university of groningen / faculty of arts

Academic year 2024-2025 | Semester I

Course unit syllabus
Archaeometry:
Scientific Approaches to Material Culture

Faculty of Arts Programs/Archaeology

Research Master

Course code: LPR024M10.2024-2025.1

Lecturers: Prof. Hans Huisman; Dr. Francesca Bulian and Dr. Bert Nijboer

1 / Type of course unit, number of ECTS credit points and admission requirements

a. **Type:** Major (for ReMa archaeology students)

b. **ETCS credit points:** 10 ETCS

c. **Admission requirements:** Completed bachelor phase or specific course units (in accordance with the OER)

2 / Content of the course unit

Research approaches that originate in the natural sciences form an important potential contribution to the study of material culture in archaeology. Although these methods have been in use for a long time, they have not yet been fully integrated in archaeology. This may partially be due to limited knowledge of the natural sciences by archaeologists, but also because of differences in research approaches. During this course, students will get in-depth hands-on training in scientific research approaches in artefacts research. This will cover the natural science approach in research as well as the publication of results in peer-reviewed journals focused on natural science applications in archaeology: Lectures and literature will provide a basis on natural sciences and scientific approaches in artefact research and publication, as well as on the divide between the archaeological and scientific method - imagined or real. Publication and peer review will be trained hands-on: Each student will choose a case study of scientific analyses on archaeological artefacts. After analyzing and interpreting the data, they will present the results in a mock-conference setting, and publish them in a mock-journal environment. In the latter phase, they will also review a paper written by a fellow student.

With the lecturers taking the role of editors, the students will have to handle the comments, revise and resubmit the paper following the guidelines of an existing archaeological science journal.

3 / Position of the course unit in the degree programme

This course is taught during the 1st semester of the Research Master curriculum Archaeology.

4 / Learning outcomes of the course unit

Upon successful completion of the course, students are able to (**bold**: tested by summative testing):

1.	1.1	have understanding of the development and structure of the discipline and the relationship between its various branches.
	1.2	**have a thorough and up-to-date knowledge of at least one branch of the discipline.**
	1.3	**have knowledge and understanding of research methods and theories in archaeology.**
	1.4	**show awareness of the interpretive potential of archaeological artefacts, the built environment, organic remains, ecosystems, and landscapes in their historical context.**
	1.5.	have understanding of archaeology's relationship with other scientific disciplines
2.	2.1	**have the skills to apply appropriate methods of analysis and theoretical frameworks when conducting archaeological research.**
	2.4	have the skills to combine datasets, to integrate methodologies and to reflect about differences between disciplinary traditions in the humanities and the sciences.
3.	3.1	are able to critically evaluate the methodologies and theories currently used in their specialization.
	3.3	**be able to design, conduct, disseminate research in line with the Netherlands Code of Conduct for Research Integrity**
4.	4.2	be able to participate in academic debate and to present an academic problem convincingly, both orally and in writing.
	4.4.	be able to communicate about their field of expertise and to engage in debate in a sphere of mutual respect and constructive criticism.
	4.5.	**be able to write a publishable article in accordance with current academic norms.**
5.	5.2	be able to communicate about their field of expertise effectively and to engage in debate in a sphere of mutual respect and constructive criticism
	5.3	be able to reflect critically on one's own research design, results, and communication in response to feedback from experienced researchers and peers, and make improvements accordingly.

5 / Mode of instruction and learning activities

Lectures and tutorials
Literature study; general and case-specific
Oral presentations
Writing scientific paper, incorporate reviewers and editors' comments
Reviewing draft paper of fellow student (anonymized)

6 / Assessment

a. Mode of assessment

A Presentation 1 (basic approach) - weight 1
B Presentation 2 (results) – weight 2
C Draft paper – weight 4
D Review draft paper of (anonymized) fellow student – weight 1
E Handling comments and final version paper – weight 2

b. Assessment: duration, time and place; deadlines and procedures; perusal and resits

