

ANTH 280- Of Trowels and Transects: An Introduction to Archaeological Science

Semester:

Meeting time:

Classroom:

Instructor:

Office:

Office hours:

Office number:

Email:

Course Description: A general introduction to the aims, methods, and history of the science of anthropological archaeology, one of the four main subfields of general Anthropology. Topics covered include site formation and research design, survey methods, data collection, laboratory analysis, site and artifact dating techniques, reconstructing and interpreting the past, history of the discipline, contemporary theoretical approaches, contemporary archaeological practice, and the ethics of archaeology. Case studies will be used to reveal these topics.

Archaeology as a natural science

Archaeology is the scientific study of the material remains (artifacts) and traces of the human past. As with other sciences, it tests hypotheses about an incredibly wide range of topics by following the scientific method and through experimentation. Many of the questions archeologists ask about the human past and principles archaeologists use to understand it are identical those employed in other natural sciences as detailed below. Thus, studying archaeological science will equip student with the tools and knowledge to know the natural world. Just a few of the questions archaeologists may ask include, what was the environment like at the time under investigation, how did it change over time, and what impact did that change have on life there? What was the landscape like at the time it was occupied, how did it change over time, and what impact did that change have on life there? What was the diet of the species under investigation? What are the sources of rocks and minerals found on the landscape? What is the chronology of a society, from its appearance to its demise? How did a population grow, and change over time? What was a population's sex ratio, birth and mortality rates, stature, and overall health?

As with other sciences, archaeological data are collected systematically, in a standardized manner allowing for comparison within and between sites, while the field itself has its own theoretical framework within which the research is performed. Most data are gathered through a combination of survey and excavation. Survey is the systematic sampling of an area whereby equally-spaced transects are established and artifacts and other traces of the human past are sought. Such sampling ranges from simply walking transects and recording all artifacts encountered, to making small excavations at regular intervals along each transect searching for the extent of a site. It also includes non-invasive techniques such as deploying a variety of machines that can detect underground anomalies, aerial photography, and air-born laser scanning (LiDAR), which detects topographic changes on the ground, especially architectural remains (houses, temples, terraces, roads, etc.).

Excavation begins by establishing a grid over a site, creating standardized units, which are then chosen for excavation either through random or selective sampling. Excavations proceed following two concepts common to Geology, Stratigraphy and the Law of Superposition. Strata are the series of layers underground indicating periods of activity, which archaeologically reflect either human or non-human

events, and stratigraphy is the study of those layers. The Law of Superposition helps archaeologists sort events and artifacts chronologically. It states that, generally speaking, the strata which are deeper in the ground are older than those above them, with the current ground surface being the most recent. Within each unit of archaeological excavation, soil is carefully scraped away in each strata, uncovering artifacts, and other material traces of the human past, all of which are mapped in three-dimensions (x, y, and z axis). The objects from each stratum in each unit are collected together, becoming comparative units of data from within the site. Archaeologists also employ the concepts of provenience and context in their excavations. Provenience refers to the exact vertical and horizontal position within the excavation unit and the site itself an artifact was found. Context refers to the other artifacts, their relationships with each other, the provenience, the soil, and everything else within a particular stratum.

Archaeological data are wide ranging and depend on the hypothesis being tested and research question asked, but most commonly include stone, ceramics, faunal remains, plant remains, and human skeletal remains. Each of these classes of data are further subjected to laboratory analyses based on the hypothesis being tested. The rest of this paragraph provides only a small sample of laboratory analyses performed on archaeological data; it is intended to demonstrate the great overlap between archaeological questions and data with those of the other natural sciences. In other words, underlying archaeological knowledge is an understanding of the same fundamental principles governing the natural world. Stone and ceramics may be analyzed using techniques common to geology and physics, such as petrography and instrumental neutron activation analysis, x-ray diffraction, and inductively coupled plasma mass spectrometry for sourcing of raw materials. Faunal (animal) remains, including aquatic species, can be used to understand diet, help reconstruct the environment and trace climate change, and they can help provide a chronological context for a site through radiocarbon dating. Plant remains are similar to animal remains in that they can help in environmental reconstruction and understanding climate change through the study of pollen and phytoliths. They are also the primary means archaeologists use to date sites through radiocarbon dating. Human skeletal remains can be subjected to isotopic studies common to biology, including oxygen, nitrogen, carbon, and strontium. If multiple skeletons are found at a site, they may also be subjected to demographic analyses.

