

Paleoanthropological Field Methods (in the Turkana Basin)

This course is an opportunity to participate in all aspects of a paleoanthropological research project, focusing on practical aspects of vertebrate paleontology, geology, zooarchaeology and taphonomy. Students are trained in field reconnaissance, fossil survey, plotting, preservation, and collection, analysis and interpretation. Hands-on examination of fossils from Plio-Pleistocene or Holocene sites around Lake Turkana will teach students how human ancestors and other animals adapted to the environments around them. Experts from TBI, Stony Brook, and other institutions provide instruction in lectures, labs, and via fieldwork within the context of on-going projects.

This field course is one of three that constitutes the Turkana Basin Institute (TBI) Origins Summer Field School. This program is dedicated to hands-on training in all of the major disciplines within human evolutionary studies. This program is a unique opportunity for undergraduate and graduate students to learn the basic principles of paleoanthropology “hands on” in a region with one of the world’s most productive and spectacular records of early hominin evolution - the Turkana Basin. Field school students participate in ongoing paleoanthropology research focusing on the last 4 million years.

Instructor: Dr. Jason E. Lewis jason.lewis@stonybrook.edu
 Office & Phone: Soc. Behav. Sci. N-513A 631-632-5808
 Will be generally available to students for office hours during the module.

Teaching Assistants: There will be at least one graduate student TA available at the facility for the duration of the program.

Class Meetings: Monday - Saturday, 8:00 am - 12:00 pm, and 2:30 - 5:30 pm

Note: for Contact Hour calculation ‘Lab’ is considered as requiring outside preparation time and given a 2/1 ratio, while ‘Field’ is considered as not requiring outside preparation time and given a 3/1 ratio.

Week	Day	Lecture	Seminar	Recitation	Lab	Field	Other	Total
1	1	6						6
1	2	3			4			7
1	3	3			4			7
1	4	3			4			7
1	5	3			4			7
1	6					8		8
2	8				8			8
2	9					8		8
2	10	3			4			7

Week	Day	Lecture	Seminar	Recitation	Lab	Field	Other	Total
2	11					8		8
2	12					8		8
2	13						3 exm	3
Total Hours		21			28	32	N/A	84
Contact Hours		21			14	10.66		45.66

Text: There is no assigned textbook for this course; assigned readings will be given digitally to the students at the beginning of the course. The readings will be useful for clarifying concepts discussed in class and for supplying additional examples from those presented in lecture. Students will find that reading the material before attending lecture will make the lecture easier to follow. Other documents, review sheets, class announcements, etc, will be downloadable from the class Blackboard site (<https://blackboard.stonybrook.edu>).

COURSE LEARNING OBJECTIVES

The objectives of this course are to teach you to:

- Understand the application of the scientific method (i.e., how to construct and test a hypothesis).
- Understand the theory of evolution at both the molecular and organismal levels.
- Understand the nature of the fossil record and the geologic context of fossils.
- Understand the evidence for primate and human evolution.
- Understand how the biology, ecology and behavior of extinct human species is reconstructed.

This course satisfies the following requirements of the **DEC**:

Category H- Implications of Science and Technology

This course will help students understand the social and global implications of science and technology in an area close to most peoples' hearts; human origins. Specifically, students will learn hands-on how the most recent advances in technology (CT scanning, mass spectrometry, satellite imagery, hand-held tablets and other devices, etc) combine with traditional techniques in the lab and field to discover and understand evidence of our lineage's evolution, and how this field of research is impacting the local communities by working side by side with the local Dassanetch and Turkana people engaged in this research. It also explains how humanity's ability to make technology, starting 3.3 million years ago at sites students will visit during this field school, have enabled our survival until today.

This course satisfies the following requirements of the **SBC**:

Pursue Deeper Understanding in Science, Technology, Engineering, and Mathematics (STEM+):

Learning Outcomes

1. Students must use the skills expected from their Versatility courses to study and practice them in greater depth, with further study applied to the area in which they are certified.

-The structure and content of this course aims to build on the previous FS course (by definition prerequisite) by practicing the skills learned in the daily labs and developing critical thinking skills in the daily seminars. Students move to a higher level of class format (daily labs, advanced fieldwork) and critical approaches (hands-on practical final exam, etc).

PREREQUISITES

This course is part of a 3-course themed cluster (field school) and there are no prerequisites. Lectures will cover the basic concepts that are required to understand the material. A science background is not necessary for the successful completion of the course.

COURSE REQUIREMENTS

- Participation (20%) – students are expected to actively participate in the data collection in the field and in class discussion and debates.
- Lab/Practical exercises (40%) – lab or practical exercises must be completed and handed in prior to the following exercise.
- Final exam (40%) – the exam consists of multiple choice, matching, and short answer questions covering topics from the course.

COURSE POLICES

Classroom etiquette:

While students are in class, they are expected to give their full attention to the lecture. Reading, talking, eating, texting or browsing on cell phones, leaving or packing up to leave before the professor has dismissed the class are inappropriate classroom behaviors and disruptive to other students. Also, please make sure that your watch alarms, pagers, and cell phones do not go off during class.

