



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

REGOLAMENTO DIDATTICO DEL CORSO

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

Sede di Ravenna

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Qualora, unicamente a scopo di sintesi, nel presente regolamento sia usata la sola forma maschile, questa è da intendersi riferita in maniera inclusiva a tutte le persone che operano nell'ambito della comunità stessa.

ART. 1 REQUISITI PER L'ACCESSO AL CORSO

a. 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 o di altro titolo di studio conseguito all'estero, riconosciuto idoneo.

Occorre, altresì, il possesso dei seguenti requisiti curriculari:

a. Avere conseguito la laurea in una delle seguenti classi:

- L-13 Classe delle lauree in SCIENZE BIOLOGICHE
- L-27 Classe delle lauree in SCIENZE E TECNOLOGIE CHIMICHE
- L-30 Classe delle lauree in SCIENZE E TECNOLOGIE FISICHE
- L-32 Classe delle lauree in SCIENZE E TECNOLOGIE PER L'AMBIENTE E LA NATURA
- L-34 Classe delle lauree in SCIENZE GEOLOGICHE
- L-43 Classe delle lauree in DIAGNOSTICA PER LA CONSERVAZIONE DEI BENI CULTURALI
- L-Sc. Mat. Classe delle lauree in SCIENZA DEI MATERIALI
- LMR/02 – Laurea magistrale a ciclo unico in CONSERVAZIONE E RESTAURO DEI BENI CULTURALI

Oppure

b. Essere in possesso di una laurea in una delle seguenti classi:

- L-1 Classe delle lauree in BENI CULTURALI
- L-7 Classe delle lauree in INGEGNERIA CIVILE E AMBIENTALE
- L-9 Classe delle lauree in INGEGNERIA INDUSTRIALE
- L-17 Classe delle lauree in SCIENZE DELL'ARCHITETTURA
- L-23 Classe delle lauree in SCIENZE E TECNICHE DELL'EDILIZIA

e avere acquisito almeno 18 CFU in Settori Scientifico-Disciplinari delle aree CHIM, FIS, BIO, GEO, e/o nei seguenti SSD: ING-IND/11, ING-IND/21, ING-IND/22, ING-IND/23, ING-IND/27, L-ART/04, ICAR-19, L-ANT/10, M-STO/05

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 del Quadro comune europeo di riferimento per la conoscenza delle lingue. La verifica è effettuata secondo le modalità definite nel punto Modalità di ammissione.

b. Modalità di ammissione

La verifica dell'adeguatezza della personale preparazione verrà effettuata da un'apposita Commissione nominata dal Consiglio di Corso di Studio. La Commissione valuterà il merito accademico attraverso il voto di laurea del candidato e attraverso la valutazione del curriculum vitae et studiorum.

In particolare, la verifica della personale preparazione si ritiene assolta se il laureato ha ottenuto un voto di laurea uguale o superiore a 100/110. Nel caso in cui il candidato non raggiunga il voto minimo di laurea richiesto o debba ancora conseguire il titolo di laurea, la Commissione verifica l'adeguatezza della personale preparazione in relazione ad

altri elementi del curriculum vitae (e.g. voti conseguiti in singoli insegnamenti; conoscenze disciplinari o esperienze professionali specifiche) e si riserva la facoltà di richiedere il sostenimento di un colloquio.

La conoscenza della lingua inglese di livello B2 viene accertata tramite il possesso di titoli e/o condizioni particolari, ovvero:

- Certificazione linguistica di livello almeno pari a B2;
- Titolo di laurea ottenuto in lingua inglese;
- Idoneità linguistica curriculare in altri cicli;
- Madrelingua.

Nel caso di mancato superamento della verifica è preclusa l'iscrizione al corso.

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 didattico.

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 delle attività formative e la relativa suddivisione in ore di didattica frontale, di esercitazioni pratiche o di tirocinio, nonché la tipologia delle forme didattiche.

Eventuali ulteriori informazioni in merito saranno rese note annualmente sul Portale di Ateneo.

ART. 4 FREQUENZA E PROPEDEUTICITÀ

L'obbligo di frequenza alle attività didattiche è 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.

Le propedeuticità delle singole attività formative sono indicate sul 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 Studenti.

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 Consiglio di 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

Lo studente può scegliere tra le attività formative attivate in Ateneo purché coerenti con il percorso formativo.