Prerequisite/Corequisites: There are no prerequisites or corequisites for this class.

Student Learning Outcomes

Upon completion of this coursework, students will/will be able to:

- Describe the different major theoretical paradigms of archaeological practice. **(Topics 1, 3, 5, 7)**
- Differentiate between the methods used by archaeologists to date archaeological artifacts and sites **(Topics 7 through 12, and associated labs).**
- Construct, formulate, and refine archaeological hypotheses based on observation **(Topics 3 through 7, 11, and associated labs)**
- Describe the scientific method and how archaeologists test hypotheses **(Topics 1 through 3 specifically, and all topics with KF readings)**
- Debate common ethical problems of archaeological practice (Ethics of the past, archaeological practice as destructive science using non-renewable resources, politics of representation, who

owns the past, community engagement, the power of the past in questions for self-determination, etc.; **Topics 2, 3, 13, 14**)

General Education Learning Outcomes

Upon completion of this coursework, student will/will be able to

- Describe and/or apply principles and methods that are necessary to understand the physical and natural world (**Topics 1, 3, 4, 6 through 11**).
- Compare and contrast relationship within and between human cultures (**Topics 8 through 13**)
- Communicate effectively in writing, using conventions appropriate to various contexts and diverse audiences (**Final research assignment, and lab write-ups**)
- Find, evaluate, and use authoritative and/or scholarly information to comprehend a line of inquiry
- Describe the importance of diverse experiences, thoughts, and identities needed to be effective in working and living in diverse communities and environments (**Final research assignment and library workshop**).

Expectations for students:

- Students are here to learn and will be active and engaged participants in their education.
- Students will be respectful of and open to listening to diverse viewpoints and cultural differences encountered in the classroom and the readings.
- Students will attend and contribute to class regularly.
- Students will come to class having completed the assignments for that day (readings, homework, etc.).
- Students should be prepared to engage in respectful, academic, evidence-based conversations with one another and the professor every class meeting.
- Students will consider their own learning and that of their peers before using electronic devices in the classroom: Ask yourself, “Will using the device have a positive impact on my learning, what about my classmates, or will it distract me or those people around me?”

Course Materials:

Credit hour policy: Per University policy, students are expected to spend a minimum of two hours outside of the classroom each week for each unit of credit engaged in learning. As a three-unit course, students in this class should expect to spend a minimum of six hours per week outside of the classroom engaged in learning. That time will be spent on course readings, take-home labs assignments, and a final paper.

Required textbooks:

- Primary textbook:
 - (RB) Renfrew, Colin, and Paul G. Bahn 2015 *Archaeology Essentials: Theories, Methods, and Practice*. 3rd ed. Thames & Hudson, New York. ISBN 978-0-500-29159-7.
 - (KF) Feder, Kenneth 2018 *Frauds, Myths, and Mysteries: Science and Pseudoscience in Archaeology* 9th ed. Oxford University Press, New York ISBN 9780190629656
 - This textbook uses scientific data and rational thought to critically analyze commonly held unsubstantiated claims and beliefs about the human past (such as ancient aliens, and Atlantis) and to debunk the culture of pseudoscience surrounding it, found especially in pop culture (Ancient Aliens tv show, occult newspapers, and the internet).

