PRIMATE ANATOMY

ANT 432L Unique# 31355
Spring 2017/Shapiro

COURSE WEBSITE (via Canvas): canvas.utexas.edu

Instructor: Liza Shapiro

Phone: 471-7533
Email: liza.shapiro@austin.utexas.edu

*If you can't come to my office during office hours, please feel free to make an appointment! You are also welcome to communicate with me by email.

Prerequisites: ANT 301 or Human biology major or consent of instructor.

Required Texts:


Recommended text:
The textbooks are available at the University Co-Op and the Whitehead book is also on reserve in the Life Sciences Library (2nd floor, Main Building).

Other required readings:

1. Readings online: In addition to the textbook readings, there are numerous other assigned readings that are available in pdf format via the course website on Canvas (canvas.utexas.edu). These readings are required. Once you log-in to the course via Canvas, you will find these readings by clicking on the links for the appropriate dates visible on the Home page.

2. Lab readings and assignments: You can find lab readings and assignment sheets on Canvas by clicking on the appropriate lab date on the Home page. Read the assignment before coming to lab, and download and print the lab assignment sheet. You MUST bring your lab readings and assignment sheets to lab EVERY WEEK.

Course description and objectives:
This course is an exploration of the relationship between primate anatomical form and function from an evolutionary perspective. The course is designed to demonstrate how the primate body form is adapted to its many functions, with an emphasis on adaptations to diet and locomotion. There will be lectures as well as a separate laboratory section. The lab will not include dissection, but will emphasize the diversity and function of the primate skeleton and give you a chance to learn anatomy "hands-on".

After taking the course, you should:

1) have a good grasp of basic primate anatomy - e.g. be able to identify the bones that comprise the skeleton, and to understand the arrangement of the basic muscle groups described in class;

2) understand the various methodological approaches one can use to elucidate the relationship between morphology and function;

3) be able to provide functional explanations for some of the basic anatomical differences among primates;

4) understand how the study of functional morphology in living primates can be applied to the reconstruction of behavior in fossil primates.

**Grading**: Grades are based on the following:

1. Midterm 20%
2. Final 20%
3. Lab Midterm 10%
4. Lab Final 20%
5. Term Paper 15% (Topic due April 13, Paper due May 2)
6. Lab assignments 10%
7. Participation in class discussion 5% (I expect you to be able to demonstrate your understanding of the reading material by responding to questions I might ask in class, or simply by asking relevant questions yourself).
Final course letter grades will be assigned using the +/- grading system. Decimal places of 0.5 or above will be rounded up. (e.g., 89.5=90=A-)

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**Lab grades:** Each lab includes a weekly assignment to hand in. You will be graded on the weekly lab assignments, and you will be tested on the lab material twice during the semester. There will be a lab midterm, covering only the 3 labs on the human skeleton. At the end of the semester, there will also be a lab final that covers the remaining lab material. Both the lab midterm and the lab final will be in the form of a lab practical. The percentages of your final grade for each of these components of lab are listed above.

**Midterm:** The midterm is 20% of your final grade and will consist of multiple choice questions and short answers, and short or longer essays. The material you are responsible for comes from the lectures, the readings, and the labs.

**Final:** The final (20% of your grade) is not cumulative and also includes material from the lectures, the readings, and the labs. Format is similar to the midterm.

**Term Paper:** Each student will be required to write a term paper 10-15 pages long (double-spaced, 12 pt font, 1 inch margins.) The paper is worth 15% of your final grade. Details about the content of the term paper are on the Canvas website (see Term Paper link on the Home page).

Submit paper topic or outline to me by April 13 no later than 5 p.m. (via Canvas) Submit paper (hard copy, plus electronic copy via Canvas) on May 2 at 2:00 p.m.

In conjunction with the paper, you are required to read a tutorial on plagiarism and take a short quiz on it. The tutorial can be found at http://www.lib.utexas.edu/services/instruction/learningmodules/plagiarism/. The plagiarism test is available on Canvas under “Quizzes”.

*Your term paper will not be graded unless you complete the plagiarism quiz. Take the quiz anytime but no later than May 2.*

**Manage your time wisely when preparing to write the paper. This may help (even though you’re not “dummies”!):**
http://www.dummies.com/how-to/content/budgeting-your-time-to-complete-a-research-paper.html

**Course policies:**
The following policies are not intended to be harsh, but are included to provide clear guidelines on issues that students often face throughout the semester.
**Expectations**
I expect you to do the assigned readings in advance of the lectures and to come to class each day on time. During class, you may use your laptop or other device for note taking but not for checking email, doing homework from other classes, surfing the web, etc. For lab, I expect you to come prepared with your assignment sheet in hand (from Canvas). If you forget to bring the assignment sheet, you will have to leave class and print it out on campus, which means you will lose precious lab time.

**Attendance:**
*I do not take formal attendance, but I am aware of who consistently comes to class and who doesn’t.* Consistent attendance can help boost your grade if you end up with a borderline final grade. Whether you come to class or not, you are responsible for keeping up with what happens in class. This applies to the content of the class, handouts, and announcements about class policies, events, deadlines, etc. Lectures and announcements can be found on Canvas, but it is easy to miss other pertinent information if you are absent from class.

**Guns.**
As of August 1, 2016, due to the passage of S.B. 11 ([https://campuscarry.utexas.edu](https://campuscarry.utexas.edu)), licensed, concealed handguns are now allowed in most campus buildings, including classrooms. If you hold a license to carry a concealed weapon, it is your responsibility to know and follow the Texas and University policies listed here: [https://campuscarry.utexas.edu/students](https://campuscarry.utexas.edu/students). Visible weapons or threatening behavior will be reported to the UT Police Department immediately.

The following statement serves as a reminder - *I am required to notify you of this verbally, and I will do so in class.*
Based on my legal right to ban guns from my UT office, *no guns are allowed in my office (SAC 5.128).* Leaving a gun unattended (as it would be, if left outside my office) is against the law. Please plan accordingly. *YOU* are always welcome in my office, just not your gun. Thank you.

**Make-ups**
There will be no make-up exams or in-class labs. Exceptions will be made only 1) with *proof* of dire emergency or illness, 2) due to observance of a religious holy day, or 3) due to military service. I will not provide alternative exam times for students who have personal travel plans or commitments, so please don’t ask.

- **Illness or emergency:** If you miss an exam or lab due to illness or emergency, contact me *as soon as possible* either before the exam or within 2 days after the exam or lab. You will not be given a make-up unless you can provide documentation regarding the reason for your absence.

- **Religious holy days.** By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within
a reasonable time after the absence.

- **Absence for military service.** In accordance with section 51.9111 of the Texas Education Code, a student is excused from attending classes or engaging in other required activities, including exams, if he or she is called to active military service of a reasonably brief duration. [The maximum time for which the student may be excused has been defined by the Texas Higher Education Coordinating Board as "no more than 25 percent of the total number of class meetings or the contact hour equivalent (not including the final examination period) for the specific course or courses in which the student is currently enrolled at the beginning of the period of active military service."] The student will be allowed a reasonable time after the absence to complete assignments and take exams.

**Students with disabilities:** Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities at ssd@austin.utexas.edu, 471-6259 (voice), 410-6644 (video phone) or http://ddce.utexas.edu/disability/. Please inform me as soon as possible if you need accommodations.

**Late assignments**
Late assignments will cost you 10 points (out of 100) per day. This could change your grade dramatically. Don't be late!

**Grades**
The grade you are given, either on an individual exam or assignment or as your final grade, is not the starting point of a negotiation. It is your grade unless an error has been made. If you think an error has been made, let me know within one week of receiving the assignment or exam grade.

**Extra Credit:**
I do not offer “extra credit” opportunities. If you are struggling in the course, please come for help *during* the semester when there is still time for me to help you. Take advantage of office hours or make an appointment with me or the TA. Do not wait until the course is over and ask me to change your grade because you are trying to graduate, or you have had a tough time with your personal life this semester. By then, it is too late for me to help you.

**Honor Code:** Each student in this course is expected to abide by the University of Texas Honor Code.:
*The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.*

**Scholastic Dishonesty**
Students who violate University rules on scholastic dishonesty are subject to disciplinary
penalties, including the possibility of failure in the course and/or dismissal from The University. Scholastic dishonesty" includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor), or the attempt to commit such an act.


For a tutorial and information on plagiarism, see http://www.lib.utexas.edu/services/instruction/learningmodules/plagiarism/.

**Emergency evacuation:** (Office of Campus Safety and Security, 512-471-5767, http://www.utexas.edu/safety/)

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.

- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.

- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.