Attendance and preparation of assignments:

Students are expected to attend all classes; if you expect to miss one or two classes, please email your TA, who will inform to me. Unexcused absences will lower your grade. Computer glitches (such as computers that die, hard disks that crash, flash drives that are lost, etc) will not be accepted as excuses for failure to do assignments on time, to study for exams, etc.

Policy Regarding Missed Exams:

Generally, makeup examinations are not given (and the score for the missed exam is entered as zero “0”). If you would like to be considered for a makeup examination, the following conditions must be met: 1. You should have a legitimate excuse for having missed the original exam, e.g., illness, family emergency. 2. You must inform me within 48 hrs before or after the scheduled exam date that you cannot take the exam. If the above conditions apply, then you will be allowed to do a makeup exam.

Americans with Disabilities Act:

If you have a physical, psychiatric/emotional, medical or learning disability that may impact on your ability to carry out assigned course work, please contact the Disability Support Services office in the Educational Communications Center (ECC) Building, room 128 (632-6748). DSS will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information and documentation of disability is confidential.

Academic Integrity:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

Critical Incident Management:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Syllabus

Day 1-

Morning: Lecture on the role of East African paleontological fieldwork in understanding human evolution

Afternoon: Lecture on East African primatological fieldwork- primate behavior and ecology, primate cognition and tool use.

Day 2-

Morning: Lecture on remote sensing and reconnaissance

Afternoon: *Lab* - Field survey techniques

Day 3-

Morning: Lecture on geology & sedimentology

Afternoon: *Lab* - Field geology activity- What to do at an outcrop?

Day 4-

Morning: Lecture on Vertebrate Paleontology & Paleoecology

Afternoon: *Lab* - bones, teeth, identification

Day 5-

Morning: Lecture on Zooarchaeology

Afternoon: *Lab* - faunal analysis, bone surface modification

Day 6-

Morning: Visit to Areas 8a-b & lecture on context of discovery

Afternoon: Survey and surface plotting of fossils

Day 7- Morning: *Lab* - Fossil curation, preparation, and identification

Afternoon: *Lab* - Hands-on ecometrics of mammal teeth and limbs

Day 8- Rest Day

Day 9-

Morning: Visit to Area 10 & lecture on context of discovery

Afternoon: Jacketing, block removal, other fossil recovery techniques

Day 10-

Morning: Lecture on isotopic analyses

Afternoon: *Lab* - drilling fossil tooth fragments for isotopic analyses

Day 11-

Morning: Visit to Areas 13 & 15 & lecture on context of discovery

Afternoon: Survey, surface plotting and collection of fossils

Day 12-

Morning: Visit to [area that hasn't been surveyed recently]

Afternoon: Survey, surface plotting and collection of fossils

Day 13-

Morning: Final Exam

Day 14- Class Over: Rest Day Before Next Module**Readings**

Readings for individual lectures will be distributed as PDFs/photocopies before or at the beginning of the module. Students are expected to have read the papers before the day that topic is covered and come prepared with questions for discussion sessions.

Day 1-

Lewin, R. 1987. *Bones of contention*. Simon and Schuster, New York. 348 pp. Chapters 9 & 10

National Museums of Kenya. 1984. *Kenya's place in geology*. NMK, Nairobi. 39 pp.

Day 2-

Njau, J.K., Hlusko, L.J. 2010 Fine-tuning paleoanthropological reconnaissance with high-resolution satellite imagery: the discovery of 28 new sites in Tanzania. *J. Hum. Evol.* 59, 680-684. doi:10.1016/j.jhevol.2010.07.014

Compton, R. R. 1985. *Geology in the field*. J. Wiley & Sons, NY. 398 pp. Chapters 1, 2 & 5

Leakey, MG et al. n.d. *Field protocol for fossil prospecting, documentation, collection, and curation*. Manuscript on file at TBI.

Day 3-

Feibel, C. S. 2011. A geological history of the Turkana Basin. *Evolutionary Anthropology* 20(6): 206-216.

Feibel, C. S. 2001. Archaeological sediments in lake margin environments. In: Stein, J. K. and

Farrand, W. R. (eds.) *Sediments in Archaeological Context*. University of Utah Press, Salt Lake City. pp. 127-148.

Feibel, C. S. 2013. Facies and Pliocene paleoecology. In: Sponheimer, M. Lee-Thorp, J. Reed, K. Ungar, P. (eds.) *Early Hominin Paleoecology*. University of Colorado Press.

Day 4-

Sponheimer, M. Lee-Thorp, J. Reed, K., Ungar, P. (eds.) 2013. *Early Hominin Paleoecology*. University of Colorado Press. Chapter 1

Day 5-

Pobiner, B., Rogers, M., Monahan, C., Harris, J. 2008. New evidence for hominin carcass processing strategies at 1.5 Ma, Koobi Fora, Kenya. *J. Hum. Evol.* 55, 103-130.

Stiner, M. 2002. Carnivory, Coevolution, and the Geographic Spread of the Genus *Homo*. *Journal of Archaeological Research* 10(1), 1-63.

Day 10- Sponheimer, M. Lee-Thorp, J. Reed, K., Ungar, P. (eds.) 2013. *Early Hominin Paleoecology*. University of Colorado Press. Chapters 3 & 8