ANTHROPOLOGY 4183C Spring 2006
ARCHAEOLOGICAL SCIENCE USF - Tampa

Instructor: Dr. Robert H. Tykot (Associate Professor)
Office: SOC 046A
Office Hours: TR 11:00-12:00 pm
Phone: 813 974-7279
Email: rtykot@cas.usf.edu
Website: http://shell.cas.usf.edu/~rtykot/

COURSE DESCRIPTION

This course focuses on the application of scientific methods of analysis to archaeological materials including bone, stone, pottery, and metal. Methods include absolute dating, remote sensing, optical and SEM microscopy, elemental and isotopic analysis. Laboratory sections provide hands-on experience with a variety of archaeological materials and analytical methods.

PREREQUISITES

By permit only. A working knowledge of archaeology and archaeological methods is expected (e.g. from ANT 3101); prior course work in geology or chemistry is useful but not required.

READINGS

Required: Banning, E.B. 2000. *The Archaeologist's Laboratory*. New York: Kluwer.

Recommended: Herz, N. & E.G. Garrison. 1998. *Geological Methods for Archaeology*. New York: Oxford University Press.

A complete set of additional articles will be made available.

GRADES

Grades will be based on seven quizzes (50%), laboratory exercises (15%); a term paper (25%); a presentation of your term paper topic (5%); and class participation (5%). All students are expected to come to class prepared to discuss the assigned readings, and to participate in all laboratory sections. Course letter grades will be based on a curved standardized score with "A" awarded for 94-100; "A-" for 90-93; "B+" for 87-89; "B" for 84-86, "B-" for 80-83; "C+" for 77-79; "C" for 74-76; "C-" for 70-73; "D+" for 67-69, "D" for 64-66; and "D-" for 60-63.

OTHER POLICIES

This is a small upper-level anthropology course, and your regular attendance and participation is expected. There will also be material presented in class which is not in the readings but will be on the quizzes. Students who anticipate being absent from class due to observation of a major religious observance must provide advance written notice of the date(s) to the instructor. There will be NO make-up quizzes or excuses for late papers except in fully documented serious circumstances. A make-up quiz must be taken within one week of the missed quiz. Academic dishonesty, including plagiarism and cheating, will be punished according to University Guidelines, and may result in the receipt of an "F" on a paper (for plagiarism), an "F" in the course, suspension or expulsion from the University. Notes or tapes are permitted for purposes of sale only with the express written consent of the instructor.

ANTHROPOLOGY 6198 Spring 2006
ARCHAEOLOGICAL SCIENCE USF - Tampa

Instructor: Dr. Robert H. Tykot (Associate Professor)
Office: SOC 046A
Office Hours: TR 11:00-12:00 pm
Phone: 813 974-7279
Email: rtykot@cas.usf.edu
Website: http://shell.cas.usf.edu/~rtykot/

COURSE DESCRIPTION

This course focuses on the application of scientific methods of analysis to archaeological materials including bone, stone, pottery, and metal. Methods include absolute dating, remote sensing, optical and SEM microscopy, elemental and isotopic analysis. Laboratory sections provide hands-on experience with a variety of archaeological materials and analytical methods.

PREREQUISITES

By permit only. A working knowledge of archaeology and archaeological methods is expected (e.g. from ANT 3101); prior course work in geology or chemistry is useful but not required.

READINGS

Required: Banning, E.B. 2000. *The Archaeologist's Laboratory*. New York: Kluwer.

Recommended: Herz, N. & E.G. Garrison. 1998. *Geological Methods for Archaeology*. New York: Oxford University Press.

A complete set of additional articles will be made available.

GRADES

Grades will be based on quizzes (40%), laboratory exercises (10%); weekly presentations and discussion (15%), a term paper (30%); and a presentation of your term paper topic (5%). All students are expected to come to class prepared to discuss the assigned readings, and to participate in all laboratory sections. Course letter grades will be based on a curved standardized score with "A" awarded for 94-100; "A-" for 90-93; "B+" for 87-89; "B" for 84-86, "B-" for 80-83; "C+" for 77-79; "C" for 74-76; "C-" for 70-73; "D+" for 67-69, "D" for 64-66; and "D-" for 60-63.

OTHER POLICIES

This is a small upper-level anthropology course, and your regular attendance and participation is expected. There will also be material presented in class which is not in the readings but will be on the quizzes. Students who anticipate being absent from class due to observation of a major religious observance must provide advance written notice of the date(s) to the instructor. There will be NO make-up quizzes or excuses for late papers except in fully documented serious circumstances. A make-up quiz must be taken within one week of the missed quiz. Academic dishonesty, including plagiarism and cheating, will be punished according to University Guidelines, and may result in the receipt of an "F" on a paper (for plagiarism), an "F" in the course, suspension or expulsion from the University. Notes or tapes are permitted for purposes of sale only with the express written consent of the instructor.

