

Course	CFU / ECSD	HOURS		Year	Sem	Language	content	Notes
1 year 1 semester								
Introduction to scientific methods and principles: Concepts of earth sciences, mineralogy, petrology, physical-chemistry	6	14+16	GEO	1	1	English	Introduction to Earth Sciences, basics of mineralogy and petrology	To be selected by students having previous degrees in Archaeology, Art History, or other non-scientific disciplines
		21	CHIM			English	Fundamentals of chemistry and physical-chemistry	
Introduction to archaeology and art history: Concepts and methods	6	21	L-ANT	1	1	English	The course is aimed at students with no basic knowledge of archaeological disciplines and aims to provide an introductory framework a) on the historical development of the Mediterranean regions and continental Europe; b) the basic methods of archaeological research; c) on the characteristics and methods of study of the main contexts. Chronological and geographical development of the main civilizations and cultures that developed between Prehistory, the Classical age and the Middle Ages in the Mediterranean and European context. Methodologies of archaeological excavation, the methods of study of building materials and architecture, the analysis of finds and ancient artistic forms will be addressed in their many aspects.	To be selected by students having previous degrees in Scientific Disciplines
		21	L-ART			English	Introduction to the basic knowledge and terminology necessary to profitably approach the study of Western art history. The course is meant to be accessible to students with little or no previous experience, but also stimulating to students with more background knowledge. The course will be articulated in two units. Unit 1) Key-concepts: through the presentation of significant case studies belonging to Western Medieval art, students will get familiar with methodological tools and specific lexicon used by art historians. (2) Beyond the artist: origin and creation of a work of art. Patron's expectations and social status, context and use.	
Geomorphology of archaeological landscapes and sites	6	35+16	GEO	1	1	English	The students will learn about the main geomorphological processes of interest for geoarchaeological applications. They will become familiar with the geomorphological methods that are commonly applied to the investigation of archaeological sites and archaeological landscapes. They will get in touch with the state-of-the-art of the discipline through the discussion of relevant case studies. Main topics: the geomorphological processes of archaeological relevance; Quaternary stratigraphy, with specific focus on the Holocene and the relations with the main cultural phases; the description and classification of sediments and soils; the impacts of the geomorphological evolution of the physical landscape on the formation and preservation of the archaeological record; the classification and mapping of the physical landscapes in relation to the potential development of settlement networks of the past, and the conservation of the archaeological heritage; methods for the diachronic reconstruction of the landscape evolution; the use of geomorphological and geological maps for landscape geoarchaeological analysis; discussion of case studies.	
Integrated analysis of cultural heritage materials - Module 1	4	28	CHIM	1	1	English	Integrated laboratory analysis of CH materials: XRD, electron microscopy and point analyses, optical microscopy, XRF, vibrational spectroscopies, MS, chromatography.	module 1
Integrated analysis of cultural heritage materials - Module 2	4	28	GEO			English	Advanced imaging techniques, surface probes, ion beams, neutron beams, synchrotron radiation.	module 2
Materials properties, use and conservation 1 (choice among the 8 courses on materials (in green))	6	42		1	1	English		
Dating laboratory	4	32	GEO	1	1	English	Introduction to relative and absolute dating methods. Laboratory of 14C preparation.	
	30							
1 year 2 semester								
History and prehistory of anthropic landscape	6	21	L-ANT	1	2	English	Introduction to the study of the anthropic landscape in the Greco-Roman world, from the late Bronze to the Roman imperial period. The concepts of landscape in contemporary theory and ancient sources. The impact of human activities (agriculture, breeding, fishing, mining, transports, war) on the natural environment; the organisation of cityscapes as places of socio-political interaction and their relationship with the surrounding territories; cultural landscapes (sacred spaces, imaginaries of space in myth and fiction, the footprint of cultural contacts and hybridisation on human landscapes); ancient travelling and explorations; reuses of ancient landscape narratives in contemporary digital and public humanities research and popularization.	
