

070:358 and 070:359 Summer 2017

## **INTRODUCTION TO HUMAN OSTEOLOGY WITH LABORATORY**

***MTWTH 1 pm-5:25 pm, BIO 201A***

**INSTRUCTOR: Darcy Shapiro, PhD**

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Office hours: By appointment

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**COURSE DESCRIPTION:** Introduction to Human Osteology and accompanying laboratory (6 credits) is an intensive course in human skeletal anatomy essential to the advanced study of forensic anthropology, paleoanthropology, and bioarchaeology. We will examine bone biology, growth and development, gross skeletal and soft tissue anatomy, and paleopathology as well as indicators of age and sex for the purposes of identification. Sixteen hours of lecture and laboratory instruction are required per week in addition to independent laboratory study time.

**COURSE OBJECTIVES:** Students will become proficient in identifying complete and fragmentary bones and teeth of the human skeleton as well as distinguishing human from non-human remains. Students will be exposed to the process of developing inferences about individuals and populations based on skeletal samples through a series of laboratory exercises. These exercises will include making relevant observations and/or measurements, summarizing data with descriptive statistics and simple graphical representations, analyzing and interpreting osteological data, and the use of comparative methodology. Students will become familiar with means of determining demographic data on sex, age, and health based on skeletal and dental indicators. Finally, students will be exposed to topics in bone biology, growth and development, functional morphology, and soft tissue anatomy that enrich their understanding of osteological samples in the paleoanthropological, archaeological, and forensic contexts.

### **LEARNING GOALS:**

- Identify complete and fragmentary human bones and teeth
- Distinguish human and nonhuman skeletal remains
- Develop inferences about individuals and populations from skeletal remains
- Analyze osteological data
- Master human bony anatomy
- Understand major muscle origins and insertions

**PREREQUISITE:** *070:102 Introduction to Human Evolution* or equivalent.

**REQUIREMENTS FULFILLED:** *070:358 and 070:359 Introduction to Human Osteology with Laboratory* fulfills the skeletal biology/human palaeontology distribution requirement for the Evolutionary Anthropology major.

**CREDIT BREAKDOWN:** 3 credits are awarded for 070:358 (Lecture) and 3 credits are awarded 070:359 (Lab). Concurrent enrollment in both is required.

**GRADED WORK:** Nine practical, cumulative quizzes will be given at the beginning of class for which you will be expected to identify bone fragments and features (e.g., soft tissue attachments), estimate age and sex, and recognize pathological conditions. The lowest quiz grade will be dropped.

The two exams will consist of practical and written portions. We will conduct three laboratory exercises, applying your osteological skills to research problems. You are also expected to prepare a course notebook complete with lecture notes and illustrations due at the end of the semester. **Note: Scheduling conflicts with quizzes and exams must be resolved PRIOR to their occurrence; make-up quizzes will only be given under extremely extenuating circumstances.** Grades will be assigned in 070:358 and 070:359 based on all graded work.

**GRADING:**

<b>Assignment, Quiz, or Exam</b>	<b>Percent of Final</b>
9 Quizzes (equal weight, drop lowest)	40%
2 Written Exams (cumulative, equal weight)	20%
2 Practical Exams (cumulative, equal weight)	20%
3 Laboratory Exercises (equal weight)	9%
Notebook	11%
<b>Total</b>	<b>100%</b>

**REQUIRED TEXTBOOKS:**

Human Osteology, 3<sup>rd</sup> edition by Tim White

**RECOMMENDED TEXTBOOKS:**

Color Atlas of Anatomy or equivalent

**ASSIGNED READINGS** are in Human Osteology by Tim White

**LAB RULES:**

- NO FOOD OR DRINKS IN THE LAB.
- You may take photos of the bones for personal/class use, but you CANNOT post them on the internet (especially social media)
- Be respectful of the material in here. These were people once, treat them with the respect they deserve.

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**DAILY SCHEDULE** (starting Thurs. 6/1):

1-2 – Open lab time I: Work on your bone notebook or lab exercise

2-2:55 – Lecture

Lunch break

3:30-4:15 – Quiz (Mon/Thurs) or Cool Osteo Thing of the Day (Tues/Wed)

4:15-5:25 – Open lab time II: Work on your bone notebook or lab exercise

## NOTEBOOK REQUIREMENTS

At the end of the semester you will turn in your course notebook. This work will demonstrate what you learned in this course and be a useful reference tool for your future study of osteology. The goal of this exercise is to help you focus on the details of the bony anatomy and form a visual image that you will need to identify bone fragments. Therefore you should stay current with your drawings, making sure to complete each segment of the skeleton before we change topics.

