



Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	2023/10/15
	Deans Council Approval Decision Number	265/2024/24/3/2
	The Date of the Deans Council Approval Decision	2024/1/23
	Number of Pages	06

1.	Course Title	Conservation and Restoration of Archaeological Metals
2.	Course Number	2632441
3.	Credit Hours (Theory, Practical)	3
	Contact Hours (Theory, Practical)	3
4.	Prerequisites/ Corequisites	N/A
5.	Program Title	Cultural Resources Management and Conservation
6.	Program Code	02
7.	School/ Center	Archaeology and Tourism
8.	Department	Cultural Resources Management and Conservation
9.	Course Level	Fourth year
10.	Year of Study and Semester (s)	1/2025-2026
11.	Program Degree	BA
12.	Other Department(s) Involved in Teaching the Course	N/A
13.	Learning Language	English
14.	Learning Types	<input type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
15.	Online Platforms(s)	<input type="checkbox"/> Moodle <input type="checkbox"/> Microsoft Teams
16.	Issuing Date	9/2018
17.	Revision Date	9/2024

18. Course Coordinator:

Name: Dr. Yazan Abu Alhassan	Contact hours:
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**19. Other Instructors:**

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20. Course Description:

The course clarifies internal and external factors of the corrosion of copper, bronze, iron, and silver. In addition, the course includes the optimum methods of cleaning, stabilization, consolidation, covering, restoration and the best methods to display in museums or store different metal objects.

21. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

PILO's	*National Qualifications Framework Descriptors*		
	Competency (C)	Skills (B)	Knowledge (A)
Distinguish between the archaeological metals and the different techniques for their mining	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Distinguish between the tendency of different archaeological metals	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



for corrosion and their environment.			
Distinguish between the different methods for examining the archaeological metals and assess their condition	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Recognize the different methods for treating archaeological metal finds according to their condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recognize the most suitable environment to preserve the archaeological metal finds.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Choose only one descriptor for each learning outcome of the program, whether knowledge, skill, or competency.

22. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

Course ILOs #	The learning levels to be achieved						Competencies
	Remember	Understand	Apply	Analyse	Evaluate	Create	
Distinguish between the archaeological metals and the different techniques for their mining	X			X			Knowledge
Distinguish between the tendency of different		X					Knowledge



archaeological metals for corrosion and their environment.							
Distinguish between the different methods for examining the archaeological metals and assess their condition				X	X		Skills
Recognize the different methods for treating archaeological metal finds according to their condition			X		X		Competency
Recognize the most suitable environment to preserve the archaeological metal finds					X	X	Competency



23. The matrix linking the intended learning outcomes of the course -CLO's with the intended learning outcomes of the program -PILOs:

PILO's * CLO's	1	2	3	4	5	6	7	8	9	10	11	12	13	Descriptors**		
														A	B	C
K1	X	X	X					X						X		
K2			X									X		X		
S1							X								X	
C1											X					X
C2			X										X			X

*Linking each course learning outcome (CLO) to only one program outcome (PLO) as specified in the course matrix.

**Descriptors are determined according to the program learning outcome (PLO) that was chosen and according to what was specified in the program learning outcomes matrix in clause (21).

24. Topic Outline and Schedule:

Week	Lecture	Topic	ILO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1 Major types of archaeological Metals (structures & properties). Factors of metals deterioration (noble, base	1.1	Classification of archaeological metals and their microstructures	K1	Face to face			<ul style="list-style-type: none"> Interactive lectures Presentations Group-Based Learning Discussion 	
	1.2	Properties of noble vs. base metals	K1,K2	Face to face			<ul style="list-style-type: none"> Interactive lectures Presentations Group-Based Learning Discussion 	



metals) (dry & aqueous corrosion)	1.3	Dry and aqueous corrosion mechanisms	S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
2 Conservation ethics and process of metal conservation	2.1	International and professional conservation guidelines	S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
	2.2	Investigative cleaning approaches	C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
	2.3	Spot cleaning and stabilization principles	K1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
3 Nature of metal artefacts (Fe, Pb, Cu, Ag & Au alloys)	3.1	Physical and chemical properties of Fe and Pb artefacts	K2	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
	3.2	Corrosion behavior of Cu alloys and Ag objects	S1,C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
	3.3	Stability and alteration of Au alloys	K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
4 Nature of deteriorated metal materials	4.1	Identification of corrosion layers and products	K1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	
	4.2	Structural changes in heavily	C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning • Discussion 	



		deteriorated metals					Discussion	
	4.3	Causes and patterns of metal degradation	K1,C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
5 Examination methods for archaeological metal artefacts	5.1	Visual and microscopic examination	C1,C2	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
	5.2	Chemical and instrumental analysis	K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
	5.3	Non-destructive testing techniques	C1,C2	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
6 Cleaning methods for archaeological metal artefacts	6.1	Mechanical cleaning methods	K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
	6.2	Chemical and electrolytic cleaning	K1,K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
	6.3	Criteria for selecting appropriate cleaning techniques	C1,C2	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
7 Restoration and reshaping methods of archaeological metal artefacts	7.1	Reassembling broken metal components	K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion	
	7.2	Corrective reshaping of	S1,C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations 	