September 26th or October 3rd: Prestentation 1; 15 minutes
November 7th or 14th: Presentation 2; 15 minutes
November 28th , 9:00 Send in draft paper; 3 – 5000 words excl. references (digitally, sent to organizer)
December 12th, 9:00 Send in review; 1-2 pages (digitally, sent to organizer)
Januari 16th, 9:00 Send in corrected final paper, with reaction to reviewers comments (1-4 pages) (digitally, sent to organizer)

c. Assesment criteria

Presentation 1 must be based on the assigned case-study-specific literature, and on the general literature where relevant. Assessment will be on the basis of the following criteria:

- Analytical and synthesizing skills with regard to the literature
- Clarity of the presentation

1st years:

%	Very good- excellent	Sufficient	Not sufficient
20	Well-presented, within time limit	Adequately presented, on time	Unclear presentation; too long or very short
20	Very good use of visual information	Adequate use of visual information	No or insufficient use of visual information; mostly text-based presentation.
30	Clear grasp of literature and discourse in the relevant field	Good grasp of literature.	Grasp of literature incomplete.

30	Very good presentation of dataset, placing it in wider discourse Including the content of the critical papers on archaeometry.	Concise and to the point summary of dataset, context and research questions	Murky or faulty presentation of dataset.

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2nd years:

%	Very good- excellent	Sufficient	Not sufficient
10	Well-presented, within time limit	Adequately presented, on time	Unclear presentation; too long or very short
10	Very good use of visual information	Adequate use of visual information	No or insufficient use of visual information; mostly text-based presentation.
40	Clear grasp of literature and discourse in the relevant field	Good grasp of literature.	Grasp of literature incomplete.
40	Very good presentation of dataset, placing it in wider discourse. Including the content of the critical papers on archaeometry.	Concise and to the point summary of dataset, context and research questions	Murky or faulty presentation of dataset.

Presentation 2 must be based on the assigned case-study-specific data and on the relevant provided general and specific literature. Assessment will be on the basis of the following criteria:

- Analytical skills with regard to the provided dataset
- Originality
- Clarity and timeliness of the presentation
- Adequate handling of discussion and interaction with session chair

1st years:

%	Very good- excellent	Sufficient	Not sufficient
10	Well-presented, within time limit	Adequately presented, on time	Unclear presentation; too long or very short
10	Very good use of visual information	Adequate use of visual information	No or insufficient use of visual information; mostly text-based presentation.
10	Presentation stands out for creativity	Presentation is adequate but not super-creative	Presentation does not stand out.
40	Showing skilled analyses and interpretation of the dataset	Analyses and interpretation adequate.	Incomplete or insufficient analyses and/or interpretation
30	Professional level of discussion as well as and interaction with the session chair	Discussion and interaction with the session chair OK	Discussion inadequate; interaction with session chair not as supposed

2nd years:

%	Very good- excellent	Sufficient	Not sufficient
5	Well-presented, within time limit	Adequately presented, on time	Unclear presentation; too long or very short
5	Very good use of visual information	Adequate use of visual information	No or insufficient use of visual information; mostly

			text-based presentation.
10	Presentation stands out for creativity	Presentation is adequate but not super-creative	Presentation does not stand out.
45	Showing skilled analyses and interpretation of the dataset	Analyses and interpretation adequate.	Incomplete or insufficient analyses and/or interpretation
35	Professional level of discussion as well as and interaction with the session chair	Discussion and interaction with the session chair OK	Discussion inadequate; interaction with session chair not as supposed

The draft paper must be based on the assigned case-study-specific data and on the relevant provided general and specific literature. Organization, format and lay-out must adhere to the submission formats of the **Journal of Archaeological Science**. Assessment will be on the basis of the following criteria:

- Analytical and synthesizing skills with regard to the provided dataset and (large enough body of) literature
- Clear presentation of data
- Clear writing, following the standard mode of scientific paper publishing
- Adhering to lay-out, referencing and submission formats of the Journal of Archaeological Science
- https://www.sciencedirect.com/journal/journal-of-archaeological-science/publish/guide-for-authors

1st years:

