Archaeology and Craft: Experimental Archaeology and the Materials Science of Ancient Technologies
Brown University, Spring 2011

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Wiki: http://proteus.brown.edu/archandcraft11/13667

Class Meetings: Wednesdays 3-5:20, Rhode Island Hall, Room 008.

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Arch ‘n Craft: Course Scope
How did people in the past make the things that archaeologists find today? How can archaeologists learn about processes of design, engineering, and technological change from ancient objects? These are among the most challenging questions facing archaeologists, who typically build interpretations by reverse engineering - working from fragmented material culture remains.

This class examines how ancient craft technologies were developed, learned, and performed cross-culturally. Students will approach production questions from the opposite direction through firsthand involvement with craft processes and materials analysis - from raw materials to finished objects. “Arch ‘n Craft” is intensively hands-on and is centered on the problem-oriented production of two types of archaeological objects: ceramics and metal. As an applied archaeology class, each week involves a practicum; these will progress, over the course of the semester, from studying manufacturing traditions, examining raw materials, crafting and firing objects, to evaluating resulting material properties post-production. Practicums will draw heavily on tools, activities, and ideas from within and beyond the discipline, ranging from actual participation in blacksmithing and kiln design to learning about pyrotechnology, mechanical properties, and archaeometric techniques.

Course practicums will culminate in an attempt to replicate the production processes of either ancient pottery or wrought iron. Objects to be crafted will be based on, and later compared with examples that the class selects from the Haffenreffer Museum collections. Background information necessary for contextualizing the crafted materials is introduced in the weekly readings, which are drawn from archaeology, materials science (engineering), and museum studies. The results of the class research and accompanying experimental replications will be the basis for the final class project – an exhibit created in collaboration with the Haffenreffer Museum displayed at the Sciences Library.

Weekly in-class workshops with presentations and occasional field trips are included. Enrollment is limited to 15.

No prerequisites.

OBJECTIVES
Upon successful completion of this course, students will
• Demonstrate a critical understanding of the research, interpretation and processes of experimental archaeology within the context of archaeological examples and principles of Materials Science
• Read and articulate studies relevant to course topics from a variety of disciplinary perspectives
• Strengthen independent and outside research practices and learn to apply these to course practicums
• Learn to work and communicate effectively during regular in-class group assignments
• Contribute to an archaeologically-informed replication of an ancient production technology
• Collaborate to produce an exhibit based on class experiments
CLASS MEETING STRUCTURE
Each week students will be assigned background readings and questions to guide the week’s topic and accompanying in-class practicum. **Students are expected to prepare required readings before each class.** Classes will begin with an introduction to the week’s topic, and will, on occasion, involve short oral presentations by students on selected case studies (to be assigned during the semester).

The second half of each class will usually involve a practicum, to be conducted in assigned groups. Each class involving a practicum will conclude with presentation and discussion of group results.

**Note on Practicums:** Before each class, questions will be circulated to guide background research necessary for in-class practicums, discussion, and design activities. Each practicum builds upon the prior weeks’ work, therefore groups will remain the same for the duration of the semester. Students will be expected to conduct extra outside research necessary to prepare for the practicum – it is up to each group to decide how best to divide the labor. References will be provided on the wiki as **starting points** for practicum preparation. Students are also strongly encouraged to consult sources from other disciplines with which they are familiar.

ASSESSMENTS
The format of this class invites creativity and exploration, and therefore requires active participation by everyone. Students will collaborate regularly in small research groups. Results of these collaborations will then be presented and discussed with the class. Students’ contributions in class and in-group activities will be evaluated three times during the semester in order to assess individual performance fairly.

Following each class meeting, students will post a short evaluation (blog) to the course wiki that identifies areas and reasons for successes, failures, and possible improvements in relation to the practicum. At the end of the semester, the class will work together to develop an exhibit about experimental archaeology based on the course exercises and informed by these blogs and data gathered.

- In-class participation, and practicum & exhibit preparation – 35%
- **3 practicum write-ups** – 18% (6pts each)
  ~500-700 words each; submit under group or individual wiki section, depending on assignment
- **5 wiki posts** – 10% (2pts each)
  ~200 words – to be written and submitted individually under individual student wiki links
- **3 individual assessments** – 6% (2pts each)
  ~200 words – to be submitted individually to the TA, and addressing your contributions / role in group activities and group dynamics overall
- **1 oral presentation (on a case study) - 6%**
  ~oral presentation and accompanying visuals, not to exceed 10 mins, on an experimental archaeology case study of your selection. Dates to be assigned in class.
- Participation in experimental replication(s) – 10%
- Final Report (group product – combining Weeks 9, 10, 12) – 10%
  ~2,000 – 3,000 words – one submission per group
- Exhibit design and presentation – 5%

**ACADEMIC INTEGRITY**
Brown’s Academic Code is posted on the Dean of the College’s webpage: [http://www.brown.edu/Administration/Dean_of_the_College/curriculum/academic_code.php](http://www.brown.edu/Administration/Dean_of_the_College/curriculum/academic_code.php). Please revisit the code’s guidelines, as “misunderstanding the code is not an excuse for dishonest work.”
SCHEDULE

Background. Ancient Technologies and Reverse Engineering

Week 1 (Jan 26). Introduction to Experimental Archaeology

Practicum 1

Required Readings (to be completed before Week 1):


Supplemental Readings (optional):

“Arts and Crafts”, Ch. 5 in J. Coles, 1979, Experimental Archaeology, p. 159-208.

