The student will be able to:

**Course Objectives**

- Link behavior and biology today by discussing human variation, modern race concepts, basic population genetics, examples of biocultural evolution, and potential future evolutionary trends.

**Course Content**

- Background to biological evolution
  - Major subfields of anthropology
    1. Biological or physical anthropology
    2. Archaeology
    3. Cultural anthropology
    4. Linguistics
  - Major research areas within physical/biological anthropology
    1. Primatology
    2. Paleoanthropology
    3. Sociobiology
    4. Forensics
- Anthropological perspective
- Scientific method and its application to physical anthropology
- Historical advances in the natural sciences, resulting in part from the age of discovery and exploration
  1. Advances in geology (Lyell)
  2. Advances in biological classification (Linnaeus)
  3. Advances in population studies (Malthus)
  4. European ethnocentric and racist world views, particularly the notions of fixity of species and a general sense of stasis

- Darwin’s theory of biological evolution and Mendelian inheritance, including basic genetics, taxonomy, and speciation
  - Historical development of the Darwinian theory of natural selection
    1. Contributions of 18th and 19th century scientists to evolutionary theory (Lamark, Wallace, Erasmus Darwin)
    2. Process by which Darwin used these earlier ideas to formulate his three postulates of natural selection
  - Theory of natural selection
    1. Variation in species and how natural selection acts on this variation through differential reproductive success to alter species
    2. Galapagos finches and recent studies by Rosemary and Peter Grant
    3. Shortcomings of Darwin’s explanation of evolution in reference to 19th century genetics and theories of inheritance (blending)
  - Basic principles of Mendelian inheritance
    1. Mendel’s pea experiments
    2. Concepts of dominant, recessive, and codominant alleles
    3. Principles of segregation and independent assortment
    4. Using the Punnett square
- Cellular structure and genetic structure of DNA and RNA
  1. Basic cell types and organelles including mitochondria and ribosomes
  2. Nature of chromosomes and the concept of a gene
  3. Compare and contrast mitosis with meiosis
  4. Meiosis and the evolutionary process
  5. New frontiers of genetic research
- Mechanisms that produce genetic variation in populations

**Student Learning Outcomes**

- Utilize a discipline-specific vocabulary to discuss the cornerstones of physical anthropology (genetics, primatology, the fossil record, and modern human variation).
- Adopt the framework of Evolutionary Theory to evaluate biological change over time.
- Evaluate the impact of human evolution on past, present, and future environments.
- Explain ancient and modern human variation in biocultural terms.
- Define scientific inquiry and its methods.

**Description**

Survey and investigation of the basic processes of evolution and their application to the development of modern humans. Impact of natural selection and genetics on development of new species. Evolutionary processes behind the physical and behavioral development of primates. History of the human lineage by reconstructing the fossil record, using investigations by paleoanthropologists, geologists, biologists, and archaeologists. Relationship between contemporary biology and behavior, facilitating an understanding of the effect of them upon future humankind.

**Course Objectives**

The student will be able to:

