**SYLLABUS**

**Anthropology 390: Fossil Hominin Anatomy**

**Fall 2015**

**T F 10:55 – 12:15 am, BIO 201A**

**HOW THIS SYLLABUS IS ORGANIZED**

The syllabus is meant to be a complete document and *everything* in the syllabus is important. The *most important* things come first. For example, please review the policy on academic integrity at <http://ctaar.rutgers.edu/integrity/policy.html#Integrity>. It is very important.

**INSTRUCTOR:**

Frederick Foster

Office Hours: T 1:00 pm – 2:00 pm or by appointment, 310 Biological Sciences Building

Email: [frf12@scarletmail.rutgers.edu](mailto:frf12@scarletmail.rutgers.edu)

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| ***BOX 1***  Major Requirements Met by this Course  This course meets the ***skeletal biology / hominid paleontology*** requirement for the Bachelor of Science degree in Evolutionary Anthropology. |

**CATALOG DESCRIPTION**

Human fossil record during Plio-Pleistocene; taxonomy, phylogenetics, and functional morphology. Origins of Hominidae, diversity in *Australopithecus* and *Paranthropus*, rise of *Homo* and of *Homo sapiens*. Casts and published reports; methods of inference.

**PREREQUISITE**

**01:070:102 and 01:070:358/359** or **permission of instructor**

**INTRODUCTION**

The anatomy or morphology of our fossil relatives are the means to reconstructing the evolutionary trajectory and behavior of our ancestors and near realtives. This course focusses on the link between anatomy and behavior. Understanding this link requires first a theoretical understanding of the influence of factors such as phylogeny, constructional constraints, and functional utility. Readings, discussions and lectures will explore these links in the first part of the course.

The second part of the course will apply this theoretical background to analysis of the hominin fossil record. The course will proceed systematically through various anatomical regions and we will ask “What can we infer of behavior from this anatomy?” This will involve considerations of function (e.g., how do bones act as levers) as well as careful comparative observation (e.g., what are the key similarities and differences). Overall emphasis will be on relatively complete skeletons and understanding what seem to be major transitions in hominin evolution (e.g., the rise of bipedalism, the rise of the genus *Homo*).

**MATERIALS**

Readings from the primary literature and selected texts available in pdf format will be used. These will be available on sakai. As much as possible reading will be split between classic literature and some recent and hopefully provocative analyses. The reading list provided below may change. Some of the readings may be removed while others may be added. It is important to check Sakai and your e-mail for notification of these changes.

Casts of key hominin fossils including more complete skeletons will be available in BIO 201A. Observation and study of these will require significant time outside of regularly scheduled class.

**SPECIFIC COURSE OBJECTIVES**

• Understand the role of phylogeny in analyses of form.

• Understand what is meant by constructional or architectural constraints on form.

• Understand the impact of function on form.

• Be able to think carefully about the concept of performance specifically with respect to natural selection.

• Think critically about adaptation.

• Be familiar with basic biomechanical concepts including lever mechanics.

• Grasp key fossil evidence for major hominin behaviors

• Link anatomy to locomotion.

• Link anatomy to diet.

• Develop the facility to make rich and detailed comparative anatomical observations.

• Apply observations of anatomy to think critically about major hominin transitions.

• Achieve broad familiarity with the whole skeleton.

• Be able to clearly express key concepts in writing and in an oral presentation..

**COURSE STRUCTURE**

The course will include lecture parts, seminar style discussion of papers, and lab exercises.

**GRADING**

Grading will be based on one student-lead discussion (~10%), one lab assignment (~20%), attendance (~10%), active classroom participation and discussion (~10%), two exams (~15% each), and a final paper with an in-class presentation (~20%).

**PREPARATION FOR CLASS**

Each week’s classes will be in part structured around discussion of required readings and/or observation and discussion of fossil casts. It is essential that the assigned reading be completed to be prepared for class.

**EXAMS**

Exams will include short answer, multiple choice, and short essay questions.

**SCHEDULE OF TOPICS**

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| **DATE** | **TOPIC** | **PDF READING** |
| Sept 4 | Seilacher’s Triangle & “Konstructions-Morphologie” | Reif et al, 1985; Briggs 2005 |
| Sept 8 | NO CLASS; Labour Day schedule change |  |
| Sept 11 | Phylogeny | Gould and Lewontin, 1979; Wood, 2010 |
| Sept 15 | Constructional Constraint | Foster and Collard, 2013; Collard and Lycett 2009 |
| Sept 18 | Function | Lucas et al. 2008 |
| Sept 22 | Natural Selection, Performance, and Adaptations | Papers selected by students |
| Sept 25 | Levers | Web resource; Drapeau 2004 |
| Sept 29 | Lab: Levers | In-class exercise |
| Oct 2 | Loads, Stress, and Strain | Web resource: Strait et al. 2009 |
| Oct 6 | Plasticity and Epigenetics | Marchi and Shaw, 2011 |
| Oct 9 | EXAM 1 |  |
| Oct 13 | The Functions of Teeth | Yeakel et al, 2013 |
| Oct 16 | Skulls & Jaws | Daegling and Hylander, 2000; Daegling and Grine, 1991 |
| Oct 20 | Limbs -The Intermembral Index | Jungers, 2009 (in The First Humans) |
| Oct 23 | Hips | Web resource; McHenry 1975; Simpson et al. 2008 |
| Oct 27 | The Spine | Been et al, 2010; Russo and Shapiro, 2013; Whitcome, 2012; Hernandez et al, 2009 |
| Oct 30 | Knees | Sylvester et al, 2011 |
| Nov 3 | Lab: Comparative Description | *Australopithecus sediba* issue of *Science*; In-class exercise |
| Nov 6 | Feet | DeSilva and Thockmorton, 2010; Griffin et al, 2010; Hailie-Selassie et al. 2012 |
| Nov 9 | Footprints | Hatala et al, 2013 |
| Nov 13 | Shoulders & Elbows | Green et al, 2012 |
| Nov 17 | Hands | Jungers et al. 1997; Richmond 2007; Rein et al, 2013 |
| Nov 24 | Skulls & Brains | McCarthy and Lieberman, 2001; Bromage et al, 2008; Bastir et al, 2011 |
| Nov 25 | EXAM II |  |
| Nov 26 | NO CLASS; Thanksgiving |  |
| Dec 1 | Class Presentations |  |
| Dec 4 | Class Presentations |  |
| Dec 8 | Class Presentations |  |
| Dec 10 | *Final papers are due on Dec 10.* | |