Il corso di studio considera coerenti con il progetto formativo le attività formative individuate annualmente 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 sopraindicati 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

Il riconoscimento dei crediti acquisiti nei precedenti studi universitari è determinato, su istanza dello studente, dal Consiglio di corso di studio.

I crediti formativi universitari acquisiti sono riconosciuti per non meno della metà e fino a concorrenza dei crediti dello stesso settore scientifico disciplinare previsti dall'ordinamento didattico del corso di studio.

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.

ART. 9 CRITERI DI RICONOSCIMENTO DEI CREDITI ACQUISITI IN CORSI DI STUDIO DI DIVERSA CLASSE, PRESSO UNIVERSITÀ TELEMATICHE E IN UNIVERSITÀ ESTERE

Il riconoscimento dei crediti acquisiti nei precedenti studi universitari è determinato, su istanza dello studente, dal Consiglio di corso di studio.

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 studio.

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.

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 del numero massimo di crediti riconoscibili fissato nell'ordinamento didattico del corso.

Il riconoscimento potrà avvenire qualora l'attività sia ritenuta 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 un tirocinio curriculare finalizzato alla preparazione della prova finale/tesi di laurea magistrale, da svolgersi secondo le procedure stabilite dal Regolamento generale tirocini di Ateneo per lo svolgimento dei tirocini o dai programmi internazionali di mobilità.

Tali esperienze formative potranno essere svolte prevedendo l'attribuzione di crediti formativi nell'ambito di quelli attribuiti alla prova finale.

ART. 12 PROVA FINALE

a. Caratteristiche della prova finale

La prova finale per il conseguimento della laurea magistrale consiste nella redazione e nella discussione pubblica di una tesi in lingua inglese, scritta ed elaborata in modo originale dallo studente, sotto la guida di un relatore, su un argomento coerente con gli obiettivi del corso di studio, che dimostri padronanza degli argomenti, chiarezza espositiva, capacità critica, attitudine a operare in modo autonomo e una capacità di comunicazione di buon livello.

La prova finale deve essere collegata a un progetto o a una attività di tirocinio, svolta in un laboratorio di ricerca o in un istituto equivalente in Italia o all'Estero.

b. Modalità di svolgimento della prova finale

La prova finale consiste nella discussione davanti ad una Commissione (composta da un massimo di cinque docenti appartenenti al corso di laurea magistrale) di una tesi di laurea, redatta in lingua inglese e sviluppata sulla base dell'esperienza acquisita dallo studente e delle attività svolte durante il periodo di tirocinio in un laboratorio di ricerca o in un istituto equivalente. L'esame orale finale valuterà anche la capacità degli studenti di ideare progetti e sfruttare i risultati finali in modo autonomo e la capacità dello studente di presentare chiaramente e discutere i propri risultati.

La valutazione della Commissione per la prova finale è espressa in centodecimali (con eventuale lode). La Commissione di Laurea può assegnare alla tesi un massimo di 8 punti che saranno aggiunti alla media finale conseguita dallo studente nel corso della sua carriera accademica. In caso di laurea entro il 2° anno dall'immatricolazione, può essere aggiunto 1 punto extra. Inoltre, per ogni esame superato con lode, il voto finale viene aumentato di 0,05 moltiplicato per il numero di crediti dell'esame. La prova si intende superata con una votazione minima di 66/110. Nel caso in cui lo studente raggiunga un punteggio finale di almeno 113/110, la Commissione può concedere la lode su decisione unanime.

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



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

TEACHING REGULATIONS OF THE MASTER DEGREE

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

Ravenna Campus

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ART. 1 ADMISSION REQUIREMENTS

a. Access requirements

Admission to the second cycle degree programme in Science for the Conservation-Restoration of Cultural Heritage, is subject to the possession of a Bachelor's degree or a three-year university diploma, or another recognized equivalent qualification obtained abroad.

Additionally, the following curricular requirements must be met:

a. Holding a degree in one of the following classes:

- L-13: Bachelor's degree in BIOLOGICAL SCIENCES
- L-27: Bachelor's degree in CHEMICAL SCIENCES AND TECHNOLOGIES
- L-30: Bachelor's degree in PHYSICAL SCIENCES AND TECHNOLOGIES
- L-32: Bachelor's degree in SCIENCES AND TECHNOLOGIES FOR THE ENVIRONMENT AND NATURE
- L-34: Bachelor's degree in GEOLOGICAL SCIENCES
- L-43: Bachelor's degree in DIAGNOSTICS FOR THE CONSERVATION OF CULTURAL HERITAGE
- L-Sc. Mat: Bachelor's degree in MATERIALS SCIENCE
- LMR/02 – Single cycle degree programme in CONSERVATION AND RESTORATION OF CULTURAL HERITAGE