- Supplemental texts (one per semester) used to demonstrate the everyday excitement and frustrations of archaeological field work, and supplement chapters in textbooks with actual experiences. These readings will be spaced out evenly over the course of the semester and will be used for pointed discussions
 - Adams, Amanda 2010 *Ladies of the Field: Early Women Archaeologists and Their Search for Adventure*. Greystone Books, D&M Publishers, Inc., Berkeley.
 - Grove, David C. 2014 *Discovering the Olmecs: An Unconventional History*. The William and Bettye Nowlin Series in Art, History, and Culture of the Western Hemisphere. University of Texas Press, Austin.
 - Johnson, Marilyn 2014 *Lives in Ruins: Archaeologists and the Seductive Lure of Human Rubble*. HarperCollins, New York.
 - Kirkpatrick, Sidney D. 2011 *Lords of Sipan: A True Story of Pre-Inca Tombs, Archaeology, and Crime*. William Morrow and Company, New York.
 - Reinhard, Johan 2005 *The Ice Maiden: Inca Mummies, Mountain Gods, and Sacred Sites in the Andes*. National Geographic, Washington, D.C.
 - Spector, Janet D. 1993 *What This Awl Means: Feminist Archaeology at a Wahpeton Dakota Village*. Minnesota Historical Society, St. Paul.

Statement on University Writing Requirement

All CSU undergraduate students must demonstrate competency in writing skills as a requirement for graduation. The All-University Writing Requirement mandates every undergraduate course at the University must have a writing component achieved in a variety of ways.

For more information

<https://www.csusm.edu/policies/active/documents/all%20university%20writing%20requirement.html>

This course requirement will be met through laboratory write-ups, a research paper, and exams

Grading:

3 exams (40% total; 2 midterms 10% each; final exam 20%)

Participation (15%; including field trips, attendance of guest lectures and films, and discussion)

Archaeology take-home labs (five, with one-and-a-half to two-page write-ups) (25%)

Final project (student will conduct scholarly research on a class-related topic or aspect of archaeology of personal interest and write a 10-page paper on that topic.) (20%)

COURSE POLICIES

Academic honesty policy

Students are expected to adhere to the standards of academic honesty and integrity outlined in the Student Academic Honesty Policy. All assignments must be original work to this class, clear, and error-free. All ideas/material that are borrowed or paraphrased from other sources must have appropriate references to the original sources. Any quoted material should give credit to the source and be punctuated accordingly.

Academic Honesty and Integrity Policy: Students are responsible for honest completion and representation of their work. Your course catalog details the ethical standards and penalties for infractions. There will be zero tolerance for infractions in this class. If you believe there has been an infraction by someone in the class, please bring it to the instructor's attention. The instructor reserves the right to discipline any student for academic dishonesty, in accordance with the general rules and regulations of the university. Disciplinary action may include the assignment of a failing grade for an exam, assignment, or the class as a whole. As a student of

CSUSM, you are expected to be familiar with, and abide by, the university's Academic Honesty Policy in its entirety, found [here](#).

Review the above policy, and after you have done so, e-mail me acknowledging you have read, understood, and will abide by the policies there, as well as those laid out in this syllabus. Students are expected to abide by all university and course policies whether or not they have sent this email to the professor.

ADA policy

Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation from the Office of Disabled Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909, and by email sent to dss@csusm.edu. Students authorized by DSS to receive reasonable accommodations should discuss their needs with me during my office hours to ensure confidentiality.

Attendance and participation policy

Attendance and active participation in class is required as part of university and department policy, and will have indirect and direct impacts on your final grade. Since you will be expected to know the material covered in class meetings, discussions, and movies for the exams, you should expect to attend every class. If you are going to miss class, please do not e-mail me and ask if we are going to go over anything important, or if I can go over what you missed in class. Everything we go over is important, and I cannot give private lectures. If you need to miss a class, make arrangements beforehand with one of your classmates to take notes for you, if possible, and then come see me during office hours for items you need further clarification.