- Explain biological evolution by discussing the field of anthropology, the scientific method, and the history behind evolutionary theory.
- Compare Darwinian theory of biological evolution and Mendelian inheritance, including basic genetics, taxonomy, and speciation.
- Explain the field of primatology by identifying various non-human primates and describing their physical and behavioral characteristics, including a focus on behavioral ecology and social structures.
- Assess current models for human origins by defining ancestral hominids and explaining important elements of paleoanthropology, including dating methods, experimental archaeology, specific fossil evidence, and general patterns of changing morphology and behavior.
1. Mutation
2. Genetic drift
3. Gene flow
vi. Concepts of population genetics using hemoglobin and malaria examples
vii. Concepts of taxonomy
viii. Homology and analogy
ix. Concepts of genus and species
x. Speciation, including the roles of geographic isolation and natural selection
xi. Geologic time scale
xii. Major living mammalian groups
xiii. Contrast gradualism with punctuated equilibrium (S. J. Gould)
c. The field of primatology
i. Ancestral mammalian traits and the evolutionary trends that define the order Primates
ii. Primate taxonomic classification, emphasizing the major taxa: suborder, superfamily, family, genus and species
iii. Distinguishing features of prosimians, monkeys, apes, and humans
iv. Describe hominoid morphological traits and social structures
v. Primate field studies
vi. Primate behavioral ecology
vii. Types of primate social interactions including grooming, dominance, and affiliative and aggressive behaviors
viii. Territoriality and resource acquisition
ix. Primate learned social behaviors and reproductive fitness
x. Reproductive strategies (r-selected versus k-selected)
xi. Kin selection and Hamilton’s rule
xii. Sexual selection
xiii. Importance of the mother-infant bond in contributing to the normal social and psychological development of primate infants
xiv. Primate communication and the evolution of language
xv. Nonhuman species’ culture and tool use
xvi. Between-group aggression in chimpanzees
xvii. Female sexual selection in baboons
xviii. Bonobo sexual relationships
d. Human origins and the important elements of paleoanthropology
i. Define hominid, integrating the concept of biocultural evolution
ii. Paleoanthropology and the reconstruction of human biocultural evolution
iii. Data gathered from Olduvai Gorge and the example of how it is employed by paleoanthropology
iv. Various dating methods
v. Experimental archaeology to interpret early hunting and tool use
vi. Different hypotheses for hominid origins
vii. Fossil evidence for primate origins
viii. Fossil evidence for anthropoid origins
ix. Fossil evidence for the origins and dispersal of the hominoids
x. Major skeletal adaptations for full-time bipedalism
xi. Pliopleistocene hominids in chronological order
xii. Major early hominid fossil sites in Africa
xiii. Classifying hominid species
xiv. Dispersal of H. erectus out of Africa
xv. Fossil discoveries from Europe
xvi. Early pre-modern Homo sapiens
xvii. Evidence that Neandertals evolved in Europe
xviii. Culture of Neandertals, including technology, settlement patterns, subsistence behaviors, and symbolic behaviors
xix. List the cultural contrasts between Neandertals and Upper Paleolithic humans
xx. Anatomically modern Homo sapiens
xxi. Skeletal differences between anatomically modern H. sapiens and pre-modern H. sapiens
xxii. Geographic distribution of H. sapiens and the Out of Africa model
xxiii. Climate, technological, and subsistence changes in the Upper Paleolithic
e. Behavior and biology today
i. Historical views of human variation
ii. Contrast modern race concepts and racist beliefs
iii. Adaptive aspects of human genotypic and phenotypic variation
iv. Population genetics and the study of human diversity
v. Hardy-Weinberg equilibrium formula
vi. Examples of human biocultural evolution
vii. Adaptive advantages of skin color related to levels of UV radiation and the incidence of rickets
viii. Human responses to heat, cold, and high altitude
ix. Bergmann’s and Allen’s rules
x. Interactions between natural selection and human infectious diseases
xi. Nutritional effects on growth and development
xii. Human senescence
xiii. The future of the Earth and the human species in light of the threat of overpopulation

Lab Content
Not applicable.

Special Facilities and/or Equipment
When taught as an online distance learning section, students and faculty need ongoing and continuous internet and email access.

Method(s) of Evaluation
Methods of Evaluation may include but are not limited to the following:

Homework
1. Short answer and problem solving exercises emphasizing class discussion of results
2. Map quizzes
1. Two map quizzes emphasizing geographic locations discussed in the class and text
Written project
1. Short anthropology field project involving the comparative study of primate physiology and behavior at the zoo
Midterm exam
1. Multiple choice
2. Identification and short essay
Final exam
1. Multiple choice
2. Identification and short essay

**Method(s) of Instruction**

Methods of Instruction may include but are not limited to the following:

- Lecture
- Discussion
- Cooperative learning exercises
- Oral presentations
- Electronic discussions/chat
- Independent study
- Laboratory
- Demonstration

**Representative Text(s) and Other Materials**


**Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments**

- a. Two map quizzes covering geography important to class
- b. Final paper with focus on scientific investigation of primates
- c. Six homework assignments for critical thinking
- d. All chapters in the textbooks are assigned
- e. Exams

**Discipline(s)**

Anthropology