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
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	The Date of the Deans Council Approval Decision	2024/1/23
	Number of Pages	06

1.	**Course Title**	Laboratory Evaluation of Conservation Materials
2.	**Course Number**	2602410
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**	☐**Face to face learning** ☐Blended ☐Fully online
15.	**Online Platforms(s)**	☐Moodle ☐**Microsoft Teams**
16	**Issuing Date**	9/2024
17.	**Revision Date**	9/2025

18. Course Coordinator:

Name: Dr. Yazan Abu Alhassan	Contact hours: Sunday, Tuesday and Thursday 11:30 – 12:30 Monday and Wednesday 12:00 – 1:00
Office number:	Phone number: 25039
Email: y.abualhassan@ju.edu.jo	

19. Other Instructors:

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Office number:
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Name:
Office number:
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20. Course Description:

This course aims to introduce students to the laboratory and field tests necessary to determine the effectiveness of materials used in maintenance and restoration. It also focuses on the requirements for materials suitable for strengthening, bonding, or isolating various types of heritage materials, particularly stones used in historical and heritage buildings, and the binding materials between them (mortar). The course includes practical applications and laboratory and field tests that help students understand the environmental impacts and various factors that may affect maintenance and restoration materials, ensuring their suitability for these processes. Additionally, the course covers the study of real-world cases of successful and unsuccessful restoration projects, with the goal of drawing lessons and learning from them. Practical training is carried out in the laboratory.

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)**
Identify and describe the main types, properties, and uses of conservation and restoration materials.	☐	☐	☒
Explain and apply scientific principles of laboratory and field evaluation methods for conservation materials.	☐	☐	☒

Perform laboratory and field tests (e.g., water absorption, porosity, mechanical strength) and analyze the obtained results.	☐	☒	☒
Interpret and evaluate test data to assess the suitability, compatibility, and durability of restoration materials under different conditions.	☐	☒	☐
Develop and propose solutions or alternative materials for conservation projects based on laboratory and field assessment results.	☒	☐	☐

* 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**	
Identify and describe the main types, properties, and uses of conservation and restoration materials.	**K1**	**K1**					Knowledge
Explain and apply		**K2**	**K2**				Knowledge

scientific principles of laboratory and field evaluation methods for conservation materials.							
Perform laboratory and field tests (e.g., water absorption, porosity, mechanical strength) and analyze the obtained results.			S1	S1			Skills
Interpret and evaluate test data to assess the suitability, compatibility, and durability of restoration materials under different conditions.				S2	S2		Skills

Develop and propose solutions or alternative materials for conservation projects based on laboratory and field assessment results.					C1	C1	Competence

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		
K3			X						X					X		
S1							X								X	
S2				X		X									X	
C1									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	1.1	Introduction to laboratory and field evaluation in conservation	K1	Face to face			• Interactive lectures • Presentations • Group-Based Learning • Discussion	• Participation • Final examination
	1.2	Safety procedures and handling of conservation materials	K1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	1.3	Laboratory equipment and documentation methods	K2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Sampling and Sample Preparation							
2	2.1	Principles of sampling for conservation materials	S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	2.2	Types of samples (building materials, organic materials, metals, etc.)	S1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	2.3	Techniques for preparing samples for laboratory analysis	K3 S1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Physical Properties							
3	3.1	Determination of water absorption	C1	Face to face			• Interactive lectures	• Participation • Final examination

		coefficient by capillarity					• Presentations • Group-Based Learning Discussion	
	3.2	Water uptake under atmospheric pressure and under vacuum	K2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	3.3	Porosity and density measurements	S1, S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Salt Weathering and Crystallization Tests							
	4.1	Salt crystallization test procedures and evaluation	S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
4	4.2	Interpretation of salt crystallization results	S1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	4.3	Salt crystallization inhibitors and their effectiveness	K2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Mechanical Properties							
	5.1	introduction to mechanical behavior of stone and mortar	C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
5	5.2	Compressive strength testing	C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	5.3	Tensile strength and other mechanical properties	K1 K2 S2	Face to face			• Interactive lectures • Presentations	• Participation • Final examination