Class participation can add or subtract from your final grade *outside* of the point system, and made at the instructor's discretion. For students who consistently make positive contributions to class discussions, and who come to class well prepared, I may raise their grade by a half-grade (e.g., from a B to a B+). Likewise, students who are disruptive in class, are poorly prepared for discussions, or have an excessive number of absences will have their grade reduced by a half-grade (e.g., from a C to a C-). **Students missing more than 8 classes will receive an F in the course, regardless of standing.**

Electronics policy

[Countless studies](#) have shown taking notes by hand rather than by computer greatly improves retention. This same suite of studies has shown the use of electronic devices for non-class purposes distracts those around you from learning as well. For your benefit and the sake of your classmates, keep electronics use to a minimum during class time, including laptops, as well as using devices for tweeting, instagramming, pinteresting, etc. If electronic use becomes a distraction for your classmates or me, those devices will be banned in the classroom for everyone.

Absolutely no audio or video recording, or photographing of lectures is permitted unless due to need documented by Office of Disabled Student Services and previously cleared with the professor during office hours.

If you missed something that was on a slide or something remains unclear, please do not hesitate to ask me to go back and clarify, ask a fellow student for notes after class, or come see me during office hours.

Email policy

College is a professional setting and your e-mails here are formal communications with other professionals. Always use your CSUSM e-mail account when e-mailing the professor. I will not open messages sent from private accounts, especially those containing attachments. Each new message should have an informative subject (e.g., question about class topic), a proper greeting (e.g., Dear Dr. Spenard), and a salutation that includes your name and my class you are attending (e.g., sincerely, Your Name, ANTH 215).

I check my e-mail regularly and will try to respond within 24 hours on the weekdays (M-Th), and 48 hours over the weekend (F-Su). If you have not heard from me by that time, resend your e-mail, or, better yet, come talk to me during office hours.

Typically, I respond to e-mails until 8:00 pm the night before a major deadline (term paper, exam, etc.); however, I will not answer questions requiring complex responses (e.g., Can you explain differences between the Out of Africa and Multiregional evolutionary models again?). Such questions are best asked during class or in office hours where we can have a face-to-face conversation. If you have a question regarding a definition of a term, or the like, try looking in the index or glossary of the textbook, or do a quick Google search before sending me an e-mail. You'll get your answer quicker, and you'll be an active participant in your education!

Exam policy

For the exams, bring at least 2 number-two pencils, an eraser, 2 pens (blue or black ink) and a scantron form 882-e. Do not be late for the exams. Late arrivals will be heavily penalized once the first completed exam is turned in. Be aware that the exams will only be given during their scheduled times. *Final exams will not be given early for any circumstance, plan your summer travel accordingly.*

Grade change policy

All grades are non-negotiable; changes will only be made due to the rare clerical error. To protect your privacy, I will not discuss grades or offer performance reports over e-mail at any time. This includes after final grades have been posted, but I will happily do so during scheduled office hours appointments.

Late work policy

All assignments and papers are due when listed in the syllabus. Late assignments will be penalized a full letter grade for each day late. Unless otherwise noted, all assignments must be turned in during class.

Course Schedule

- Topic 1: The Nature and Aims of Archaeology
 - (RB) Introduction: The Nature and Aims of Archaeology
 - (KF) Chapter 1 Science and Pseudoscience in Archaeology

- Topic 2: Ethics of archaeology: Who owns the past?
 - (RB) Chapter 11: Whose Past?
 - [Society for American Archaeology's Statement of ethics](#) (click hyperlink to access)
 - [How the Parthenon Lost its Marbles](#) (click hyperlink to access)
 - This article discusses the Elgin Marbles, sculptures that originally decorated the Parthenon. They were removed by a British nobleman at the behest of the British Museum (BM) in the very early 1800s and have been on display there. Greece has continually asked for them back, but the BM refuses, argues the marbles are a world heritage "treasure," which would be ruined if they were returned to Greece due to negligence and that country's inability to "take care of itself, let alone priceless artifacts from one of the most important points in human history."