Or b. Hold a degree in one of the following classes:

- L-1: Bachelor's degree in CULTURAL HERITAGE
- L-7: Bachelor's degree in CIVIL AND ENVIRONMENTAL ENGINEERING
- L-9: Bachelor's degree in INDUSTRIAL ENGINEERING
- L-17: Bachelor's degree in ARCHITECTURE SCIENCES
- L-23: Bachelor's degree in SCIENCES AND TECHNIQUES OF BUILDING

and have acquired at least 18 CFU (university credits) in the Scientific-Disciplinary Sectors (SSD) of the following areas: CHIM, FIS, BIO, GEO, and/or the following SSDs: ING-IND/11, ING-IND/21, ING-IND/22, ING-IND/23, ING-IND/27, L-ART/04, ICAR-19, L-ANT/10, M-STO/05

Admission to the Master's degree course is also subject to passing an assessment of the candidates' personal knowledge and skills, which will be carried out according to the methods defined in the Admission Procedures section.

Additionally, knowledge of English at a B2 level according to the Common European Framework of Reference for Languages (CEFR) is required. The assessment will be carried out according to the methods defined in the Admission Procedures section.

b. Admission modality

The assessment of the adequacy of the candidate's academic preparation will be carried out by a special Committee appointed by the Degree Programme Board. The Committee will evaluate academic merit based on the candidate's graduation grade and the evaluation of the curriculum vitae et studiorum.

In particular, the assessment of personal preparation is considered fulfilled if the graduate has obtained a graduation grade equal to or greater than 100/110. If the candidate does not meet the

minimum required graduation grade or has not completed their degree yet, the Committee will assess the adequacy of the candidate's preparation based on other elements of the curriculum vitae (e.g., grades obtained in individual courses, subject knowledge, or specific professional experiences) and reserves the right to request an interview.

Knowledge of English at a B2 level is verified through the possession of specific qualifications and/or conditions, including:

- A language certificate at least at the B2 level;
- A degree obtained in English;
- Language proficiency obtained in other academic cycles;
- Native speaker.

In case of failure to pass the verification, enrollment in the programme is not allowed.

ART. 2 INDIVIDUAL STUDY PLANS

Students will be allowed to present individual study plans according to the methods, deadlines and criteria published on the University website.

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 learning 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 learning 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.

The prerequisites for each learning activity are published on the University Portal.

ART. 5 FLEXIBLE STUDY PLAN

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

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 Board 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 student can choose among the learning activities activated at the University as long as they are consistent with the learning path.

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 recognition of credits acquired in previous university studies is determined, at the student's request, by the Degree Programme Board.

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.

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

The recognition of credits acquired in previous university studies is determined, at the student's request, by the Degree Programme Board.

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.

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-secondary 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 degree programme 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 CURRICULAR INTERNSHIP

The Degree program includes a curricular internship for the purposes of preparing the final dissertation, to be carried out according to the procedures established by the University Internship Regulations or by international mobility programs.

These training experiences may be carried out with the assignment of credits within those granted for the final dissertation.

ART. 12 FINAL EXAMINATION

a. Final examination characteristics

The final examination consists of writing and publicly defending a thesis in English, which must be original and developed by the student under the guidance of a supervisor. The topic of the thesis must be consistent with the objectives of the study program and should demonstrate mastery of the subject matter, clarity in presentation, critical thinking, the ability to work independently, and a good level of communication skills.

The final dissertation must be related to a project or an internship activity carried out in a research laboratory or an equivalent institution, either in Italy or abroad.

b. Final Examination procedures

The final examination consists of a discussion in front of a Commission (composed of a maximum of five professors from the Master's degree program) of a thesis, written in English and developed based on the experience acquired by the student and the activities carried out during the internship period in a research laboratory or an equivalent institution. The final oral exam will also assess the students' ability to design projects and autonomously apply the final results, as well as the student's ability to clearly present and discuss their findings.

The evaluation by the Commission for the final exam is expressed in hundredths (with possible honors). The Graduation Committee can award up to 8 points for the thesis, which will be added to the final average achieved by the student during their academic career. In case of graduation within the 2nd year from enrollment, an additional 1 point may be added. Furthermore, for each exam passed with honors, the final grade will be increased by 0.05 multiplied by the number of credits for the exam. The exam is considered passed with a minimum score of 66/110. If the student reaches a final score of at least 113/110, the Commission may grant honors with unanimous decision.