ARCHAEOLOGICAL SCIENCE LECTURE/LAB TOPICS
(schedule as of February 22, 2006)

H&G = N. Herz & E.G. Garrison, *Geological Methods for Archaeology*, Oxford University Press, 1998.
R&H = G. Rapp & C.L. Hill, *Geoarchaeology: The Earth-Science Approach to Archaeological Interpretation*, Yale University Press, 1998.
P&H = A.M. Pollard & C. Heron, *Archaeological Chemistry*, Royal Society of Chemistry, 1996.

Jan. 10 **Introduction. Archaeological Science & Archaeometry**
P&H chaps. 1, 10
De Atley, S.P.& R.L. Bishop. 1991. Toward an integrated interface for archaeology and archaeometry, in R.L. Bishop & F.W. Lange (eds.), *The Ceramic Legacy of Anna O. Shepard*, 358-82. Colorado Press.
Killick, D. & S.M.M. Young. 1997. Archaeology and archaeometry: from casual dating to a meaningful relationship? *Antiquity* 71: 518-23.
Jones, A. 2004. Archaeometry and Materiality: Materials-Based Analysis in Theory and Practice. *Archaeometry* 46(3), 327-338.

Jan. 13 **Data. Classification of materials. Lab.**
Banning chaps. 1-6
USF facilities, safety procedures, project selection.

Jan. 17 **How old is it? Dating methods in archaeology**.
R&H chap. 7; Banning chaps. 13-15
Taylor, R.E. 2000. Fifty years of radiocarbon dating. *American Scientist* 88: 60-67.

Jan. 20 **Lab: Radiocarbon dating and calibration.**
Taylor, R.E. 1997. Radiocarbon dating. In R.E. Taylor & M.J. Aitken (eds.), *Chronometric Dating in Archaeology*, 65-96. Plenum.
Grad student presentations (dating)

Jan. 24 ***Quiz 1 (Dating Methods)***
Soils
Guest Lecture & Lab Demo: Dr. Christian Wells (USF)
H&G chap. 3; Banning chap. 12; Wells 2004

Jan. 27 **Making pottery** (Guest Lecturer: John Wissinger, City of Tampa Ceramicist)

Jan. 31 **Geoarchaeology in Yemen** (Guest Lecture: Dr. Rick Oches, in NES 323)
H&G chap. 2
Lab: Amino Acid Geochronology (with Dr. Rick Oches, SCA 514)
P&H chap. 8
Johnson, B.J. & Miller, G.H. 1997. Archaeological applications of amino acid racemization. *Archaeometry* 39(2): 265-287.
Parfitt, S.A. et al. 2005. The earliest record of human activity in northern Europe. *Nature* 438: 1008-1012.

Feb. 3 ***Quiz 2 (Geomorphology, Soils)***
Preparation of Beverages including Beer
Guest Lecturer: Dr. Lisa Kahn (USF St. Petersburg)

Feb. 7 **What plants did they eat?** Special topic: plant domestication.
Zohary, D. 1999. Domestication of the Neolithic Near Eastern crop assemblage. In P.C. Anderson (ed.), *Prehistory of Agriculture. New Experimental and Ethnographic Approaches*, 42-50. Institute of Archaeology, UCLA.
McClung de Tapia, E. 1992. The origins of agriculture in Mesoamerica and Central America. In C.W. Cowan & P.J. Watson (eds.), *The Origins of Agriculture: An International Perspective*, 143-171. Smithsonian.
What was the environment? Microbotanical remains: pollen and phytoliths.
Holloway, R.G. 1997. Excavation and recovery of botanical materials from archaeological sites. In T.R. Hester, H.J. Shafer & K.L. Feder (eds.), *Field Methods in Archaeology*, 283-297. Mayfield.
Grad student presentations (paleoethnobotany)

Feb. 10 **Lab: flotation & paleoethnobotanical analysis** (Jeff Du Vernay/Dan Tyler: SOC 047)
Banning chap. 11
Lab: phytolith studies (R. Bowers)

Feb. 14 **Did they eat meat?** Topics: scavenging & hunting; domestication.
Banning chap. 10
Baker, B.W., B.S. Shaffer & D.G. Steele. 1997. Basic approaches in archaeological faunal analysis. In T.R. Hester, H.J. Shafer & K.L. Feder (eds.), *Field Methods in Archaeology*, 298-318. Mayfield.
Grad student presentations (zooarchaeology)

Feb. 17 ***Quiz 3 (Zooarchaeology, paleobotanical studies)***
Banning chap. 8
Lithics demonstration (Guest Lecture/presentation: Dr. Fred Sellet and Bill Boynton)

Feb. 19 Optional Sunday meeting: Kiln preparation and pottery firing. 10-5 at John Wissinger's house.