Geoarchaeology and soil micromorphology	6	42	L-ANT	1	2	English	Interactions between sedimentary processes, soil formation and archaeological sites; anthropic sediments and site formation processes; post-depositional processes and site taphonomy; concepts and practicals in archaeological soil/sediment micromorphology	
Geophysics for cultural heritage and civil engineering	6	48	GEO	1	2	English	Field prospection and survey, architectural prospection and survey, geophysical methods and techniques.	Mutuato da "Geophysics for natural risks and resources" SCQ1098758
Materials properties, use and conservation 2 (choice among the 8 courses on materials (in green))	6	42		1	2	English		
Language requirements	3	75					Proficiency in Italian for foreign students / Advanced English for non-English speakers	
Field/laboratory work	3	48		1	2	English	Use of diagnostic instrumentation in the field and in the laboratory	
	30							
2 year 1 semester								
Materials properties, use and conservation 3 (choice among the 8 courses on materials (in green))	6	42		2	1	English		
Materials properties, use and conservation 4 (choice among the 8 courses on materials (in green))	6	42		2	1	English		
Historical buildings and sites: Constructional and static principles	6	28	ICAR	2	1	English	Construction techniques for walls, arches, vaults and horizontal diaphragms. Actions on structures and equilibrium conditions. Fundamentals of statics and statics of vertical (walls and pillars) and horizontal (beams, lintels and arches) elements. Main types of soils, foundations, and soil-structure interaction. Structural problems, main causes and damage. Earthquakes and seismic effects on sites and buildings. Practice for intervention	
		7	L-ANT			English	Introduction of construction principles and techniques which spread in ancient times to realize foundations, wall revetments, hydraulic structures and vaults, with a specific focus on the Greek and Roman period. Analysis of ancient anti-seismic methods.	
		7	L-ANT			English	Principles of Stratigraphy in standing buildings, identification of the chronological sequence and its interpretation particularly on postclassical buildings. From the single building to the archaeology of historical urban landscapes: methods and applications.	
Free course selected by student	6	42		2	1			
	24							
2 year 2 semester								
Free course selected by student	6	42		2	2			
Thesis / Dissertation	30						Original dissertation work	
	36							
courses on "materials properties, use and conservation" (the students will have to follow at least 4 out of 8)								
Materials properties, use and conservation: Natural stone materials and tools	6	21+16	GEO	1	1	English	Dimension and ornamental stones, production processes, provenance, diagnostic techniques. Weathering and conservation.	
		7	L-ANT			English	Use of natural stones in prehistory and history. Use of natural stones in art (seminars)	
		7	L-ANT			English	Use of natural stones for lithics and tools. Manufacturing techniques.	
Materials properties, use and conservation: Construction materials and binders	6	28	GEO	1	1	English	Lithics and binders in construction. Composite materials: masonry. From raw materials to production and use. Diagnostic techniques. Weathering and degradation. Materials for architectural conservation.	
		14	L-ANT			English	Use of construction materials in history. Development of construction techniques.	
Materials properties, use and conservation: Biomaterials and biominerals	6	28	CHIM	2	1	English	Introduction to biomaterials: wood, skin tissues, textile fibers, paper. Diagnostic techniques. Degradation and conservation.	
		7	GEO			English	Ambers, natural resins. Properties, diagnostics, conservation, treatments. Their use in prehistory and history.	
		7	GEO			English	Biominerals: bones, shells, corals, pathological biomineralizations. Chemical diagenesis.	
Materials properties, use and conservation: Macromolecules and genetics	6	45	BIO	2	1	English	Scientific methods in human evolution, essentials of molecular anthropology, modern and ancient DNA, applications and case studies in human evolution.	mutuato da "Anthropology" SCP8085142
Materials properties, use and conservation: Ceramics	6	21+16	GEO	2	1	English	From clays to ceramics. Raw materials, production and use. Pottery, structural clay products. Diagnostic techniques. Weathering and conservation. Organic residues.	
		14	L-ANT			English	Use of ceramics in prehistory and history. Archaeological significance. Development of manufacturing technology.	
Materials properties, use and conservation: Pigments and dyes	6	14	CHIM	2	1	English	Ancient and modern pigments: properties, identification, and degradation. Wall and rock painting techniques. Degradation, conservation.	