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 and subsequent amendments.

Anno Accademico 2025/2026
Scuola Scienze
Classe LM-11 R-CONSERVAZIONE E RESTAURO DEI BENI CULTURALI
Corso 6684-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.
6684 000 000 87588 - 0 - ADVANCED MATERIALS FOR CULTURAL HERITAGE	CON	CHIM/12		7	36/0/12/0	No	Voto
Ambito: 2305 - Scienze e tecnologie per la diagnostica e la conservazione dei beni culturali 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.							
6684 000 000 69859 - 0 - AIR POLLUTION CHEMISTRY	CON	CHIM/12		6	36/0/0/0	No	Voto
Ambito: 2305 - Scienze e tecnologie per la diagnostica e la conservazione dei beni culturali 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.							

6684 000 000 37478 - 0 - ANALYTICAL CHEMISTRY OF ORGANIC MATERIALS	CON	CHIM/01	6	30/12/0/0	No	Voto
Ambito: 2305 - Scienze e tecnologie per la diagnostica e la conservazione dei beni culturali 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.						
6684 000 000 99567 - 0 - BIOLOGY FOR BIOARCHAEOLOGICAL MATERIALS AND CULTURAL HERITAGE (10 CFU)	CON	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.						
6684 000 000 81836 - 0 - CHEMISTRY FOR RESTORATION	CON	CHIM/12	7	30/0/24/0	No	Voto
Ambito: 2305 - Scienze e tecnologie per la diagnostica e la conservazione dei beni culturali 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).						
6684 000 000 99568 - 0 - ENVIRONMENTAL IMPACT ON MATERIALS, DETERIORATION AND AGEING (9 CFU)	CON	FIS/07	9	42/0/24/0	No	Voto
Ambito: 2019 - Attività 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.						

6684 000 000 99564 - 0 - PHYSICAL METHODS OF EXAMINING CULTURAL PROPERTY (7 CFU)	CON	FIS/07	7	30/0/24/0	No	Voto
Ambito: 2019 - Attività 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.						
6684 000 000 99570 - 0 - STONE MATERIALS CHARACTERIZATION	CON	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.
6684 000 000 B2142 - 0 - CHEMOMETRICS FOR CULTURAL HERITAGE	CON	CHIM/12		6	36/0/0/0	No	Voto
Ambito:2305 - Scienze e tecnologie per la diagnostica e la conservazione dei beni culturaliB 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.							

6684 000 000 B2143 - 0 - PROCESSES IN CONSERVATION	CON	L-ART/04	6	36/0/0/0	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.						
6684 000 000 37485 - 0 - CHEMICAL METHODS OF EXAMINING CULTURAL PROPERTY	CON	CHIM/12	6	30/0/12/0	No	Voto
Ambito: 2305 - Scienze e tecnologie per la diagnostica e la conservazione dei beni culturali 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.						
6684 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.						
6684 000 000 B9746 - 0 - PROGETTO TESI	CON		3	6/0/0/0	No	Voto
Ambito: 1007 - Ulteriori conoscenze linguistiche F Obiettivi: Alla fine dell'attività, lo studente sarà in grado di acquisire una conoscenza di base della lingua italiana, con particolare attenzione al lessico scientifico. In particolare, sarà in grado di comprendere testi scientifici in italiano e di produrre un breve documento contenente una ricerca bibliografica su un argomento scientifico. Obiettivi inglese: At the end of the activity the student will be able to achieve a basic knowledge of the Italian language, with particular attention to scientific terminology. In particular, the student will be able to understand scientific texts in Italian and to produce a short document containing a bibliographical research on a scientific subject.						

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
 Il Dipartimento 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.
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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.
6684 000 000 86282 - 0 - PREPARATION ABROAD FOR THE FINAL EXAMINATION OR INTERNSHIP ABROAD FOR THE PREPARATION FOR THE FINAL EXAMINATION				18	0/0/450/0	No	Giudizio
Ambito: 1018 - Per la prova finale	E						
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 cultural 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 cultural 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).							
6684 000 000 86283 - 0 - PREPARATION FOR THE FINAL EXAMINATION OR INTERNSHIP FOR THE PREPARATION FOR THE FINAL EXAMINATION				18	0/0/450/0	No	Giudizio
Ambito: 1018 - Per la prova finale	E						
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 cultural 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 cultural 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.