidated scientific techniques for the study of artistic-historical objects).

Obiettivi inglese: At the end of the activity, the student has acquired data and/or information for the final examination in the field of science for conservation-restoration of cutural heritage. The activities will be performed in a private or public institution in Italy and will be aimed at collecting either information or experimental data (developing analytical protocols or testing consolidated scientific techniques for the study of artistic-historical objects).

Legenda:

CFU: crediti formativi universitari
TAF: tipologia attività formativa (A-di base; B-caratterizzanti; C-affini o integrative; F-ulteriori attività formative; D-a scelta autonoma dello studente; S- stages e tirocini presso imprese, enti pubblici o privati, ordini professionali; E-per la prova finale)
SSD: settore scientifico disciplinare
F/E/L/N: indica le ore Frontali/Esercitazioni/Laboratori/Ore di esercitazione e/o laboratorio tenute da non docenti
Freq.: segnala l'esistenza di un obbligo di frequenza
Ver.: indica la modalità di verifica del profitto finale
TIP.: indica la tipologia delle forme didattiche. Queste possono essere CON: convenzionali, E-L: in e-learning, MIX: miste, C/E: convenzionali e/o e-learning. Il corso di studio può definire annualmente una delle modalità.