%	Very good- excellent	Sufficient	Not sufficient
35	Showing skilled analyses and interpretation of the dataset, including literature analyses	Analyses and interpretation adequate, literature suffices but scant.	Incomplete or insufficient analyses and/or interpretation, too little literature used
30	Clear presentation of data	Data is presented well, but some	Data presentation inclear of faulty

		aspects are unclear	
20	Clear writing, following the standard mode of scientific paper publishing	Text is written well, but there are faults with formulation and/or text structure	Faults with formulation and/or text structure make text difficult to impossible to comprehend
15	Lay-out, referencing and submission formats are followed to the letter	Some errors in lay-out, referencing and/or submission formats	Serious errors in lay-out, referencing and/or submission formats

2nd years:

%	Very good- excellent	Sufficient	Not sufficient
45	Showing skilled analyses and interpretation of the dataset, including literature analyses	Analyses and interpretation adequate, literature suffices but scant.	Incomplete or insufficient analyses and/or interpretation, too little literature used
35	Clear presentation of data	Data is presented well, but some aspects are unclear	Data presentation inclear of faulty
10	Clear writing, following the standard mode of scientific paper publishing	Text is written well, but there are faults with formulation and/or text structure	Faults with formulation and/or text structure make text difficult to impossible to comprehend
10	Lay-out, referencing and submission formats are followed to the letter	Some errors in lay-out, referencing and/or submission formats	Serious errors in lay-out, referencing and/or submission formats

The review must be based on a critical reflection of an anonymized draft paper of a fellow student. Assessment will be on the basis of the following criteria:

- Critical reflection on content and organization of the draft paper and on adherence to submission formats
- Clear and to the point reporting to editor

1st and 2nd years:

%	Very good- excellent	Sufficient	Not sufficient
50	Critical review, pointing out the flaws and errors in the reviewed manuscript	Some of the errors are indicated, but others are missed	Most of the shortcomings in the paper are missed, or wrongly identified
50	Timely, clear and fair report to the editor	Timely report to the editor is comprehensible but not super clear	Report is unclear or not in time

The final version of the paper is a revised version after the reviews and editors' comments. It must still adhere to the submission formats of the Journal of Archaeological Science, and must therefore include a "reaction to comments" document. Assessment will be on the basis of the same criteria of the draft paper, as well as:

- Proper handling of reviewers' and editors' comments, as seen in the paper as well as in the "reaction to comments" document.

1st and 2nd years:

%	Very good- excellent	Sufficient	Not sufficient
30	Clear, fair and professional reaction to	Reaction to comments OK, but lacks clarity,	Unprofessional or incomplete reaction to comments

	reviewers' comments	or is too defensive.	
30	Reviewers' comments used well in revision	Most of reviewers' comments used well in revision, but not all	Inadequate revisions after reviewers' comments
40	Final paper would be publishable in archaeological science journal	Final paper is good, but not at the level that it would be publishable	Final paper has serious flaws in interpretation, text and/or structure.

d. Calculating preliminary and final marks

Presentation 1 on the basis of literature (basic approach)	10%
Presentation 2 on research outcomes	20%
Draft paper on research outcomes	30%
Review of draft paper of (anonymized) fellow student	10%
Final paper on research outcomes	30%

e. Conditions of taking exams

NA

f. Example of tests

NA

7 / Cheating and plagiarism

Use of AI for this course is not allowed. Its use is considered fraud if copied and pasted.

Cheating and plagiarism are subject to the provisions set down in the TER (Article 8.17 of Part A of the BA TER or Article 4.13 of Part A of the MA TER).

The Board of Examiners is always informed in cases of suspected cheating or plagiarism.

8 / Calculation of student workload

Starting points

• Senior students are expected to be able to read 6,5 pages of an average textbook or monograph per hour and to reproduce the content in an oral or written exam or a written assignment.

• One ECTS credit point is the equivalent of 28 hours of study.

• Two study hours is be counted for each one-hour lecture or tutorial; the second hour is spent preparing for the class and/or studying the material discussed.

