Penn | Center for the Analysis of Archaeological Materials

INTRODUCTORY

Food & Fire: Archaeology in the Laboratory
ANTH 148, CLST 148, NELC 189

This introductory course will let students explore the essential heritage of human technology through archaeology. People have been transforming their environment from the first use of fire for cooking. Since then, humans have adapted to the world they created using the resources around them. We use artifacts to understand how the archaeological record can be used to trace breakthroughs such as breaking stone and bone, baking bread, weaving cloth and firing pottery and metals. The seminar will meet in the Penn Museum's new Center for the Analysis of Archaeological Materials. Students will become familiar with the Museum's collections and the scientific methods used to study different materials. Class sessions will include lectures, demonstrations, discussions, and guest presentations. Recitation/lab sections will include practical experience with laboratory procedures and equipment, examination and analysis of archaeological materials, and tours of key Museum departments.

The Material Past in a Digital World
CLST 127, ARTH 127, ANTH 127, HIST 127, NELC 187

The material remains of the human past -objects and spaces- provide tangible evidence of past people's lives. Today's information technologies improve our ability to document, study, and present these materials. But what does it mean to deal with material evidence in a virtual context? In this class, students will learn basic digital methods for studying the past while working with objects, including those in the collections of the Penn Museum. This class will teach relational database design and 3D object modeling. As we learn about acquiring and managing data, we will gain valuable experience in the evaluation and use of digital tools. The digital humanities are a platform both for learning the basic digital literacy students need to succeed in today's world and for discussing the human consequences of these new technologies and data. We will discuss information technology's impact on the study and presentation of the past, including topics such as public participation in archaeological projects, educational technologies in museum galleries, and the issues raised by digitizing and disseminating historic texts and objects. Finally, we will touch on technology's role in the preservation of the past in today's turbulent world. No prior technical experience is required, but we hope students will share an enthusiasm for the past.

INTERMEDIATE

Material World in Archaeological Sciences
ANTH 221/521, CLST 244, ARTH 230, NELC 284/584

By focusing on the scientific analysis of inorganic archaeological materials, this course will explore processes of creation in the past. ANTH 221 will take place in the new Center for the Analysis of Archaeological Materials (CAAM) and will be team taught in three modules: analysis of lithics, analysis of ceramics and analysis of metals. Each module will combine laboratory and classroom exercises to give students hands-on experience with archaeological materials. We will examine how the transformation of materials into objects provides key information about past human behaviors and the socio-economic contexts of production, distribution, exchange and use. Discussion topics will include invention and adoption of new technologies, change and innovation, use of fire, and craft specialization.

Living World in Archaeological Sciences
ANTH 267/567, CLST 268/568, NELC 286/586

By focusing on the scientific analysis of archaeological remains, this course will explore life and death in the past. ANTH 267 will take place in the new Center for the Analysis of Archaeological Materials (CAAM) and will be team taught in three modules: human skeletal analysis, analysis of animal remains, and analysis of plant remains. Each module will combine laboratory and classroom exercises to give students hands-on experience with archaeological materials. We will examine how organic materials provide key information about past environments, human behavior, and cultural change through discussions of topics such as health and disease, inequality, and food.

Forensic Anthropology
ANTH 230

This course will investigate and discuss the various techniques of analysis that biological anthropologists can apply to forensic cases. Topics include human osteology, the recovery of bodies, the analysis of life history, the reconstruction of causes of death, and various case studies where anthropologists have contributed significantly to solving forensic cases. Discussions will include the limitations of forensic anthropology and the application of DNA recovery to skeletal/mummified materials.

Food and Feasting: Archaeology of the Table
ANTH 248

Food satisfies human needs on many levels. ANTH 248 explores the importance of food in human experience, starting with the nutritional and ecological aspects of food choice and going on to focus on the social and ritual significance of foods and feasts. Particular attention will be paid to the way that archaeologists and biological anthropologists find out about food use in the past. Contemporary observations about the central significance of eating as a social activity will be linked to the development of cuisines, economies, and civilizations in ancient times. The course will use lectures, discussions, films, food tastings, and fieldwork to explore the themes of the course.

Introduction to Digital Archaeology
CLST 362/562, ANTH 362, AAMW 562

Digital methods allow archaeologists to approach research questions about the human past with increasing accuracies on larger datasets and at multiple scales. This class introduces students to the three main steps of digital archaeology: data management, analysis, and sharing. Data management involves the design, creation, and curation of digital objects that capture the archaeological process and evidence. Students will gain deep familiarity in working with the main types of digital archaeological data: structured data (relational databases), 3d models/spatial data, and raster images. The class will provide abundant hands-on experience with the latest equipment and software for working with many different kinds of data. We will learn about data analysis techniques through a close examination of a variety of case studies in the literature that demonstrate how other archaeologists have applied digital methods to their archaeological questions. Finally, we will discuss the importance of sharing data through open access data publication and we will apply our skills with structured data to existing online archaeological datasets. The goal of this class is to prepare students to make methodological decisions during future research endeavors, both in the field and in the archaeological lab. Prior archaeological classwork and/or experience preferred.

Pottery and Archaeology
CLST 309, ANTH 319

Pottery is the most ubiquitous material recovered from archaeological sites of the last 10,000 years; all archaeologists must be capable of working with it. This course presents the basics on the recovery, documentation, and analysis of archaeological pottery. Instruction includes treatment of pottery in the field, museum, and laboratory. Students will develop critical awareness of the potentials and problems of interpreting pottery within the wider social contexts of production, exchange and consumption. This course will foster an appreciation of the range and complexity of

pottery studies and encourage students to understand the materials and technological processes used in the manufacture of ceramic objects.