Part 1. Metal Production: Smelting and Smithing

Week 2 (Feb 2). The Metal Production Process and Introducing Reverse Engineering (Archaeometry)

Guest Lecture: Kevin Smith, Haffenreffer Museum of Anthropology

Practicum 2

Required Readings (to be completed before Week 2):


Hodges , H. 1988. Iron and Steel, Ch. 5 in Artifacts: An Introduction to Early Materials and Technology, p.80-90


Supplemental Readings (optional):


Week 3 (Feb 9). Raw Materials and Fuel: Physical Properties, Location, Extraction, and Preparation

Ore and examples of reconstructed smelting operations

Practicum 3

Required Readings:


Senn, M. et al. 2009. Tools to qualify experiments with bloomery furnaces, Archaeometry, 52(1)


Supplemental Readings (optional):


*Due this week*: Turn in (on wiki) write-up for Week 2 practicum, as an individual product.

Week 4 (Feb 16). Pyrotechnology: Furnaces, Firing Processes, and Physical Properties

Practicum 4

Required Readings:

Ironworking (Schmidt)


Brandon, R. 2004. The Pangwa practice of iron smelting (includes sections on building a furnace, processing ore, etc.), Ch. 5 in An Ethnoarchaeological Study of Iron-Smelting Practices among the Pangwa and Fipa in Tanzania.

*Due this week*: Post (on wiki) entry about Week 3 practicum.

Week 5 (Feb 23). Form and Function: Crafting Objects and Materials Science Considerations

Practicum 5

Required Readings:


Supplementary Readings (optional):
Revisit readings in Brandon (2004)


*Due this week*: Turn in (on wiki) write-up about Week 4 practicum as a group product (1 submission per group).

Week 6 (Mar 2). Experiencing or Experimenting with Iron Production?

Either: Field Trip to Saugus Ironworks or creation of a mini-bloomery

*Due this week*: Post (on wiki) entry about Week 5 practicum.

AND

Individual assessment # 1 – Turn in to TA.
Part 2. Ceramic Production

Week 7 (Mar 7). *Raw Materials and Fuel: Physical Properties, Location, Extraction, and Preparation*

**Practicum 6**

**Required Readings:** (ore processing, geochemistry, etc.)


**Supplementary Readings** (optional):


- Revisit: Tite 1999 from Week 2

*DUE this week*: Turn in (on wiki) write-up about Week 6 practicum (product, individual or group, TBD).

Week 8 (Mar 16). *Form and Function: Crafting Ceramic Vessels I – Techniques and Materials Science Considerations*

**Practicum 7**

**Required Readings:**

- Sinopoli, C. 1991. Defining Ceramics, Ch. 2 in *Approaches to Archaeological Ceramics*.


**Supplementary Readings** (optional):


*Due this week*: Post (on wiki) entry about Week 7 practicum.

**Week 9 (Mar 23) Pyrotechnology: Firing Processes, and Physical Properties**

**Practicum 9**

**Required Readings:**
Dawson, David, & Kent, Oliver 1985 “Kiln superstructures – the Bickley experiments”, in Bulletin of the Experimental Firing Group 3, 70-79.

Dawson, David, & Kent, Oliver 1984 “Methods of kiln reconstruction”, in Bulletin of the Experimental Firing Group 2, 13-17.


Velde, B. and I. Druc, 1999. *Ch. 5.4 + 5.5* p. 96-1137 and *Ch. 6.7*, p. 169-175.


**Supplementary Readings** (optional):
Rice 1987 (Chapters 11, 12)


*Due this week*: Post (on wiki) entry about Week 8 practicum.

AND

Individual assessment #2, turn in to TA.

**SPRING BREAK!!!**
Part 3. Experiments in Action

Week 10 (Apr 6). *Experiment Preparation*

**Practicum 10**

Required Readings:

Week 11 (Apr 13). *Form and Function: Crafting Ceramic Vessels 2 – Techniques and Materials Science Considerations*

**Practicum 11** – Making ceramics

*Due this week* : Post (on wiki) entry about Week 10 practicum.

Week 12 (Apr 20). *Experimental Firing and Evaluation*

**Practicum 12** - Experimental firing. Evaluation of Technological Process

Week 13 (Apr 27). *Wrap-up and Exhibit Preparation*

Required Readings:

*Due this week* : Turn in (on wiki) report, addressing practicums from Weeks 9, 10, and 12 – as a group product.

Week 14 (May 4). *Exhibit Presentation*

*Due this week* : Fully-mounted exhibit

AND

Individual assessment #3 – turn in to TA.