• c. 90 pages of general and 90 pages of subject-specific literature (academic publications, review papers and book chapters as well as guidelines) will need to be read and used for the oral presentations, research and article

• Research consists of studying and critically analyzing the provided data and relevant literature.

• Article writing includes writing texts, preparing original images to present data and results and preparing format and lay-out (including literature references).

The course has a student workload of 10 ECTS credit points (280 hours).
The following activities are included:

• Tutorial: 2 hours per week for 13 weeks (52 hours = 1,9 ECTS credit point)
• Reading general and specific literature (90 + 90 p. = 28 hours = 1 ECTS credit point)
• Research based on provided data and literature (100 hours = 3,6 ECTS credit points)
• 2 oral presentations (8+8 = 16 hours =0,6 ECTS credit points)
• Writing an article (40 hours =1,4 ECTS credit points)
• Peer review (4 hours =0,1 ECTS credit points)
• Revising an article (40 hours =1,4 ECTS credit points)

Total: 1,9 + 1 + 3,6 + 0,6 + 1,4 + 0,1 + 1,4 = 10 ECTS credit points.

9 / Literature

Caple, C., 2006, Objects, reluctant witnesses to the past, Routeledge, Abington, 266 pp. Chapter 1 (pp. 1-33)

Killick, D., 2015, The ackward adolescence of archaeological science, Journal of Archaeological Science 56: 242 – 247

Mumpton, F.A., 1990, The universal recipe or how to get your manuscript accepted by persnickety editors, Clays and Clay Minerals 38(6): 631 – 636

NWO, 2018, Netherlands Code for Research Integrity: https://www.nwo.nl/sites/nwo/files/documents/Netherlands%2BCode%2Bof%2BConduct%2Bfor%2BResearch%2BIntegrity_2018_UK.pdf

Pollard, M. & P. Bray, 2015, The archaeological bazaar: scientific methods for sale? Or: putting the "arch" back in archaeometry. In: Chapman, R. & A. Wylie: Material evidence. Learning from archaeological practice, Routeledge, Abington, pp. 113 – 127

Guidelines for authors, Journal of Archaeological Science: https://www.elsevier.com/wps/find/journaldescription.cws_home/622854?generatepdf=true

Richard Feynman on Scientific Method (1964): https://www.youtube.com/watch?v=0KmimDq4cSU Or https://www.youtube.com/watch?v=OX1EK5IBSdw 16:30 – 24:50

Additional literature will be assigned to each student after they have chosen their research subject.

At least three of the five papers listed here, need to be referred to in your first presentation. It will show your ability to reflect on Archaeometry in a wider context. Not doing so will result in a lower grade.

10 / Weekly schedule

Week	Date	Prepare/do	Topic(s)
1	5 Sep	Read general literature from literature list	Lectures: General introduction to the course Overview of specialist subjects
2	12 Sep	Read general literature. Choose personal research subject.	Issues with archaeological science Discussion on science in archaeology. Science publishing and presenting Short introduction lecturers and students. During the course you can make appointments with your lecturers for individual tutorials whenever

			required in order to discuss issues with your datasets and their interpretation. No lectures from 21st of October until 1st of November and neither after Christmas.
3	19 Sep	Study specific literature, organize datasets and study.	Introduction to analytical techniques Introduction to material properties Introduction to archaeological material characteristics
4	26 Sep	Prepare presentation 1*	Presentations 1*
5	3 Okt	Prepare presentation 1*	Presentations 1*
6	10 Okt	Research	Guest lectures
7	17 Okt	Research	Guest lectures
8	7 Nov	Prepare presentation 2	Presentations 2*
9	14 Nov	Prepare presentation 2*	Presentations 2*
10	21 Nov	Research and writing	Room for individual tutorials
11	28 Nov	Finalize draft paper	Hand in draft paper
12	5 Dec		Receive paper for review
13	12 Dec	Review paper	Hand in review paper
14	19 Dec		Receive reviewed paper
	16 Jan	Finalize revised paper	Hand in final paper

* Group will be split; for individual presentation, the date choice will be announced.

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