Your notebook should be assembled in a binder and must include the following minimum entries:

1. A table of contents at the beginning
2. A scale for **each** drawing and labels of all salient features.
3. Page numbers
4. **Skull:** 3 views (lateral, anterior and inferior) of the skull with all bones and major craniometric points labeled
5. **Teeth:** A complete dental arcade (both maxillary and mandibular) for both adult and juvenile dentition.
  - a. The maxillary arcade should include the bones of the hard palate (maxillae and palatines)
  - b. Label salient features on the teeth
  - c. Views of the teeth in a full dental arcade should be lingual/occlusal for the incisors and canines, and occlusal for the post-canine teeth (see p. 105 in White *et al.* for an idea of what that looks like)
6. **Vertebrae:**
  - a. **Cervical vertebrae:**
    - i. Superior and inferior view of C1
    - ii. One relevant view of C2
    - iii. One relevant view of a typical cervical vertebra (C3-C6)
    - iv. One relevant view of C7
  - b. **Thoracic vertebrae:**
    - i. Lateral view of T1
    - ii. One relevant view of a typical thoracic vertebra (T2-T8)
    - iii. Lateral views of each of T9-T12
  - c. **Lumbar vertebrae:**
    - i. One relevant view of a typical lumbar vertebra (L1-L4)
    - ii. One relevant view of L5
7. **Shoulder girdle:**
  - a. **Scapula:**
    - i. Posterior view
    - ii. Lateral view
  - b. **Clavicle**
    - i. Inferior view
8. **Ribs:**
  - a. Superior view of each of Rib 1 **and** Rib 2

- b. Superior view of a typical rib (Ribs 3-9)
- c. Superior view of each of Rib 10, Rib 11, **and** Rib 12

9. **Sternum:** One relevant view.

**10. Pelvic girdle**

- a. **Innominates:**
  - i. Lateral view
  - ii. Medial view
- b. **Sacrum:** One relevant view

11. **Patellae:** Posterior view

**12. Long bones of the limbs, metacarpals, and metatarsals:**

- a. **Limb bones:**
  - i. One of: anterior, posterior, medial, **or** lateral
  - ii. One of: proximal **or** distal
- b. **Metacarpals:**
  - i. One of: dorsal or palmar
  - ii. Proximal (base)
- c. **Metatarsals:**
  - i. One of: dorsal or plantar
  - ii. Proximal (base)

13. **Carpals and tarsals:** Two relevant views of each **except** the pisiform. **One** relevant view of the pisiform

**14. Manual and pedal phalanges:**

- a. One of dorsal **or** palmar/plantar
- b. Proximal (base)

SCHEDULE OF LECTURES, LABS, QUIZZES, AND EXAMS (subject to change)

DAY	DATE	QUIZ	LECTURE, LABS, EXAMS	REQUIRED READING
Tues	5/30		Course Overview; Anatomical & Directional terms; Bone Biology; <i>Drawing Lesson?</i>	Chapters 2-3 Chapter 4: 54-59
Wed	5/31		The Skull	Chapter 4: 59-100
Thurs	6/1	<b>Q1</b>	LABORATORY 1 Paleoanthropology: Cranial morphometrics; Osteometric points	
Mon	6/5	<b>Q2</b>	Dentition: Identification, morphology, and function	Chapter 5, 18: 385-388
Tues	6/6		Dentition: Identification, growth and development, and pathology	Chapter 5, 18: 385-388
Wed	6/7		Axial skeleton: vertebral column, ribs, and sternum	Chapters 6-7
Thurs	6/8	<b>Q3</b>	Axial skeleton II: shoulder girdle	Chapter 8, <b>LAB 1 DUE</b>
Mon	6/12	<b>Q4</b>	LABORATORY 2 Bioarchaeology: Dental morphometrics	
Tues	6/13		Arm: Humerus, Radius and Ulna	Chapter 9
Wed	6/14		Os Coxae and Sacrum	Chapter 11
Thurs	6/15	<b>Q5</b>	<b>REVIEW for Midterm Exam</b>	
Mon	6/19	<b>E1</b>	<b>Midterm Exam</b>	
Tues	6/20		Leg: The Femur, Tibia, Fibula, and Patella	Chapter 12, <b>LAB 2 DUE,</b> <b>Notebook Review</b>
Wed	6/21		Determination of Sex, Estimation of Age	Chapter 18
Thurs	6/22	<b>Q6</b>	Inferences about Ancestry; LABORATORY 3 Forensic Anthropology: Age and Sex Determination	
Mon	6/26	<b>Q7</b>	Hand I: Carpals, Metacarpals, and Phalanges	Chapter 10
Tues	6/27		Hand II: Carpals, Metacarpals, and Phalanges	Chapter 10
Wed	6/28		Foot I: Tarsals, Metatarsals, and Phalanges	Chapter 13
Thurs	6/29	<b>Q8</b>	Foot II: Tarsals, Metatarsals, and Phalanges	Chapter 13
Mon	7/3		Osteological and Dental Pathology	Chapters 19; <b>LAB 3 DUE</b>
Wed	7/5	<b>Q9</b>	REVIEW for Final Exam; <b>Notebooks Due</b>	
Thurs	7/6	<b>E2</b>	<b>Final Exam</b>	