# Bioarchaeology

## Prof. Sila Motella

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The main aims of the course are to acquire knowledge and understanding of scientific methods applied to the study of organic findings in archaeological contexts (remains of bones, plants, textiles, etc.). The different techniques used make it possible to address specific issues such as subsistence economics, human population dynamics and demographics, and human impact on the environment.

By analysing human bone remains found in individual burial sites and necropolises, it is possible to identify the morphological characteristics, health status and lifestyle of ancient populations; studying them, along with the other kinds of biological remains, also helps reconstruct aspects related to funeral rituals.

By studying plant remains, it is possible to identify economic and ritual areas and to discover particular aspects of the natural and man-made plant landscape. This knowledge, linked to that of traditional archaeology and integrated with climate studies, allows us to expand current knowledge of the evolution of the natural environment and the human environment during the Holocene.

By the end of the course, students will be able to describe/apply the scientific methods that can be used in different excavation contexts; they will have the basic knowledge to carry out significant surveys of organic finds in different contexts, in particular in funerary (burial and cremation) and inhabited areas; they will have learned to distinguish the basic categories of organic finds; they will be able to make connections between scientific data emerging from a specific archaeological context; and they will be able to recognize different degrees of complexity within different fields of study. In addition, students will be able to use expressive and argumentative tools, including in the scientific field.

***COURSE CONTENT***

*Module 1: Natural sciences in archaeology*

History of natural sciences applied to archaeology. Introduction to palaeobotany, physical anthropology applied to archaeology, archaeozoology and other organic remains in archaeology with reference to prehistoric, proto-historical, Roman and medieval case studies and excavation contexts.

*Module 2: The remains of organisms in archaeology.*

The complexity of the structure of organisms: from DNA, to cells, to the anatomy of living things in the field of biodiversity. Scientific systematics and nomenclature; classification of organisms for archaeologists. The basic categories of organic finds found in archaeological contexts. Preservation and taphonomic processes.

*Module 3: Palaeobotany and applied methodologies*

Plant macroremains (wood and charcoal; seeds and fruits) and microremains (pollens, phytoliths, diatoms); preservation conditions and contexts.

Sampling and analysis procedure for wood and charcoal in the laboratory; excavation sites and analysis objectives.

Taphonomic processes, ways of recovering seeds and fruits during excavations, analysis and study.

Reconstruction of economic areas in archaeological contexts.

The study of pollen remains and their importance in the archaeological and environmental fields.

Phytoliths and diatoms: main anatomical features and taphonomy.

Macroremains and microremains in funerary contexts.

Environmental reconstruction and evolution of the landscape through plant remains.

*Module 4: Elements of archaeozoology*

Macrofauna and microfauna.

Types of finds, taphonomy and excavation contexts.

Remains of vertebrates and invertebrates in archaeological contexts: distribution and retrieval.

Basic procedures for the analysis, identification and quantification of remains.

Reconstruction of economic and sometimes ritual aspects.

*Module 5: Taphonomy and sampling of organic remains*

How organic remains are buried.

Some geoarchaeology and pedology content: sediments and soils;

stratigraphic units and pedological units; soil profile.

Preservatoin of vegetable remains in wet and dry locations;

mineralization and carbonization.

Taphonomy of buried and cremated human remains.

How bones are preserved in different climate settings.

Sampling of organic remains and processing of samples.

*Module 6: Human remains in archaeology*

Skeletal anatomy; taphonomy of graves and transformation of bones.

Buried remains: types of burials; primary and secondary deposition; processing of bones in the field and taphonomic study.

Anthropological macroscopic morphological study: characteristics of skeletal remains, determination of gender and age at death.

Osteometry and innovative techniques applied to the study of bones.

Palaeopathological study: diseases that leave marks on bones.

Reconstructing state of health.

Cremated human remains; cremation and the actions of fire; alterations, preservation and study of cremated bones.

*Module 7: Other scientific methodologies applied to organic remains*

DNA and aDNA; DNA techniques: from detection to PCR. Fields of application in archaeology.

Methods for dating organic remains. Isotopes in archaeology. Radiocarbon, measurement accuracy and calibration. Dendrochronology.

*Module 8. Case Studies*

Residential settings between prehistory and the Middle Ages.

Burial and cremation necropolises. Bronze Age, Iron Age, Roman and medieval contexts.

***READING LIST***

S. Minozzi-A. Canci*, Archeologia dei resti umani. Dallo scavo al laboratorio*, new edition. Carrocci, 2015 (chapters assigned during lectures).

C. Renfrew-P. Bahn*, Archeologia. Teoria,* *Metodi, Pratica,* Zanichelli, 2006 (chapter parts assigned during lectures).

Specific articles on the topics and case studies covered will be assigned during the course.

***TEACHING METHOD***

Lectures will be supplemented - where current legislation permits - by practical classes in the Unicatt archaeology laboratory using iconographic models and organic remains; observations will be made at macroscopic level and using the stereoscopic optical microscope; bone and botanical materials from current collections and artefacts will be used if available. This is to accustom students to finding organic remains in excavation contexts and to systematically observing and identifying them.

The lectures will also include written assignments to test students’ knowledge of the content proposed.

Scholars from other universities/research centres may be contacted to lead further study.

***ASSESSMENT METHOD AND CRITERIA***

Students will be assessed by means of a final oral exam. Students must demonstrate knowledge of the content proposed during the course and in the articles on specific subjects on the reading list; they must be able to identify excavation strategies and the research path envisaged for case studies similar to those proposed during the course, and be able to understand the interactions between the different fields of application for the scientific methodologies learned.

The assessment will be based on: the appropriateness of answers to the questions asked, the ability to construct arguments through the use of appropriate scientific terminology, the ability to identify links between the topics presented during the course.

***NOTES AND PREREQUISITES***

There are no specific notes or prerequisites.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG or on the Faculty notice board.