

College of San Mateo
Official Course Outline

1. **COURSE ID:** ANTH 127 **TITLE:** Biological Anthropology Laboratory **C-ID:** ANTH 115L
Units: 1.0 units **Hours/Semester:** 48.0-54.0 Lab hours; 48.0-54.0 Total Student Learning hours
Method of Grading: Grade Option (Letter Grade or Pass/No Pass)
Prerequisite: Completion of or concurrent enrollment in ANTH 125

2. **COURSE DESIGNATION:**

Degree Credit

Transfer credit: CSU; UC

AA/AS Degree Requirements:

CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science

CSU GE:

CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B3 - Laboratory Activity

IGETC:

IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: C: Science Laboratory

3. **COURSE DESCRIPTIONS:**

Catalog Description:

Laboratory designed to become familiar with the methods of the science of biological anthropology while investigating topics in laboratory and field situations. Topics covered in the course: the scientific method, biological variation and forces of evolution, genetics, human osteology and variation, comparative osteology and behavior of primates, and fossil evidence for human evolution. Field trips may be offered.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**

Upon successful completion of this course, a student will meet the following outcomes:

1. Practice and apply understandings of evolution.
2. Critically analyze and interpret physical anthropological data.
3. Apply anthropological principles for solving human problems on the local, regional, and world scales.
4. Understand, practice and apply methods used in physical/biological anthropology field and laboratory research.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**

Upon successful completion of this course, a student will be able to:

1. Formulate and test simple hypotheses using the scientific method.
2. Describe the sources of biological variation.
3. Identify bones and morphological features of primate skeletons.
4. Calculate sex-related, age-related, and other variation present in human populations.
5. Classify living primates and differentiate between hominins, apes, monkeys, and prosimians in anatomy and behavior.
6. Identify and date the significant anthropoid, hominoid, and hominin fossils.
7. Evaluate problems and challenges in interpreting the fossil evidence.
8. Operate a microscope and/or identify cellular structure and division in mitosis and meiosis.
9. Examine forensic anthropology as an applied physical anthropology.

6. **COURSE CONTENT:**

Lecture Content:

Lecture is a separate course, Anthropology 125. This course is the lab component.

Lab Content:

1. Scientific method: illustrated to students who write and test hypotheses using lab workbook exercises that stress critical thinking and how to develop a scientific experiment.
2. Mating preferences: students compile data based on their own preferences and interviews of others regarding gender differences by ranking of priorities for mate choice for males and females in a standardized questionnaire. A hypothesis regarding gender preferences for mates is tested by students. Students may also measure symmetry in human faces in "beauty" magazines as an example of bilateral symmetry as a desirable genetic trait for humans.
3. Cell biology, mitosis, meiosis: students acquire ability to critically analyze and interpret physical

anthropological data by learning to operate microscopes to view prepared slides of cells in states of division to understand mitosis and meiosis, and prepare slides of their own using pond water to view living organisms. Online students view animations of same.