		deformed artefacts					<ul style="list-style-type: none"> • Group-Based Learning Discussion 	
	7.3	Gap filling and structural reinforcement	K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion 	
8 Active and passive stabilization for archaeological metal artefacts	8.1	Passive stabilization using environmental control	S1,C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion 	
	8.2	Active stabilization using chemical agents	S1,C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion 	
	8.3	Long-term storage and preventive guidelines	K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion 	
9History of metal conservation and writing treatment report	9.1	Evolution of metal conservation practices	S1,C1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion 	
	9.2	Development of modern conservation approaches	K2,S1	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion 	
	9.3	Structure and components of a professional treatment report	C2	Face to face			<ul style="list-style-type: none"> • Interactive lectures • Presentations • Group-Based Learning Discussion 	
10	10.1	Practical training for conservation of modern						
	10.2							
	10.3							
11	11.1							
	11.2							
	11.3							
							<ul style="list-style-type: none"> • Report 	



12	12.1	corroded metals	K1, K2, S1,C1,C2	Face to face			<ul style="list-style-type: none"> • Team work • Skills 	
	12.2							
	12.3							
13	13.1							
	13.2							
	13.3							
14	14.1							
	14.2							
	14.3							
15	15.1	Discussing the resulted reports		Face to face			<ul style="list-style-type: none"> • Report • Presentation skills 	
	15.2			Face to face			<ul style="list-style-type: none"> • Report • Presentation skills 	
	15.3			Face to face			<ul style="list-style-type: none"> • Report • Presentation skills 	

25. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	*Mark wt.	CILO's				
		K1	K2	S1	C1	C2
First Exam	30	X	X	X		
Second Exam –If any						
Final Exam	50	X	X	X	X	X
**Class work						
Projects/reports	10	X	X	X	X	X
Research working papers	5	X	X	X	X	X
Field visits						
Practical and clinical						
Performance Completion file						
Presentation/	5	X	X	X	X	X



exhibition						
Any other approved works						
Total 100%						

* According to the instructions for granting a Bachelor's degree.

**According to the principles of organizing semester work, tests, examinations, and grades for the bachelor's degree.

Mid-term exam specifications table*

No. of questions/ cognitive level						No. of questions per CLO	Total exam mark	Total no. of questions	CILO/ Weight	CILO no.
Create %10	Evaluate %10	analyse %10	Apply %20	Understand %20	Remember %30					
1	1	1	4	2	1	10	30	4	10%	K1
										K2
			X			1	30	1	10%	S1
										C1
	X	X					30	1	10%	C2

Final exam specifications table

No. of questions/ cognitive level						No. of questions per CLO	Total exam mark	Total no. of questions	CILO Weight	CILO no.
Create %10	Evaluate %10	analyse %10	Apply %20	Understand %20	Remember %30					
				X	X	2	50	1		K1
	X				X	2		1		K2
			X		X	1		2		S1
		X				1		1		C1
		X				1		3		C2

26. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform...etc.):



27. Course Policies:

A- Attendance policies:

B- Absences from exams and submitting assignments on time:

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

F- Available university services that support achievement in the course:

28. References:

A- Required book(s), assigned reading and audio-visuals:

Corrosion and Conservation of Cultural Heritage Metallic Artefacts

B- Recommended books, materials, and media:

- Caple, C., & Garlick, V. (2021). Studies in Archaeological Conservation. Routledge — Presents global case studies in archaeological conservation including the treatment of metals as part of integrated practice, reflecting contemporary approaches.
- European Federation of Corrosion (EFC), WP21 Working Party. (2025). Bridging the Gap: Corrosion Science for Heritage Contexts (forthcoming). EFC Publications — A forthcoming interdisciplinary volume focusing on corrosion mechanisms and conservation strategies for metal artefacts in cultural heritage.
- Doni, M., Fierascu, I., & Fierascu, R. C. (2024). Recent developments in materials science for the conservation and restoration of historic artifacts. Applied Sciences, 14(23), 11363 — A comprehensive review of materials, including nanomaterials relevant to metallic heritage stabilisation.
- Journal of Cultural Heritage Editorial Board. (2025). Journal of Cultural Heritage, Vol. 73. Elsevier — Contains multiple peer-reviewed studies on analytical methods and conservation materials applied to heritage artefacts, including metals.



- Journal of Cultural Heritage Editorial Board. (2024). Journal of Cultural Heritage, Vol. 66. Elsevier — Research on analytical approaches and monitoring techniques valuable for understanding metal artefact conditions and treatment decisions.

29. Additional information:

Name of the Instructor or the Course Coordinator:	Signature:	Date:
Name of the Head of Quality Assurance Committee/ Department	Signature:	Date:
Name of the Head of Department	Signature:	Date:
Name of the Head of Quality Assurance Committee/ School or Center	Signature:	Date:
Name of the Dean or the Director	Signature:	Date: