

## INTRODUCTORY HUMAN OSTEOLOGY

### PURPOSE

To prepare members to recognize human remains when encountered during excavation or in other context, to provide an understanding of proper ethical and legal treatment of human remains, and to promote proper handling and storage of human remains to ensure that they are properly protected and secured.

### OBJECTIVES

At the conclusion of the course students are expected to:

1. Be able to specifically identify each human bone, or group of bones, by name, including isolated and fragmentary elements. Be able to side bones and bone fragments (as originating from the left or right side of the body), identify segment of bones presented in fragments (proximal/distal, medial/lateral, superior/inferior, anterior/posterior), identify articulations, and recognize effects of bone growth (including epiphyseal closure). Be able to distinguish the anatomy (landmarks and features) of various bones. Be able to recognize and discuss various aspects of dentition including dental terminology, deciduous and adult dental formula, dental development, dental anatomy, tooth identification, dental variation, and dental wear. Be familiar with terms constituting general bone features such as articulation, boss, crest, condyle, diaphysis, eminence, epicondyle, epiphysis, facet, hamulus, head, line, malleolus, neck, process, ridge, spine, torus, trochanter, tubercle, tuberosity, alveolus, canal, fontanelle, foramen, fossa, fovea, groove, meatus, sinus, sulcus, and suture.
2. Have an understanding of how human osteology articulates with the general framework of anthropology, including its relationship with archaeology, paleontology, physical anthropology, and forensics.
3. Understand and be able to discuss ethical and legal issues related to human remains encountered on private, state, and federal lands. Be aware of state and federal laws and to Arizona Archaeological Society rules and guidelines related to human remains.
4. Understand proper procedures for handling and storage of human remains as they relate to both care and treatment of bones (and associated osteometric equipment) and to issues of protection and security. This includes proper use of sliding, hinge, and coordinate calipers; osteometric boards; and bean bags or donut rings.

5. Be familiar with the standard anatomical position of the human body. Be able to properly and appropriately use directional terms such as;
- orthograde/pronograde,
  - cranial/postcranial/axial/appendicular,
  - superior/inferior
  - dorsal/ventral,
  - proximal/distal,
  - anterior/posterior,
  - medial/lateral,
  - palmar/plantar/dorsal,
  - labial/buccal/mesial/distal/occlusal/lingual,
  - cephalic/cranial/caudal,
  - endocranial/ectocranial

when describing bones and teeth. Be familiar with sagittal, coronal, and transverse reference planes in the human body. Be familiar with terms related to basic motion of the body including abduction, adduction, eversion, extension, flexion, inversion, opposition, pronation, rotation, and supination.

6. Have a broad understanding of bone and tooth formation, growth, and function. Be aware of idiosyncratic, gender, geographic, and ontogenetic variation and their effects upon bone identification. Be aware of the nature, including bone structure and chemistry, calcification, bone growth and repair, and joints and joint lubrication, function such as axial skeleton, upper limbs, lower limbs, and skull, and movement of bones during breathing, manipulation, walking, and chewing.
7. Have a cursory understanding of procedures for recovery, preparation, and curation of human remains; skeletal analysis; age, sex, stature, and ancestry assessment using various bones; nonmetric variation and pathology (trauma and disease); taphonomy; and applications of human skeletal analysis to reconstruction of human populations. Case studies may be used.

#### FORMAT

Thirty hours of classwork and laboratory work are required to present the class. (Twelve classes of two and one-half hours each are recommended.)

The suggested class format is approximately one-half hour of lecture and approximately two hours of laboratory work. The laboratory section should be structured to include an instructor presentation of the specific descriptive material (description of adult and subadult bones, side identification, articulations, and other pertinent material) related to the bones of interest, and a quiz.

#### PREREQUISITES

Prehistory of the Southwest as presented by the AAS or the equivalent

which has been approved by the Department of Certification.

## TEXTBOOK

The suggested text for the class is *Human Osteology: A Laboratory and Field Manual*, Fourth Edition, by William M. Bass (1995). Refer to the REFERENCES for further information.