Feb. 21 Grad student presentations (lithics)
What is it made of? Elements, compounds, minerals, alloys.
P&H chap. 2; H&G chaps. 10, 12

Feb. 24 **What is it made of?** (continued)
H&G chap. 11; P&H appendices.
Grad student presentations (ancient technology)

Feb. 28 **How was it made?** Materials analysis in archaeology.
Kingery, W.D. 1996. Materials science and material culture. In W.D. Kingery (ed.), *Learning from Things. Method and Theory of Material Culture Studies*, 181-203. Washington, DC, Smithsonian Press.
Banning chap. 9; H&G chap. 13
Lab: optical microscopy

Mar. 3 **Lab: scanning electron microscopy** (NAN, with Jay Bieber)
Lab: XRD
Tite, M.S. 1999 Pottery production, distribution, and consumption- the contribution of the physical sciences. *Journal of Archaeological Method and Theory* 6:181-233.

Mar. 7 **What does it look like?** Microscopy of archaeological materials.
Killick, D.J. 1996. Optical and electron microscopy in material culture studies. In W.D. Kingery (ed.), *Learning from Things. Method and Theory of Material Culture Studies*, 204-230. Washington, DC, Smithsonian Press.
Grad student presentations (microscopy applications)

Mar. 10 *no class*

Spring break

Mar. 21 ***Quiz 4 (Material Science, Microscopy)***
Total Station/GPS - Lori Collins/Travis Doering
Rick, J.W. 1996. Total stations in archaeology. *SAA Bulletin* 14(4): 24-27.

Mar. 24 **Remote Sensing** (Guest Lecture: Dr. Chuck Connor, SCA 534)
Ground penetrating radar & proton magnetometry (Dr. Sarah Kruse, SCA 522)
H&G chap. 8

Mar. 28 **Computers in Archaeology** (Guest Lecturer: Richard Estabrook, USF)
Wheatley, D. & M. Gillings. 2002. Chapter 1 of *The Archaeological Applications of GIS*. London: Taylor & Francis.
Wescott, K.L. & R.J. Brandon (eds.). 2003. *Practical Applications of GIS for Archaeologists: A Predictive Modeling Toolkit*. London: Taylor and Francis. online: http://www.netLibrary.com/urlapi.asp?action=summary&v=1&bookid=96865
Grad student presentations (computer applications)

Mar. 31 ***Quiz 5 (Remote sensing, electronic/computer based applications)***
Where did it come from? Provenance studies in archaeology.
R&H chap. 6
Tykot, R.H. 2002. Determining the source of lithic artifacts and reconstructing trade in the ancient world. In P.N. Kardulias & R. Yerkes (eds.), *Written in Stone: The Multiple Dimensions of Lithic Analysis*, 59-85. Maryland: Lexington Books.

Apr. 4 **Provenance studies (continued)**
Tykot, R.H. 1997. Characterization of the Monte Arci (Sardinia) obsidian sources. *Journal of Archaeological Science* 24: 467-479.
Grad student presentations (provenance/trade studies)

Apr. 7 *Quiz 6 (provenance studies)*
What did they eat and how much? Paleodietary analysis and bone chemistry.
Mays, S. 1998. Chemical analysis of bone. Chapter 9 in S. Mays, *The Archaeology of Human Bones*, 182-196. Routledge. [less detailed but easier read than Larsen article]
Larsen, C.S. 1997. Isotopic and elemental signatures of diet and nutrition. Chapter 8 in C.S. Larsen, *Bioarchaeology. Interpeting Behavior from the Human Skeleton*, 270-301. Cambridge University Press.
Lab: demonstration of sample preparation

Apr. 11 **Lab: stable isotope mass spectrometry** (Marine Science, St. Petersburg campus)
Lab: ICP spectroscopy

Apr. 14 *no class*

Apr. 18 **Reconstructing life histories**. Applications and recent advances in bone chemistry.
Katzenberg, M.A. & R.G. Harrison. 1997. What's in a bone? Recent advances in archaeological bone chemistry. *Journal of Archaeological Research* 5(3): 265-293.
Grad student presentations (stable isotope analysis)

Apr. 21 **Ancient DNA and organic residues.**
Mays, S. 1998. The study of DNA from ancient bones. Chapter 10 in S. Mays, *The Archaeology of Human Bones*, 197-206. Routledge.
Brown, T.A. & K.A. Brown. 1994. Ancient DNA Using molecular biology to explore the past. *BioEssays* 16: 719-26.
Evershed, R.P., C. Heron, S. Charters & L.J. Goad. 1992. The survival of food residues. New methods of analysis, interpretation and application. In A.M. Pollard (ed.), *New Developments in Archaeological Science*, 187-208. New York: Oxford University Press.
Grad student presentations (DNA, residues)

Apr. 25 ***Quiz 7 (Isotopes, DNA, Residues)***
Student Project Presentations

Apr. 28 no class - SAA

May 1 papers due