		14	L-ART			English	The palette of Medieval art. Development of Medieval painting techniques. Historical sources of information.	
		14	L-ART			English	The palette of Modern art. Development of Modern painting techniques.	

Materials properties, use and conservation: Metals and metallurgical processes	6	21	GEO	2	English	Copper and copper alloys. Iron and carburized iron. Lead. Precious metals. From ores to metal objects, metallurgical processes, metallography, chemical and isotopic tracers. Corrosion and conservation. Use of metals in prehistory and history, development of technology.		
		7	L-ANT		English	Metals stocks in history, metals and monetary value		
		14	GEO		English	Copper and copper alloys in prehistoric Italy. Diffusion of metals in the Ancient Mediterranean.		
Materials properties, use and conservation: Glass, glazes, faiences, mosaics	6	14	GEO	2	1	English	Introduction to the physics and chemistry of glass. Weathering and conservation. Use of vitreous materials in prehistory, development of technology.	
		14+16	GEO			English	Glass colouring. Weathering and conservation. Use of vitreous materials from the iron age to modern times, development of technology. Introduction to mosaics properties and conservation.	
		7	L-ART			English	Glass and mosaics in art history.	
courses selected by the students (the students will have to select at least 2)								
Remote sensing for geomorphology and archeology	6	21+16	GEO	2	1	English	The student will acquire knowledge about interpretation and processing of remote sensing data to map archeological sites and signs and the geomorphological evolution of the landscape to support archeological studies. Topics: Acquisition platforms manned or unmanned: drones, aerial vehicles, satellites; Basic principles of spectral signatures; Optical and multispectral imagery: atmospheric correction, topographic processing and supervised and not supervised classifications, multi-temporal analyses; Photogrammetry: basic principles of SfM technique to generate digital elevation models and orthophotos. Prerequisites: basic notions of topography (coordinate systems, geoids etc.), some experience with GIS and basic knowledge about geographic data formats such as vectors and rasters.	
		14	L-ANT			English		
Databases and data processing	6	42	ING-INF		2	English	Data treatment and processing, data modeling, data mining	
Cultural heritage, cultural goods, cultural market: Legal assessment in a European perspective	6	42	IUS		2	English	Defining cultural heritage, cultural goods, and cultural goods' markets. Understanding the legal framework(s): National Laws and Conflict of Laws; European and International Law. Protecting cultural heritage: National Law on the protection of (material) cultural heritage: the Italian approach and different national approaches; International Law on the protection of (material) cultural heritage (in time of peace; in time of war). Circulation (including control) and restitution of cultural heritage/goods intra and extra EU; cultural goods circulation – the applicability of EU internal market law and common commercial policy instruments; – the application of EU private international law of contracts and the obligations/property titles qualification; – conflicting property titles on cultural goods in private international law - including auctions and the influence of violation of international legal standards; problems of attribution as contractual issues; violation of international legal standards on cultural heritage/goods as contractual issues.	
Management and valorization of cultural heritage (by GCI Getty Conservation Institute)	2	14			1	English	Management and valorization of archaeological sites	
Authentication: Concepts and methods	6	14	L-ANT	2	English	Authentication of cultural heritage: concepts, methods, case studies.		
		14	L-ART		English			
		14	GEO		English			
History and theory of restoration	6	21	L-ART	1	English	A historical survey: evolution of the theories and methodologies concerning the conservation of monuments and artworks. The figure of the restorer and the role of the scholars. Theory and standard procedure of the restoration today. Case-studies		
		21	L-ART		English	Approach for the study of Painting: Historical Sources, Investigation Methods and Artist's Techniques		
3D Methods and technologies for cultural heritages	6	42	ICAR		2	English	Acquisition of 3D images at different scales. Reconstruction and use of the virtual images.	<i>Mutuato dal Curriculum parallelo</i>
Communication and digital experience in CH	6	42				English	Communicating cultural heritage. Virtual reconstructions.	<i>to be defined</i>
Urban history: Methodologies of historic research for cultural heritage sites	6	21	ICAR	2	English	Complex urban environments. Site transformation through time.		
		21	ICAR		English	Complex urban environments. Representation and interpretation.		