## RESOURCE MATERIAL

For students to derive a reasonable knowledge of human skeletal remains it is recommended that they have access to at least an articulated or disarticulated adult skeleton and an array of fragmentary human bones. Access to a nonadult skeleton would add to the learning experience. A sample of nonhuman bones should also be available for comparative study. All of this material should be properly labeled and sturdy enough to withstand student handling.

## EXAMINATION

Cumulative Practice quizzes should be included to add to the student learning experience and to indicate areas of class weakness to guide instructor presentations. These should include occasional non-human bones and may be self-graded or otherwise at the instructor's preference. No formal examinations are required.

## COURSE OUTLINE:

1 <sup>st</sup> Class	Lecture	General Overview, including relationship of human osteology to anthropology and subfields, state and federal laws, rules, and guidelines. Arizona Archaeological Society ethics, protection and security of human remains, and care and treatment of bones during handling and storage.
	Lab	Use and care of osteometric equipment and bean bags/donut rings. Handling the skull. Cranial vault consisting of frontal, parietals, occipital, and temporals, including discussion of sutures and general cranial abnormalities and pathologies. Total six bones.
2 <sup>nd</sup> Class	Lecture	Introduction to the composition of bone and the layout of the human skeleton, standard anatomical position and directional terms, reference planes, and terms related to motion (see Objective 5). Introduction of general bone features. (see Objective A)
	Lab	Skull orientation, sinuses, osteometric points, remaining bones of the skull consisting of maxilla, palatines, vomer, inferior nasal concha, ethmoid, lacrimals, nasals, zygomatics, sphenoid, auditory

ossicles, malleus, incus, and stapes, mandible, and hyoid. Total 23 bones.

COURSE OUTLINE (continued)

3 <sup>rd</sup> Class	Lecture	Bone formation. Bone chemistry, structure, growth, and calcification.
	Lab	Dentition. Total 20 deciduous and 32 adult teeth.
4 <sup>th</sup> Class	Lecture	Dentition including dental terminology, tooth formation, deciduous and adult dental formula, dental development, dental anatomy, dental wear, dental variation, tooth identification, and tooth and chewing function.
	Lab	Vertebral column including cervical, thoracic, and lumbar vertebra, including general vertebral abnormalities and pathologies. Total 24 vertebra.
5 <sup>th</sup> Class	Lecture	Bone growth and repair. Bone as a material. Idiosyncratic, gender, geographic, and ontogenetic variation and their effects upon identification of bone.
	Lab	Ribs and sternum. Total 25 bones.
6 <sup>th</sup> Class	Lecture	Joints and lubrication.
	Lab	Shoulder girdle, cervicle and scapula. Total four bones.
7 <sup>th</sup> Class	Lecture	Function of the axial skeleton and breathing.
	Lab	Arms, humerus, radius, and ulna. Total six bones.
8 <sup>th</sup> Class	Lecture	Function of the upper limbs and manipulation.
	Lab	Hands, carpals, metacarpals, and phalanges. Total 54 bones.
9 <sup>th</sup> Class	Lecture	Function of the lower limbs and walking.
	Lab	Pelvic girdle, sacrum, coccyx, and os coccyx. Total four bones.
10 <sup>th</sup> Class	Lecture	Recovery, preparation, and curation of human skeletal remains. Cremations. Taphonomy effects on skeletal remains.
	Lab	Legs, femurs, patella, tibia, and fibula. Total

eight bones.

- 11<sup>th</sup> Class Lecture      Skeletal analysis, age, sex, stature, and ancestry assessments. Human or nonhuman; a comparison.
- Lab                      Feet, tarsals, metatarsals, and phalanges. Total 52 bones.
- 12<sup>th</sup> Class Lecture      Nonmetric variation, pathology (trauma & disease), and application of human skeletal analysis to reconstruction of past human populations.
- Lab                      Introduction of skeletal analysis to determine age, sex, stature, and ancestry.

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