							• Group-Based Learning Discussion	
	Chemical Evaluation Methods							
6	6.1	Identification of chemical components using wet chemical tests	K1 K2 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	6.2	Solubility, acidity, and alkalinity testing	C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	6.3	Simple reagent-based identification of salts and organic compounds	S2C 1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Advanced Analytical Techniques							
7	7.1	XRF (X-ray Fluorescence) for elemental composition analysis		Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	7.2	FTIR (Fourier Transform Infrared Spectroscopy) for functional group identification	K1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	7.3	SEM (Scanning Electron Microscope) for microstructural examination	K2 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Assessment of Stone Deterioration in Heritage Sites							
8	8.1	Identification of stone decay patterns (cracking, scaling, exfoliation)	S1C 1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination

	8.2	Mapping and documentation of deterioration areas	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	8.3	Correlation between stone type, environmental exposure, and deterioration	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Reporting and Interpretation of Evaluation Results							
9	9.1	Structure and content of technical evaluation reports	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	9.2	Interpretation of laboratory and field data	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	9.3	Formulation of preliminary conservation recommendations	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Case Studies in Conservation Assessment							
10	10.1	Analysis of a real case study of laboratory and field evaluation	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	10.2	Discussion of laboratory results and their implications	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	10.3	Comparison of local and international conservation assessment practices	K2 C1 S2	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination

	Consolidation and Cleaning Test Evaluation							
11	11.1	Evaluation of cleaning effectiveness	K1 S1 S2 C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	11.2	Testing consolidation performance	K1 S1 S2 C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	11.3	Compatibility and reversibility assessment	K1 S1 S2 C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	Data Analysis and Interpretation							
12	12.1	Statistical analysis of laboratory data	K1 S1 S2 C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	12.2	Correlation between physical and mechanical results	K1 S1 S2 C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
	12.3	Reporting results and error analysis	K1 S1 S2 C1	Face to face			• Interactive lectures • Presentations • Group-Based Learning Discussion	• Participation • Final examination
13	13.1	Practical work						• Report • Team work
	13.2							
	13.3							
14	14.1	Practical work						
	14.2							
	14.3							
15	15.1	Practical work						
	15.2							
	15.3							

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	K3	S1	S2	S3	C1	C2
First Exam (Mid)	30	x	x			x			
Second Exam –If any									
Final Exam	50	x	x	x	X	x	x	x	x
**Class work		x	x	x	X	x	x		
Projects/reports	10	x	x	x	X	x	x	x	x
Research working papers	5	x	x			x			
Field visits									
Practical and clinical									
Performance Completion file									
Presentation/ exhibition	5	x	x	x	x	x	x	x	X
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	100	100	10%	K1

										K2
					X	1	30	1	10%	K3
										S1
			X			1	30	1	10%	S2
										S3
										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		1		K3
			X		X	1		2		S1
						3		2		S2
X	X		X			2		1		S3
		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:

-Frederick, M. H. (1998). **The Deterioration of Historic Stone and Masonry through the Crystallization of Water – Soluble Salt**. The National Training Center for Stone & Masonry Trades.

-Price, C. (1996). **Stone Conservation: An Overview of current Research**. Getty Conservation Institute, USA.

- Feilden, B. M. (1994) **Conservation of Historic Buildings**, Butterworth-Heinemann, Oxford.

-Borrelli, E. (1990). **Conservation of Architectural Heritage, Historic structure and materials**. ICCROM, Rome.

-Amoroso, G., and Fassina, V. (1983). **Stone Decay and Conservation**, Elsevier and Amsterdam

-Robertson, E. (1982). **Physical properties of building stone. In: Conservation of historic stone buildings and monuments**, 62–86, National Academy Press, Washington, DC

B- Recommended books, materials, and media:

Historic Construction and Conservation: Materials, Systems and Damage

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: ……..……