4. Students complete written exercises answering questions regarding cell structure and functions. Students may make 3-dimensional cell models with clay and other materials to help learn cellular structure.
5. DNA: students can extract DNA from bananas or other fruit and view DNA they have extracted in microscopes. Simple instructions are available from many internet sources for different fruits (www.biology.about.com/od/biologylabhowtos/ht/dnafromabanana.htm), and students in online courses can do this at home.
6. DNA: students can have their own DNA processed by a commercial lab to identify genetic markers for disease, identify ancestral origins and percentages of Neanderthal genes present. Students can locate relatives via the data bases and compare results with classmates.
7. Population genetics: exercises identify forces of evolutionary change and mathematical formula for determining gene frequencies. Human Genome Project exercises inform students of current developments. Real-time simulations in web-based sections of workbooks are available for students to perform Hardy-Weinberg calculations.
8. Blood-type testing and typing: students apply understanding of evolution in a lab setting by using blood typing kits containing synthetic blood to provide simulated typing for ABO and Rh systems and include exercises that clarify the role of antigens and antibodies. These kits are available through Wardley and other laboratory suppliers, or are animated experiments in online courses. Kits are also available that allow students to type their own blood if actual blood use is allowed.
9. Human osteology, growth and development: students use actual or model skeletal material and exercises to identify major bones of human skeletons, calculate indices, identify non-metric traits, pathologies, and practice aging and sexing of skeletal material. Articulated and disarticulated skeletons are examined. Online students view photos online in online lab manual.
10. Biological classification and skeletal comparisons: casts of primate crania, including prosimians, Old and New World monkeys, and apes, including pelvis and other anatomical skeletal material is compared by students in questions answered in exercise from lab workbooks. Articulated and disarticulated skeletons are examined. Online students view animations of same.
11. Living primates, behavior and morphology: apes and monkeys are observed by students in films and when possible, at research facilities or zoos to make comparisons in physiology, behavior including locomotion, diet, mating and social structure, observations are recorded and reported in a primate observation exercise involving individual and group observations. Observations are made at San Francisco Zoo or at the Gibbon Conservation Center in Santa Clarita, CA.
12. Hominoid and hominin fossil evolution: casts of hominoid and hominin cranial and post-cranial material are examined by students to identify ancestral and derived traits that have evolved over 7 million years. Online students view photos of fossils in online lab manual and view additional fossils on websites including www.talkorigins.org, Smithsonian and Leakey Foundation websites. Students read and discuss online articles of current paleoanthropological research at LeakeyFoundation.org and other news sources. Analysis of the fossil record is the goal and is a significant step in the understanding of evolution in a lab setting.
13. Anthropometry and forensic anthropology: measurement with sliding and spreading calipers of living populations, and applications of DNA in law enforcement exercises that are examples of applied anthropology used in the student's own community, state, federal and global practices. Online students view simulations of same. Field trips may be arranged by instructor to tour the San Mateo County Sheriff's Forensic Lab and Coroner's Office. Students apply anthropological principles for solving human problems on a local, regional and global scale.

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lab
- B. Activity
- C. Discussion
- D. Experiments
- E. Field Experience
- F. Field Trips
- G. Other (Specify): Online

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

Answer written questions with complete written answers in laboratory workbook or manual, for example formulating a hypothesis and testing it using scientific method in a five page exercise. 15 exercises require several pages of written answers and explanations each.

Reading Assignments:

Reading of lab exercises in Lab Manual or Workbook necessary for completion of exercises, approximately 400 pages of reading for 15 exercise chapters. Students may also read supplementary materials such as, "A Photographic Atlas for Physical Anthropology: by Whitehead, Sacco, Hochgraf (2005, Morton Publishing Co, Colorado) for reference.

Other Outside Assignments:

- A. Primate observations may be done by students at any major zoo that houses a substantial number of primate species, such as San Francisco Zoo, or at a research facility like the Gibbon Conservation Center in Santa Clarita, CA.
- B. Students may obtain their own DNA analysis from a commercial lab.
- C. Students may visit a coroner's lab, such as the San Mateo County Sheriff's Forensic Lab and Coroner's Office.
- D. Lectures are presented at the Leakey Foundation, California Academy of Sciences, and other universities and research facilities on topics relevant to the course.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Participation
- B. Class Performance
- C. Class Work
- D. Exams/Tests
- E. Field Trips
- F. Group Projects
- G. Homework
- H. Lab Activities
- I. Oral Presentation
- J. Papers
- K. Projects
- L. Quizzes
- M. Research Projects
- N. Simulation
- O. Written examination

10. REPRESENTATIVE TEXT(S):

Possible manuals include:

- A. France, Diane L. Lab Manual and Workbook for Physical Anthropology, Cengage, 01-01-2018
- B. Walker-Pacheco, Suzanne. Exploring Physical Anthropology: A Lab Manual and Workbook, Morton Publishing Co., 01-01-2017
- C. Soluri, Elizabeth & Agarwal, Sabrina C. Laboratory Manual and Workbook for Biological Anthropology, 2nd ed., W.W. Norton & Co., 01-01-2020

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Course Originator: Michele Titus