# Archaeological Science 3098

Instructor: Dr. Gideon Hartman

Office: Beach Hall, Room 441

Telephone: office (860) 486 4850

E-Mail: gideon.hartman@uconn.edu

Office Hours: Thursday 1:00 – 2:00pm, or by appointment

Meets: BH 304 (alternative meeting locations will be announced in class)

Meeting time: Tuesday and Thursday, 9:30am – 10:45am

**Course abstract:**

Archaeological interpretation begins with the examination of unearthed remains. In many cases these remains contain valuable information that can only be unraveled using scientific methods. Archaeological Science is a course that is designed to introduce students to a wide array of methods that are used to extend the boundaries of archaeological interpretations. Dating techniques, material sciences, stable isotope techniques, and ancient DNA analysis are among the many topics that will be covered in this course. The course will also include demonstrations of scientific methods in laboratory settings (see image below). The course will be pitched at a level suitable for non-science majors.

**Course requirements:**

Students are expected to attend the lectures and the presentations. Reading materials will be posted at the end of each lecture. Readings are not mandatory. A Quiz that covers the material taught in class will be given at the end of each module. The quizzes will take place at the first 10 minutes of class before a new module is introduced. There will be no makeup quizzes. For grading purposes the best 3 out of 4 quizzes will averaged.

Absence from exams should be fully supported before alternative date for makeup exam is scheduled.

**Course evaluation:**

Module quizzes (3 out of 4) 20%

| | |
|---|---|
| Midterm exam | 35% |
| Final exam | 35% |
| Attendance | 10% |

Course schedule:

**August 28** Introduction

## Module I: Dating

**August 30** Absolute dating techniques + radiocarbon

**September 4** Radiometric dating: Uranium series, $^{40}Ar/^{39}Ar$

**September 6** Trapped charge dating and amino-acid racemization.

**September 11** Dating Quiz

## Module II: Imaging

**September 11** Optical Microscopy

**September 13** Sample preparation and optical microscopy demonstration

**September 18** Scanning Electron microscopy

**September 20** Visit to the Material Sciences SEM facility

**September 25** Imaging Quiz

## Module III: Biomolecular techniques

**September 25** Ancient DNA

**September 27** visit to a forensic DNA laboratory

**October 2** Stable isotopes (IRMS)

**October 4** Residue analysis

**October 9** MIDTERM EXAM

## Module IV: Tracing methods

**October 11** XRF, EDS-SEM, NAA

**October 16** ICP-MS

**October 18** FTIR, XRD

**October 23** visit to the CESE ICP-MS + XRF

**October 25** Tracing Methods Quiz

## Module V: Shape analysis

**October 25** from caliper to Micro-scribe

**October 30** radiography and CT scanning

**November 1** 3D scanning

**November 6** Shape analysis Quiz

## Module VI: Integrating Methods

**November 8** Early evidence for the use of fire

**November 13** Reconstructing the Neanderthal diet

**November 15** Domestication: Zooarchaeology and genetics

**November 20** THANKSGIVING RECESSION

**November 22** THANKSGIVING RECESSION

**November 27** Domestication: plants

**November 29** Authenticity of artifacts: Turin Shrouds

**December 4** The mystery of Ötzi the iceman

**December 6** Last Class (review session)

## Bibliography for the enthusiastic Students:


Bowman, S. 1990 Interpreting the past, radiocarbon dating. University of California/British Museum, Berkeley. ( library calling number: CC78 .B68 1990)

Brothwell, D. R., Pollard, A. M., 2001. Handbook of Archaeological Sciences. John Wiley & Sons Ltd., Chichester.

Malainey, M. E., 2010. A consumer's guide to archaeological science: Analytical techniques**.** Springer, New-York.

Weiner, S., 2010. Microarchaeology, beyond the visible archaeological record. Cambridge University Press, Cambridge. (library calling number: CC75.7; .W45 2010)