

SMC Core Curriculum Course Proposal Form Fall 2014

Electronically submit this course form and attachments to the Chair of the CCC by October 1. Please submit a separate proposal for each desired learning goal.

1. Name of Proposer: **Jennifer Heung and Greg Smith**
2. Email address: **jheung@stmarys-ca.edu, gsmith@stmarys-ca.edu**
3. Department/Program of Proposer: **Anthropology and Biology**
4. Name of Department/Program housing the course: **Biology**
5. Name(s) of Program Director/Department Chair housing the course:
Vidya Chandrasekaran
6. Course Acronym, Number and Title: **Bio 07: Biological Anthropology**
7. Proposal is for All Sections of the course: **Only one section is taught.**
Proposal is for instructor's section(s) (Engaging the World only):
8. Course Prerequisites (if any): **Anthropology majors only, junior standing.**
9. Unit Value of Course: **One credit**
10. Mark with an X the Learning Goal for which the course is being proposed.
(Please submit a separate proposal for each desired goal.)

Pathways to Knowledge (at most one)

- Artistic Understanding – Artistic Analysis only:
- Artistic Understanding – Creative Practice only:
- Artistic Understanding – Both Artistic Analysis and Creative Practice:
- Mathematical Understanding:
- Scientific Understanding:
- Social, Historical, Cultural Understanding:
- Christian Foundations:
- Theological Explorations:

11. Expected Attachments:

- a) Syllabus: Current course syllabus, expected to contain a course description and learning outcomes. The course's learning outcomes must include coverage of the Learning Outcomes associated with the Core Curriculum Learning Goal for which the course is being proposed.
- b) Teaching and Learning: A narrative that explains how the course will guide students toward achieving each Learning Outcome and how coursework (e.g., papers, exams, videotaped presentations) will be used to measure student achievement of each Learning Outcome. Please address the outcomes directly and one by one.

Bio 007 – Biological Anthropology
Heung and Smith, Fall 2014

Application for **Scientific Understanding**

Teaching

Anthropology is the holistic and comparative study of human diversity and is related to both science and the humanities. It consists of four subfields: Cultural and Social Anthropology (the study of cultural diversity and variation), Physical Anthropology (the study of human evolution and primatology and the subject of this application), Archaeology (the study of humans in relation to the past and its material remains), and Linguistic Anthropology (the study of the origin and use of human languages).

LO#1 Demonstrate an understanding of scientific concepts, principles, and theories that explain the natural and physical world.

Physical or Biological anthropology, as a subfield of anthropology, provides a biological viewpoint to the systematic study of human variation and the adaptability of humans to environmental pressures. Molecular, Mendelian and population genetics serve as a basis for the larger discussion of natural selection and how that affects biological and physiological adaptation. The emphasis of this course explores why we see broad variations among Homo sapiens and how these variations affect humans in their life cycle, health, and culture. Principles and theories that explain genetics and cell function, human variation, natural selection in humans, biological adaptation and human development are among the topics presented in to students in this course. Material is covered in lecture, student discussions, field trips, and video materials.

LO#2 Collect, analyze, and interpret empirical data gathered in a laboratory or field setting.

Bio 7 requires students to also enroll in a mandatory lab section that meets 3 hours a week. The objectives for the lab include data collection and analysis demonstrating natural selection, karyotyping and its use in genetic disease counseling, DNA fingerprinting and geographical origin determination, paleoanthropology and the debate in human evolution, forensic anthropology and criminal justice; and primate anatomy and how locomotion changed in hominids.

As an example, the DNA fingerprinting lab presents the nature of basic science and its subsequent applications. The students learn about the historical development of the fingerprinting procedures. The procedures were originally used to determine the base sequence of a gene, which could be applied to the synthesis a specific protein. This could

provide relief to a person with a specific genetic disease. The procedures were then expanded to determine the entire gene profile of animals and specifically humans (as a part of the Human Genome Project). Human traits and many diseases have been sequenced allowing scientists and medical practitioners to treat diseases like cancer. But only the creative futurists could have predicted that a criminal's phenotype (hair color, eye color and skin color) could be determined with a DNA sample eliminating the need of a witness to a crime or that the hominid tree would be redrawn because of DNA determines. And finally, that people could affect the genetic profile of their offspring by selectively inserting specific genes.

So, in a lab like this, the students perform the procedures to determine who could be guilty in a "mock" crime. And they can use the results of their DNA sequence to see how the presence of mutations can be used to generally determine the migratory path that their ancestors took. The students learn why basic science is done and how the application of scientific knowledge can lead to controversial issues.

LO#3 Examine social or ethical issues that arise in the process of scientific inquiry or out of scientific or technological developments.

Since the understanding of the cultural context of human behavior and society is integral to this course, biological anthropology serves as a unique link between the social and biological sciences. Moreover, this approach requires students to examine social and ethical issues that arise within the very nature of how scientific inquiry is designed and implemented. Science, itself a cultural construction created by humans, is an object of study for anthropologist in order to understand how specific cultural and social circumstances have given rise to the type of research considered important within science. What were the economic and political context of the 19th century, which gave rise to eugenics and scientific racism? How does cultural context affect biological processes such as fertility in relation to cultural values surrounding gender equality? An anthropological approach to biological human variation requires an examination of these types of social and ethical issues in relation to a cross-cultural understanding of human variation, cultural change, and development.

Learning

LO#1 Demonstrate an understanding of scientific concepts, principles, and theories that explain the natural and physical world.

Students' understanding of LO#1 will be assessed through 3-4 exams and 1 final given during the semester. The exams consist of a combination of matching, true-false, multiple choice, short answer fill-in, and essay questions. Understanding, integration of concepts and theories, and the application of presented theories and concepts are emphasized over the mere recitation and memorization of terms.

Student participation in class lectures and discussions is another opportunity for students to demonstrate their understanding of relevant scientific principles and theories.

LO#2 Collect, analyze, and interpret empirical data gathered in a laboratory or field setting.

In the laboratory classes there will be quizzes and data reports required of students. The content of these assessment tools will focus on the scientific information provided in class as they serve as the framework for the topic of lab exercises, laboratory procedures and techniques presented each week.

LO#3 Examine social or ethical issues that arise in the process of scientific inquiry or out of scientific or technological developments.

In addition to this LO being assessed in the exams mentioned above, the course also has an one-page social issues abstract that asks the student to critically reflect upon a specific topic in science and its larger social, cultural, and political implications. Given the inherent cross-cultural approach of anthropology, students can select from and discuss numerous social issues.