- Topic 3: The History of Archaeology
 - (RB) Chapter 1: The Searchers: The History of Archaeology
 - Although affiliated with anthropology programs in the United States, the field of archaeology began in Europe where it developed in the 17th and 18th century alongside Geology, Paleontology, and other Natural Sciences. This chapter discusses that history, but also the origins of Western science in general as it was part of that intellectual movement.
 - (KF) Chapter 7: The Myth of the Moundbuilders
 - This chapter details an early period in the history of American Archaeology when archaeologists were debating who built the massive pre-Columbian mounds found throughout the United States, sites such as Cahokia, Serpent Mound, Etowah, and Ocmulgee, sites of the Mississippian culture. Original conclusions were built on racist speculation; extant Native American populations were too "primitive" to have been able to build them, therefore, the most likely conclusion is that they were built by long-lost Europeans, perhaps Vikings or one of the great civilization of Central or South America. Others even speculated they were built by people from Atlantis. Nonetheless, only when the first empirically-based archaeological research project using stratigraphic excavations and systematic sampling of several hundred sites and the analysis of tens of thousands of artifacts aimed at answering the question, "Were the mounds built by the Indians?" did the origins of the mounds become clear. They were built by Native Americans.

- Topic 4 Starting a project
 - Text Chapter 2: What is left: The Variety of the Evidence
 - Library workshop "Finding archaeological resources"
 - This workshop will teach students about the top archaeological journals in the field and how to do literature searches.

- Topic 5: Archaeological theory
 - (RB) Chapter 10: Why did things change? Explanation in Archaeology
 - (KF) Chapter 2: Epistemology: How You Know What You Know

- Topic 6: Finding and surveying sites
 - (RB) Chapter 3: Where? Pp 73-110
 - (KF) Chapter 11: Good Vibrations: Physics and Archaeology
 - This chapter provides a review of how archaeologists use hypothesis testing, systematic sampling surveys, stratigraphic excavations, and tools such as ground penetrating radar to locate and investigate archaeological sites. It also evaluates and ultimately rejects some of the pseudoscientific methods seen in pop culture for locating ancient sites, including dowsing and psychic vibrations.
 - Lab 1: Mapping and systematic survey
 - Along with mapping and survey skills, this lab will also teach students about random and non-random sampling strategies, both of which are founded in statistical analysis
 - Lab 2: Site taphonomy lab (students will flake stones in a public area, and map their initial distribution, they will check back in weekly to remap their “site,” and take notes on how it changes over time.)

- Topic 7: Excavation
 - Text Chapter 3: Where? Pp. 110-130
 - Lab 3: Site grids and excavation units
 - In this lab, students will learn Stratigraphy, the Law of Superposition, as well as Context and Association, the underlying theories and methods upon which much archaeological knowledge is build.

- Topic 8: Dating the Past
 - Text Chapter 4: When? Dating Method and Chronology
 - In this topic, students will learn about atoms, the atomic structure and isotopes, as well as the functioning of earth’s magnetic field and how these and other aspects of nature are used to date the past.

- Topic 9: Artifact analysis
 - Text Chapter 7: What did they eat?
 - Text Chapter 8: How did they make and use tools?
 - Lab 4: Ceramic seriation.
 - In this lab, students will learn to make data meaningful by studying archaeological ceramic sherds (pieces of broken pots). This lab will include a discussion of the Linnaean classification system of life, and how such systems have been applied to archaeological ceramics. It also draw on the knowledge of atoms from Topic 8 to discuss Instrumental Neutron Activation Analysis, a technique common to archaeology and geology for identifying sources of parent material within a particular region.
 - Lab 5: Lithic (stone) analysis
 - This lab will include learning about and identifying different types of rock, their structural compositions, and how those and other factors allow them to be transformed into stone tools