- In the event of an evacuation, follow the instruction of faculty or class instructors.

- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

**Other useful information:**

**Resources for Learning & Life at UT Austin**

- The University of Texas has numerous resources for students to provide assistance and support for your learning.
  - Sanger Learning and Career Center: https://ugs.utexas.edu/slc
  - Undergraduate Writing Center: http://uwc.utexas.edu/
  - Counseling & Mental Health Center: http://cmhc.utexas.edu/
  - Career Counseling: http://ugs.utexas.edu/vick/career
  - Student Emergency Services: http://deanofstudents.utexas.edu/emergency/
Behavior Concerns Advice Line (BCAL)

- If you are worried about someone who is acting differently, you may use the Behavior Concerns Advice Line to discuss by phone your concerns about another individual’s behavior. This service is provided through a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit http://www.utexas.edu/safety/bcal
### LECTURE SCHEDULE

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<tr>
<th>Jan</th>
<th>17</th>
<th>Introduction</th>
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<tr>
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<td>19</td>
<td>The primate musculoskeletal system</td>
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<td>24</td>
<td>Primate diversity</td>
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<td>26</td>
<td>The evolutionary origin of primate features</td>
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<td>31</td>
<td>Adaptation, natural selection, and functional morphology</td>
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<tr>
<th>Feb</th>
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<th>Functional morphology: methods</th>
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<td>7</td>
<td>Muscles and lever systems</td>
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<td>9</td>
<td>Primate Locomotion</td>
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<td>14</td>
<td>Movie: Life of Mammals (strepsirrhines and monkeys)</td>
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<td>16</td>
<td>Primate quadrupedal gait</td>
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<td>Bone Biomechanics</td>
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<td>Body size and primate adaptations</td>
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<tr>
<th>Mar</th>
<th>2</th>
<th>Functional morphology of the dentition</th>
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<td>Functional morphology of the jaw</td>
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<p>|      | 21    | Functional morphology of the forelimb I (arm, forearm, shoulder, elbow) |</p>
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<th>Date</th>
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<tr>
<td>Apr 4</td>
<td>Cranial morphology and locomotion</td>
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<tr>
<td>6</td>
<td>Kinematics of bipedalism</td>
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| 11    | Functional morphology of the hind limb I  
     | (pelvis, thigh, leg, hip, knee) |
| 13    | Functional morphology of the hind limb II (ankle, foot)  
     | (Paper topic due today via Canvas by 5 p.m.) |
| 18    | Movie: Life of Mammals (apes) |
| 20    | No Class – work on term paper |
| 25    | (lab during class time) LAB 11: Primate Pelvis and Hind Limb |
| 27    | Reconstruction of locomotor behavior in fossils:  
     | Australopithecus afarensis and the evolution of bipedalism |
| May 2 | Review for lab final (TERM PAPER DUE TODAY AT 12:30 p.m.) |
| 4     | No class (study for lab final!) - lab final during lab hours (3:00) |

**FINAL EXAM**
Monday May 15  2:00-4:00 p.m. (2 hrs, not 3)
## ANT 432L  PRIMATE ANATOMY  Spring 2017

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<th>Jan</th>
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<th>No lab</th>
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<td>26</td>
<td>LAB 1: Shoulder and Forelimb: Osteology</td>
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<th>Feb</th>
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<th>LAB 2: Pelvis and Hind limb: Osteology</th>
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<td>LAB 3: Skull, Vertebral Column and Thorax: Osteology</td>
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<td>LAB 4: Muscles and Lever Systems</td>
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<td>LAB 5: Primate quadrupedal gait <em>(This lab will be held in MEZ 4.136!)</em></td>
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<th>Mar</th>
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<th>Lab Midterm (on human osteology only)</th>
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<td>LAB 6: Primate Teeth and Jaws</td>
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<td>LAB 7: The Primate Forelimb</td>
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<td>LAB 8: Primate Vertebral Column and Thorax</td>
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<th>LAB 9: Back muscle function during locomotion <em>(This lab will be held in MEZ 4.136!)</em></th>
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<td>13</td>
<td>Lab 10  Kinematics of bipedalism <em>(This lab will be held in MEZ 4.136!)</em></td>
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<td>No lab: work on your paper</td>
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**Note:** LAB 11: Primate Pelvis and Hind limb will be held during lecture hours (12:30-2:00) on April 25.

