

ANTH 0001L - BIOLOGICAL ANTHROPOLOGY LABORATORY

Catalog Description

Prerequisite: Completion with grade of "C" or better or concurrent enrollment in ANTH 1

Hours: 54 laboratory

Description: Introductory laboratory course designed to investigate the science of biological anthropology. Areas of study include the production and distribution of genetic variation, human osteology, human variation, comparative primate taxonomy, behavior and osteology, and fossil evidence for human evolution. Field trip required. Students are responsible for fees associated with required field trip. (C-ID ANTH 115L) (CSU, UC)

Course Student Learning Outcomes

- CSLO #1: Utilizing the human skeletal materials, identify the elements of the human cranium and skeleton and apply established protocol for determining various aspects of variation.
- CSLO #2: Using a lab activity and/or materials, describe the structure and function of DNA and explain the mechanisms that produce and redistribute variation in gene frequencies in populations.
- CSLO #3: Using both skeletal materials and living non-human primate observations, apply appropriate taxonomic and biological terminology, evaluate social behavior, and compare and contrast structural variation, modes of locomotion, and dental variation in the major groups of living and extinct primates.
- CSLO #4: Using hominin fossil materials, evaluate developments in biology, brain size, cultural adaptations, and migration in hominins.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

0

Total Student Learning Hours

54

Course Objectives

1. Utilizing the human skeletal materials, identify the elements of the human cranium and skeleton.
2. Using the human skeletal materials, apply established protocol for determining various aspects of human variation.
3. Using a lab activity and/or materials, describe the structure and function of DNA and RNA and evaluate the process of protein synthesis.

4. Using a lab activity and/or materials, explain the mechanisms that produce and redistribute variation in gene frequencies in populations.
5. Using both the primate skeletal materials and appropriate taxonomic and biological terminology, compare and contrast structural differences, modes of locomotion and dental variation in the major groups of primates.
6. Observe and evaluate living non-human primate social behavior.
7. Using the primate skeletal materials, correlate similarities in the earliest primate traits (Paleocene to the Oligocene) with generalized mammals and living primates; explore primates living during the Miocene.
8. Using hominin fossil materials, compare and contrast bipedal skeletal characteristics with other locomotor strategies.
9. Using hominin fossil materials, evaluate developments in biology, brain size, cultural adaptations, and migration in hominins existing from greater than 5mya to early Homo, (comprising mostly the Australopithecines but including Sahelanthropus, Orrorin and Ardipithecus).
10. Using hominin fossil materials, evaluate developments in biology, brain size, cultural adaptations, and migration in hominins from Homo habilis to Homo sapiens sapiens.

General Education Information

- Approved College Associate Degree GE Applicability
 - AA/AS - Life Sciences
 - AS - Life Science Lab
- CSU GE Applicability (Recommended-requires CSU approval)
 - CSUGE - B3 Lab Activity
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
 - IGETC - 5C Laboratory Science

Articulation Information

Methods of Evaluation

- Essay Examinations
 - Example: Essay exam questions related to lecture topics will be used. For example: A man has been taken to trial in a paternity suit by a woman who claims he is the father of her son. The man claims he is not. At the trial the following blood types are disclosed: The woman: Type B The man: Type A The child: Type O Could the man be the father of this child? Please explain your answer.
- Objective Examinations
 - Example: During our non-human primate section students will be asked to distinguish between Old and New World monkeys using various anatomical features as applied to a skeletal specimen, for example, a fully articulated spider monkey skeleton.
- Problem Solving Examinations
 - Example: (A) During our genetics section of the course students are assigned monohybrid and dihybrid crosses to predict probabilities for expression of various genetic traits. For example: Using a punnett square, cross a man who is homozygous for Type A blood with a woman who has type O blood. Which are the possible actual blood types (phenotypes) for their offspring? (B) During our population genetics section students are asked to evaluate whether a population is evolving by applying the Hardy-Weinberg formula to a data set or set of genes ($p^2+2pq+q^2=1$).
- Projects
 - Example: Each student submits an extensive zoo report during our non-human primate section. This project/report typically

comes from the laboratory manual assigned by the instructor. The general project involves visiting the Sacramento or San Francisco Zoo and observing two different non-human primates for an extended period of time. Observations are guided to note biological and behavioral attributes of one or more members of the group. Taxonomic and geographical information about the primate is included in the final report materials.

- Reports

- Example: Students will complete a laboratory report for each class session. Each report requires demonstration of knowledge and comprehension as well as analysis and critical thinking. For example: (A) We know that generally we see a reduction in snout length within the Primate Order, but this monkey clearly maintains a longer one. What other features would you use that would allow you to tell that it was a primate and not a dog (for instance)? Name at least two. (B) Look at the differences in skulls between the following chimp, gorilla and human males and females. Focus on overall size, sagittal and nuchal crests, and canines. We know that the social structure in which nonhuman primates participate influences their physical differences. How could you use these physical structures to deduce the social groups of these primates?