- Topic 10: Osteological and mortuary analysis
 - (RB) Chapter 8: What were they Like?: The Bioarchaeology of people
 - This section draws on the atomic lessons in Topic 8 to discuss how isotopes, and skeletal populations are used for paleodemography. It also covers forces of evolution, and genetics
 - (KF) Chapter 4: Dawson’s Dawn Man: The Hoax at Piltdown
 - This chapter discusses how a paleoanthropological hoax was unmasked after fooling naturalists and other scientists for 40 years through the application of scientific investigations of the fossil remains. The hoax was designed to demonstrate humans emerged in England, not in Africa as Charles Darwin had recently suggested. As such, discussions of this chapter will include Natural Selection, and how Charles Darwin came to his conclusions
 - (KF) Chapter 5: Who Discovered America?
 - This chapter deals with the peopling of the Americas, a topic of great debate in archaeology, and in regular scientific discourse since Columbus first sailed to the Americas. It continues with a review of DNA and osteological analyses, and how they, along with paleoclimatological and archaeological data have largely settled the debate.

- Topic 11: Landscape and Settlement Patterns
 - (RB) Chapter 5: How Were Societies Organized
 - Basso, Keith H. 1996 *Wisdom Sits In Places: Notes on a Western Apache Landscape*. In *Senses of Place*, edited by Steven Feld, and Keith H. Basso, pp. 53-90. School of American Research Press, Santa Fe.)

- Topic 12: Art, and ideology
 - (RB) Chapter 10: What did they think
 - (KF) Chapter 10: The Mystery of Ancient Civilizations: How Did People Get So Smart
 - This chapter draws together archaeological finds that are commonly discussed together in pseudoscientific/pseudoarchaeological TV shows, webpages, books, etc. (Maya and Egyptian works of arts and pyramids, Stonehenge, and other archaeological finds), and discusses successful scientific experiments using low-grade technology, and records from these past societies to explain them.
 - (KF) Chapter 9: Prehistoric E.T. The Fantasy of Ancient Astronauts
 - Through the application of Occam’s Razor, and critically thinking about the implication of the arguments that ancient aliens are responsible for much of the archaeological past, from the Nazca Lines to the Intaglios in Blythe, CA to the painted rock art in the Utah to unfamiliar art from Egyptian and Maya tombs, this chapter debunks the myth of Ancient Astronauts. Moreover, it recognizes the inherent racial biases in such arguments. In short, which is more plausible, that intelligent life exists somewhere else in this universe, that it found our small planet peopled by a few tens of thousands hunter-gatherers, predicted what our future would look like, so they painted in some caves and rock shelters, and with their advanced technology, built pyramids out of stone (why not super advanced space metal?!), then decorated them with art containing hidden messages about who they were, and then left a few bread crumbs spattered about here and there over the globe and throughout history to help only the most dedicated find “the

truth,” then they went away, and are waiting to be found; or, the ancestors of people living around sites today were able to paint, stack rocks, and sometimes carve and paint on them?

- This chapter specifically pairs with the Elgin Marbles article from Topic 2 listed directly above it. While the Elgin Marbles article discusses the debate about who owns the past, this chapter delves into the underlying theoretical reasons for it. Specifically, it demonstrates how to evaluate a hypothesis, data sources, and conclusions drawn from those data using critical thinking and rational thought.

- Topic 13: Community Engagement and Contemporary Archaeological Practice
 - (RB) Chapter 11: Whose past?: Archaeology and the Public
 - Fowles, Severin 2010 The Southwest School of Landscape Archaeology. *Annual Review of Anthropology* 39:453-468.

- Topic 14: Careers in Archaeology
 - (RB) Chapter 12: The Future of the Past: Managing our Heritage
 - This chapter details the everyday practice of archaeology, mini-biographies of archaeologists, and how to build a career doing archaeology
 - www.Shovelbums.org
 - www.Archaeologyfieldwork.com
 - Society for American Archaeology Career Center (<http://careers.saa.org/>)
 - Register of Professional Archaeologists
 - Guest speaker panel: Participants drawn from local archaeology firms and museums