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<th>Apr</th>
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<th>Lab 12: Locomotor anatomy of <em>Australopithecus afarensis</em></th>
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<th>May</th>
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<th>LAB FINAL EXAM</th>
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A review session for the lab final will be held on TUES, May 2 during lecture hours.
Note: Readings below include the two textbooks (Gebo, and Whitehead et al.) as well as other readings beyond the textbooks. The Whitehead book is on reserve in the Life Sciences Library in case you don't want to purchase it. All non-textbook readings are available online via the course website (Go to Canvas at canvas.utexas.edu)

**Jan 17: Introduction to the course** (no reading)

**Jan 19: THE PRIMATE MUSCULOSKELETAL SYSTEM**


2. Whitehead et al. (Textbook) Chapter 2

   and see https://www.youtube.com/watch?v=5YcNAPzDxDg

**Jan 24: PRIMATE DIVERSITY**

1. Whitehead et al. (Textbook) Chapter 1

2. Gebo (Textbook): Chapters 2 and 3

**Jan 26: THE EVOLUTIONARY ORIGIN OF PRIMATE FEATURES**


**Jan 31: ADAPTATION, NATURAL SELECTION, AND FUNCTIONAL MORPHOLOGY**

1. History of the study of form and function:
   http://www.ucmp.berkeley.edu/history/aristotle.html
   http://www.ucmp.berkeley.edu/history/hilaire.html
   http://www.ucmp.berkeley.edu/history/cuvier.html

Feb 2: FUNCTIONAL MORPHOLOGY: METHODOLOGICAL APPROACHES


Feb 7: MUSCLES AND LEVER SYSTEMS


2. Gebo textbook: pages 47-54

Feb 9: PRIMATE LOCOMOTION


Feb 14: No reading

Feb 16: PRIMATE QUADRUPEDAL GAIT


(and see lab reading for Gait lab (Lab 5), posted on page for Feb. 25)

**Feb 21: BONE BIOMECHANICS**

1. Gebo textbook 45-47


**Feb 23: BODY SIZE AND PRIMATE ADAPTATIONS**

1. Gebo textbook: pages 54-55


******** Feb 28: MIDTERM***************

******** Mar 2: REVIEW FOR LAB MIDTERM AND LAB MIDTERM

******** Mar 7: FUNCTIONAL MORPHOLOGY OF THE DENTITION


******** Mar 9: FUNCTIONAL MORPHOLOGY OF THE JAW

1. Gebo textbook: pages 80-82

(March 14 and 16– no reading – Spring Break!!)

Mar 21: FUNCTIONAL MORPHOLOGY OF THE FORELIMB I (ARM, SHOULDER, FOREARM, ELBOW)

2. Gebo textbook: pages 119-133, plus 170-171

Mar 23: FORELIMB II (HANDS)

1. Whitehead et al. textbook: pages 178-181 (Hand and Wrist)
2. Gebo textbook: pages 133-137

Mar 28 and Mar 30: VERTEBRAL COLUMN

1. Whitehead et al. textbook: pages 156-166 (Axial Skeleton)

Apr 4: Cranial morphology, posture and locomotion


Apr 6: KINEMATICS OF BIPEDALISM

Apr 11: HINDLIMB I (PELVIS, THIGH, LEG, HIP, KNEE)

1. Whitehead et al. textbook: pages 181-191
2. Gebo textbook: 141-156, plus 171-181

Apr 13: HINDLIMB II (ANKLE, FOOT) (Paper topic due today at 12:30 p.m.)

1. Whitehead et al. textbook pages 192-198
2. Gebo textbook: 156-161

Apr 18: No reading

Apr 20: Work on term paper, topic due today at 5 pm

Apr 25: LAB DURING CLASS TIME. (Lab 11: Primate pelvis and hind limb)

April 27: RECONSTRUCTION OF LOCOMOTOR BEHAVIOR IN FOSSILS: AUSTRALOPITHECUS AFARENSIS AND THE EVOLUTION OF BIPEDALISM

May 2: Review for lab final (PAPER DUE TODAY AT 12:30 P.M.)

May 4: No class – Study for lab final. Lab final begins at 2:00 in SAC 5.172

Read Whitehead et al. textbook pages 199-204 for summary of postcranial comparative anatomy

** FINAL EXAM ** **
Monday May 15 2:00-4:00 p.m. (2 hrs, not 3)
GOOD LUCK!!