

HUMAN OSTEOLOGY

COURSE: Anth 407-01
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SEMESTER: FALL 2003
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This lab-intensive course will explore the methods used in physical anthropology for studying individual human remains, as well as those employed to establish biocultural connections at the population level. Forensic techniques utilized in individual identification will be developed in the first third of the course. You will become very familiar with human skeletal anatomy and bone physiology. In the latter portions of the course, you will develop skills using bio-ethnographic tools such as paleodemography, paleopathology, and the techniques used in the reconstruction of ancient health and nutrition. Ultimately, you will be able to identify fragmentary skeletal material typical of that found in many archaeological settings, and, using independent lines of evidence, establish a biocultural framework for ancient populations.

The three primary objectives of this course are to: a) provide an opportunity to develop and expand your skills in the identification of human skeletal remains; b) lead you into the literature and allow you to develop an understanding of how skeletal remains can be used in reconstructing prehistoric patterns of adaptation and biocultural evolution; and c) have you produce and present a piece of original research as you would do for a professional meeting.

With these objectives in mind, the course will be divided into three parts as follows: during the "Human Identification" portion of the course, you will learn the bones of the body, as well as the major landmarks for each. You will learn how to side the bone, determine age and sex, reconstruct stature, and identify possible causes of death. During the "Bioethnographic Approach" portion, you will learn the methods used for biocultural reconstructions of ancient populations. The final week of the course will be dedicated to the presentation of original research projects conducted by each student during the course of the semester. This is a 4 hour course -- one to two hours each week will be lecture. During that time, you will learn the methods and theories pertinent to that "feature". The remaining class time will be spent focusing on a particular aspect of that feature in hands-on laboratory investigation.

Required Text: Laboratory Packet of Readings listed in the syllabus

Supplemental Texts (available for reference in the lab):

Bass, WM. 1995. *Human Osteology: A Laboratory and Field Manual*. 4th edition. Columbia: Missouri Archaeological Society.

Cartmill, M, WL Hylander, and J Shafland. (1987) *Human Structure*. Cambridge: Harvard University Press, 448 pp.

Gray, H, T Pickering, and R Howden. (1972) *Gray's Anatomy* New York: Crown Publishers, 1257 pp.

Laydon, JH. (1994). *Human Dissection for the Health Sciences*. Boston: Little, Brown, and CO. 327 pp.

McMinn, RMH and RT Hutchings (1988) *Color Atlas of Human Anatomy*. Chicago: Yearbook Medical Publishers Inc, 358 pp.

Shipman, P., A Walker, D Bichell (1985). *The Human Skeleton*. Cambridge: Harvard Univ. Press, 343 pp.

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PART I: HUMAN IDENTIFICATION

Introduction to the course -- A discussion of the format of the course and the materials that you will be working with. The utility of forensic anthropology techniques for both individual identification and population studies will be explored using a skeleton from Wyoming as a case study.

Feature: FORENSIC ANTHROPOLOGY: DEAD WO/MEN DO TELL TALES.

Models -- An overview of the Nubian and St. Stephen's skeletal collections will be provided. The Nubians provide a clear example of the power of the biocultural approach, drawing upon almost 20 years of intense, interdisciplinary investigation. The Byzantine St. Stephen's collection provides a chance to implement the techniques discussed on a collection currently under investigation.

Human Identification I: Cranium -- You will begin a review of the bones of the cranium as well as major features and landmarks. Using comparative anatomy, we will look at the form and function of the skull and mandible in modern and fossil hominids.

Feature: BIOMECHANICS OF THE MANDIBLE

Human Identification II: Axial Skeleton -- You will begin a review of the bones of the axial skeleton as well as major features and landmarks. The comparative anatomy of limb structure and the evolution of bipedal locomotion will be the foci.

Feature: BIPEDAL LOCOMOTION

Human Identification III: Appendicular Skeleton -- You will continue to work on identification including fragmentary remains as might be found in an archaeological context. By the end of this week you should be familiar with all of the bones of the human body. We will explore a current analysis of Byzantine monastic bones in a reconstruction of occupational stress in the lower limb. By combining the biological and historical records, a possible aspect of daily life is addressed, with cultural and historical ramifications of importance to numerous disciplines.

Feature: KNEELING FOR ??? – A BIOMECHANICAL AND BIOCULTURAL RECONSTRUCTION

Human Identification IV: Age, Sex, and Race -- You should be working extensively with the identification of fragments including isolated teeth. Age changes in the human skeleton, sexual dimorphism, and race determination will be this week's concentration.

Human Identification V: Paleopathology -- This week will concentrate on the identification of skeletal indicators of diet and disease in skeletal remains.

Exam 1: IN-CLASS LAB PRACTICAL

PART II: THE BIOETHNOGRAPHIC APPROACH

The biocultural model for investigating ancient human remains will be emphasized, focusing on those methods utilized in the analysis of skeletal collections from ancient Nubia and Byzantine Palestine. During this section, more time will be spent on lecture and discussion of pertinent literature. However, there will still

be time devoted each week to laboratory analysis of the topics discussed. In this portion of the course, we will focus on major features of osteological investigation related to biocultural reconstructions.

The Demographic Context -- An overview of paleodemography focusing on the methods used in creating a life table, and how this information is necessary in ancient biocultural reconstructions. A good demographic profile can "make or break" a bioethnographic reconstruction. Then, the class will "debate" the efficacy of paleodemographic reconstructions based on the articles listed below.

Growth, Development and Childhood Stress in Ancient Populations -- one of the major monitors of a population's success at adapting to its environment is the health of the subadult segment of the community. We will look at methods for reconstructing childhood stress from the skeletal evidence.

Nutrition and Disease -- numerous methods for determining ancient diet and disease will be explored, as well as the paleopathological indicators of nutritional stress in the skeleton. We will tour the Bioarchaeology facilities at Notre Dame and become familiar with many of the methods employed in the investigation of ancient diet and disease.

Bone Maintenance and Adult Stress -- bone histology and remodeling will be discussed. The subtle skeletal indicators of adult physiological stress will be explored.

Exam 2: OBJECTIVE, SHORT ESSAY

Part III: STUDENT RESEARCH PROJECTS

Student Presentation of Research Projects (*last week of class*). Students will present their research projects during the final week. You will be provided 30 minutes for presentation, and the remainder of the period will be devoted to questions and discussion by the class. The class is expected to draw upon information from the semester to ask questions related to the research being presented. The presentations should include visual aids. The 10-pg research papers will be due the last day of class.

GRADING POLICIES: The final grade will be based upon:

- 40% = each of the two exams will count 20% of your final grade. Because there is a lab practical portion to each exam, **make-up tests will not be possible.**
 - 35% = the research paper and presentation will each count for 20% of your final grade. This research project and paper will replace a final exam.
 - 25% = *class participation constitutes a significant fraction of your grade.* You will be expected to read and discuss the articles in the packet, and actively partake in the laboratory portion of the course. Your active participation in the discussions and learning process will ensure both a successful class, and a good grade in this category. There will be in-class assignments on occasion that will be included in this portion of your grade as well.
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