ADVANCED

Archaeology of Animals: Faunal Analysis
ANTH 415

Anthropology 415 integrates archaeology, biology, and paleontology. Bones, shells, and other remains yield evidence for the use of animals by humans and evidence for past environments. We focus on these important transitions in human-animal relationships: the development of human hunting and fishing; animal domestication; early pastoralism; and the emergence of market economies in animal products. Practical experience will include using comparative skeletal material, experimental work with field and laboratory equipment, and supervised work identifying and describing archaeological materials from Museum collections.

The Past Preserved: Conservation in Archaeology
ANTH 435/ARTH 433/CLST 435/NELC 486

This course explores the scientific conservation of cultural materials from archaeological contexts. It is intended to familiarize students with the basics of artifact conservation but is not intended to train them as conservators. ANTH 435 will take place in the Center for the Analysis of Archaeological Materials and the West Wing Conservation Labs and will be taught by Museum conservation staff and other specialists. The course will cover how various materials interact with their deposit environments; general techniques for on-site conservation triage and retrieval of delicate materials; what factors need to be considered in planning for artifact conservation; and related topics. Class sessions will include lectures, demonstrations, hands-on activities, and guest presentations. Class size is limited and permission of the instructor is required for enrollment.

Plants and Society
ANTH 440, CLST 441

Interactions between humans and the living landscape around us have played – and continue to play – a fundamental role in shaping our worldview. This course is designed to introduce students to the diverse ways in which humans interact with plants. We will focus on the integration of ethnographic information and archaeological case studies in order to understand the range of interactions between humans and plants, as well as how plants and people have profoundly changed one another. Topics will include the origins of agriculture; cooking and plant processing; human health and the world of ethnomedicine; and poisonous and psychoactive plants. We will examine ancient plant material firsthand at the Center for the Analysis of Archaeological Materials

(CAAM) and will handle botanical ecofacts from the Penn Museum's collections. Students will also carry out a substantial research project focused on an archaeological culture and plant species of their own interest.

Introduction to the Human Skeleton
ANTH 404

An introduction to the anatomy and biology of the human skeleton. Laboratory work will be supplemented by lectures and demonstrations on the development structure, function, and evolution of the human skeleton.

Mining Archaeology
ANTH 419/NELC 419

In ancient times, materials such as stone and metals were used to produce artifacts including pigments, jewelry, tools, and weapons. This course is designed to introduce students to research on the early exploitation of mineral resources. Which techniques were used to access and process raw materials in antiquity? Which archaeological methods can be used to investigate these features and artifacts? The course will provide worldwide examples through time, ranging from Stone Age flint mining, Iron Age rock salt mining to Medieval silver mining. Ethnographic studies and hands-on activities will contribute to our understanding of mining in archaeology, and artifacts from the Museum's collections will undergo scientific analysis in the Center for the Analysis of Archaeological Materials.

GRADUATE

Petrography of Cultural Materials
CLST 512, AAMW 512, ANTH 514

Introduction to thin-section petrography of stone and ceramic archaeological materials. Using polarized light microscopy, the first half of this course will cover the basics of mineralogy and the petrography of igneous, metamorphic and sedimentary rocks. The second half will focus on the petrographic description of ceramic materials, mainly pottery, with emphasis on the interpretation of provenance and technology. As part of this course, students will characterize and analyze archaeological samples from various collections. Prior knowledge of geology is not required.

Archaeometallurgy Seminar
ANTH 552, AAMW 552, CLST 552, NELC 587

This course is designed to provide an in-depth analysis of archaeological metals. Topics to be discussed include: exploitation of ore and its transformation to metal in ancient times, distribution of metal as a raw material, provenance studies, development and organization of early metallurgy, and interdisciplinary investigations of metals and related artifacts like slag and crucibles. Students will become familiar with the full spectrum of analytical procedures, ranging from microscopy for materials characterization to mass spectrometry for geochemical fingerprinting, and will work on individual research projects analyzing archaeological objects following the analytical methodology of archaeometallurgy.

Archaeobotany Seminar
ANTH 533, AAMW 539, CLST 543, NELC 585

In this course we will approach the relationship between plants and people from archaeological and anthropological perspectives in order to investigate diverse plant consumption, use, and management strategies. Topics will include: plants as foods and intoxicating beverages; medicines, poisons, and psychoactive plants; plants as building supplies and textiles; wild plant collection, and the origins of plant domestication. Students will learn both field procedures and laboratory methods of archaeobotany through a series of hands-on activities and lab-based experiments. The final research project will involve an original in-depth analysis and interpretation of archaeobotanical specimens. By the end of the course, students will feel comfortable reading and evaluating archaeobotanical literature and will have a solid understanding of how archaeobotanists interpret human activities of the past.

Spatial Analysis of the Past
CLST 545, ANCH 545, ANTH 515, AAMW 545, NELC 581

Humans continuously move through, interact with, and modify their spaces, leaving a palimpsest of human activity all around us. The ability for digital methods to deal with larger datasets, at higher accuracies, and at multiple scales, lends itself particularly well to the study of diachronic human-space interaction. In this class, we will examine space at a range of scales from landscapes, to urban settings, to archaeological contexts and architecture. We digitally represent space using a variety of 3d and 2d data types, from models of land surfaces and buildings, to multispectral satellite imagery and urban plans. We will first gain experience creating, gathering, and manipulating spatial datasets in preparation for analysis. We will next practice a variety of analytical techniques on these data and examine case studies that have used spatial methods to draw important archaeological and historical conclusions. Tools covered in this class will include geographical information systems (GIS), global navigation satellite systems (GNSS), raster image processing, photogrammetry, and 3d spatial modeling softwares. Finally, we will gain experience with the visualization of our data and results, and the presentation of those results through open online publication.