Universitat Autònoma de Barcelona

2022/2023

Introduction to Biomolecular Archaeology

Code: 44484
ECTS Credits: 6

Degree	Type	Year	Semester
4317545 Prehistoric Archaeology	OT	0	2

Contact

Name: Rafael Mico Perez
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Use of Languages

Principal working language: spanish (spa)

Teachers

Andre Carlo Colonese
Krista Michelle Mcgrath
Asier Garcia Escarzaga
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Prerequisites

No previous requirement

Objectives and Contextualisation

The objective of this module is to introduce and train students to methods used in biomolecular archeology, as well as the technical and instrumental aspects associated with them. Special emphasis will be placed on the strategies for obtaining and sampling suitable materials (mainly bones, teeth and dental calculi, among others) for analyzes focused on amorphous and structured residues (proteins, lipids), stable isotopes and paleoproteomics. Likewise, the introduction to laboratory work and the use of common detection and measurement instruments used for the study of biomolecular archaeological materials will be addressed. The analytical results will be linked to problems around the determination of diet, human mobility, health, gender and social relations in general terms. In all cases, both the preparation of the required documentation and the health and safety protocols in the laboratory, at a theoretical and practical level, as well as the importance of avoiding the introduction of contaminating factors or elements, will be taken into account.

Competences

- Analyse and extract significant scientific information from archaeological materials and from the results of specialist scientific studies.
- Combine findings from different programmes of specialist analysis, identifying any contradictions and drawing conclusions
- Critically analyse a scientific problem area on the basis of specific evidence and documents.
- Design research projects on prehistoric archaeological sites and materials
- Knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context.
- Recognise present-day challenges in the study of prehistoric archaeology.

- That students have the learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous.
- That the students can apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
- Work both individually and in multidisciplinary teams

Learning Outcomes

1. Analyse specific problems in different cases of prehistoric societies
2. Critically assess the value of the different analytic and instrumental tools involved in biomolecular research in prehistoric archaeology.
3. Design systematic research projects in methodologies of biomolecular analysis which take into account all dimensions of dissemination in prehistoric archaeology.
4. Knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context.
5. Recognise and put into practice basic teamwork skills.
6. Recognise the main challenges in the study of prehistoric metallic resources.
7. That students have the learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous.
8. That the students can apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
9. Understand the process for solving specific problems and certain archaeometric techniques.
10. Use the main methods, techniques and instruments of biomolecular analysis in prehistoric archaeology.

Content

INTRODUCTION TO BIOMOLECULAR ARCHEOLOGY, including a brief history of the field, past and current developments, and future perspectives. Review of theoretical background and a variety of methods, techniques and applications in ancient biomolecular research. Introduction to the processes that induce the degradation and preservation of molecules in organic materials and of organisms in archaeological and environmental contexts.

INTRODUCTION TO STABLE ISOTOPES ANALYSIS in organic (proteins) and inorganic (carbonates) materials, with special emphasis on dietary, mobility and ecological/climatic applications.

INTRODUCTION TO ORGANIC RESIDUE ANALYSIS, with a focus on the recovery and identification (structural, isotopic) of lipids from archaeological artifacts, osteological remains and sediments

INTRODUCTION TO PLANT RESIDUE ANALYSIS, with a focus on dietary and environmental reconstructions

INTRODUCTION TO THE ANALYSIS OF COLLAGEN PEPTIDE MASS FINGERPRINTING (ZooMS) AND PALEOPROTEOMIC for taxonomic identification of organic residues and fauna remains from archaeological and environmental contexts

Methodology

Directed activities:

- Introductory classes on the theoretical and methodological approaches of the subject.

- Discussion seminars

Supervised activities:

- tutorials and guided learning exercises (individual or in small groups)

Autonomous activities:

- search of documentation, reading of texts, writing of works, study

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Casses on theoretical and methodological aspects of the subject	19	0.76	1, 2, 9, 3, 10, 8, 7, 5, 4
Discussion and debate classes	17	0.68	1, 2, 9, 3, 10, 8, 7, 5, 4
Seminars with renowned researchers	9	0.36	1, 2, 9, 3, 10, 8, 7, 5, 4
Type: Supervised			
Tutorials and guided learning exercises	25	1	1, 2, 9, 3, 10, 8, 7, 5, 4
Type: Autonomous			
Research, reading texts, writing papers	66	2.64	1, 2, 9, 3, 10, 8, 7, 6, 5, 4

Assessment

Essays and oral presentations

Practical skill in class

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Essays and oral presentations	70%	10	0.4	1, 2, 9, 3, 10, 8, 7, 6, 5, 4
Practical skill in class	30%	4	0.16	1, 2, 9, 3, 10, 8, 7, 5, 4

Bibliography

Richards, M.P. and Britton, K., 2020. Archaeological Science: An Introduction. Cambridge University Press.

Brown, T. A. and Brown, K., 2011. Biomolecular Archaeology: An Introduction. John Wiley & Sons.

Richards, M. P., 2020. Isotope Analysis for Diet Studies," in Richards, M. P. and Britton, K. (eds) Archaeological Science: An Introduction. Cambridge: Cambridge University Press

Britton, K., 2020. Isotope Analysis for Mobility and Climate Studies," in Richards, M. P. and Britton, K. (eds) Archaeological Science: An Introduction. Cambridge: Cambridge University Press

Hendy, J., van Doorn, N. and Collins, M., 2020. Proteomics, in Richards, M. P. and Britton, K. (eds) Archaeological Science: An Introduction. Cambridge: Cambridge University Press.

Craig, O., Saul, H., Spiteri, C. 2020. Residue Analysis, in Richards, M. P. and Britton, K. (eds) Archaeological Science: An Introduction. Cambridge: Cambridge University Press.

Software

No specific software is necessary.