- Skill Demonstrations

- Example: Students will complete a laboratory report for each class session. Each report requires demonstration of knowledge and comprehension as well as analysis and critical thinking. For example: (A) We know that generally we see a reduction in snout length within the Primate Order, but this monkey clearly maintains a longer one. What other features would you use that would allow you to tell that it was a primate and not a dog (for instance)? Name at least two. (B) Look at the differences in skulls between the following chimp, gorilla and human males and females. Focus on overall size, sagittal and nuchal crests, and canines. We know that the social structure in which nonhuman primates participate influences their physical differences. How could you use these physical structures to deduce the social groups of these primates?

Repeatable

No

Methods of Instruction

- Laboratory
- Distance Learning

Lab:

1. During the sex estimation section, the teacher will assign relevant readings to prepare students before class. During the class meeting s/he will explain the application of techniques to discern sexual dimorphism using images and skeletal samples. Students will be asked to discuss the relevancy of the techniques to sets of human remains, and to collaborate to estimate the likely sex of the individuals in the images/samples presented. After clarifying any questions, the teacher will facilitate students' work at establishing the sex of individuals using human remains.
2. Professor will provide a well-organized laboratory with the appropriate materials for the class meeting. For example, during the nonhuman primate section, various taxonomic categories of primates will be represented and students will use their laboratory reports and guides to work through the stations making observations. This may be

accomplished alone or in small groups. The professor will provide assistance throughout the class meeting.

3. (Distance learning: hybrid) During the hybrid/distance learning section, the instructor will provide a dynamic video lecture using voiceover with images or short recorded videos. For example, during the section covering fossils hominins belonging to the genus *Homo*, the instructor will use images representing each of the taxonomic groups or the actual skeletal materials. S/he will point out the major morphological attributes noteworthy for each group and explain their functional and/or evolutionary significance. These on-line video lectures will provide the background information necessary for students to come to the in-class meeting prepared to evaluate the materials in a group laboratory setting.

Distance Learning

1. (Distance learning: online) During the online learning section, the instructor will provide a dynamic video lecture using voiceover with images or short recorded videos. For example, during the section covering sex estimation, the instructor will use images representing variations in skeletal manifestations of male attributes or female attributes using actual skeletal materials. S/he will point out the major morphological attributes noteworthy for each group and explain their functional and/or evolutionary significance. These on-line video lectures will provide the background information necessary for students to estimate the sex of individuals using a different set of samples in the online weekly assignment. To ensure that students have access to high quality images that demonstrate such variations in biological sex, the department has a Canvas module where such images are shared and can be easily accessed. Discussion forums are utilized to discuss contemporary conversations about sex estimation in the forensic anthropological setting, and to answer questions about the techniques. Weekly asynchronous video conferencing sessions with the instructor will also provide the opportunity for students to ask questions and collaborate on estimating sex as well.

Typical Out of Class Assignments Reading Assignments

1. Read the assigned pages from the laboratory text on primate biology and be prepared to discuss the topics during class meetings.
2. Read the assigned pages from the laboratory text on early hominins and summarize the information in writing prior to class meeting.

Writing, Problem Solving or Performance

Complete laboratory reports which require analysis of genetic data, skeletal materials of modern and prehistoric humans, and nonhuman primates. The following are sample directives from lab assignments.

1. Observe the two pelves here. Name one trait that is similar in the australopithecine pelvis and the modern human pelvis. Name one way in which these pelves differ.
2. Compare the dentition of *A. africanus* with that of the even earlier *A. afarensis*. In what ways can the dentition of *A. afarensis* be said to be more primitive than *A. africanus*? Do you think the dentition provides a good case for being an ancestor to *Africanus*? Why or why not?
3. Given the differences you noticed between the gracile and robust australopithecines, do you think the differences are great enough to warrant classifying the robust australopithecines into their OWN genus, *Paranthropus*? Why or why not?

Other (Term projects, research papers, portfolios, etc.)

A field trip to a zoo is required for the course. During this field trip students are required to observe at least two different nonhuman primates for a minimum of thirty minutes. From these observations, directed questions about biology and behavior will be addressed. Students will perform analyses such as comparing and contrasting body size of males and females and ascertaining the dominant individual in the group.

Required Materials

- Lab Manual and Workbook for Physical Anthropology
 - Author: Diane France
 - Publisher: Wadsworth Publishing
 - Publication Date: 2018
 - Text Edition: 8th
 - Classic Textbook?: No
 - OER Link:
 - OER:
- Method and Practice in Biological Anthropology: A Workbook and Laboratory Manual for Introductory Courses
 - Author: Samantha Hens
 - Publisher: Prentice Hall
 - Publication Date: 2015
 - Text Edition: 2nd
 - Classic Textbook?: No
 - OER Link:
 - OER:
- Exploring Physical Anthropology: A Lab Manual & Workbook
 - Author: Suzanne E. Walker-Pacheco
 - Publisher: Morton Pub Co
 - Publication Date: 2017
 - Text Edition: 3rd
 - Classic Textbook?: No
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.