G349/549 SYLLABUS

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Instructors:

Jackson Njau
Email: jknjau@indiana.edu
Office: GY 513, Geology Bldg.
Phone: 856-3170

Jim Brophy
Email: brophy@indiana.edu
Office: GY 309, Geology Bldg.
Phone: 855-6417

Course Material

Relevant reading material and handouts will be provided throughout the course. Students will be expected to read materials upon assignment so they can best benefit from field instructions, lectures, discussions, exercises and field journals. Readings may include the following.

Geology

Paleoanthropology

General topics and field excursions

The northern Tanzania volcanic province is renowned for its tectonic activity, paleoanthropological and paleoenvironmental information it preserves. It consists of a series of extinct volcanoes (e.g., Mt. Kilimanjaro, Mt. Meru, the Ngorongoro volcanic highlands) and the famous Ol Doinyo Lengai, perhaps the only active carbonatite-rich volcano on Earth. These volcanoes range in age from the Pliocene to recent time and are responsible for the development of
most archaeological sites including the evolution of Serengeti grass plains. Some topics will be instructed on a particular locality depending on the nature of evidence yielded by a particular site.

- Olduvai Gorge: E.g., Pleistocene vertebrate fossils, human paleontology, stratigraphy, Early Stone Age archaeology, determining the source of raw material for making stone tools.
- Laetoli: E.g., Plio-Pleistocene vertebrate fauna.
- Natron and Manyara rift and rift lakes: E.g., sedimentology, faults, sedimentary structures, stratigraphy, geological formations.
- Ol Doinyo Lengai, Ngorongoro Crater: E.g., volcanism, seismicity.
- Serengeti: e.g., continental margin, the Neogene - Precambrian Tanganyika Shield boundary.
- Lakes Masek & Ndutu in Serengeti: e.g., vertebrate taphonomy and archaeology.
## COURSE SCHEDULE

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<th>Topic</th>
<th>Activity</th>
<th>Days</th>
<th>Location</th>
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| **A. Travel logistics**       | - Arrival Kilimanjaro International  
- Transfers to hotel in Arusha  
- Travel, safety, health & living in Tanzania  
- Introduction to course activities, methods of instructions, field sites, student responsibilities.                                                                                                                                                                           | 2    | Naura Springs Hotel, Arusha     |
| **B. Academic program**       |                                                                                                                                                                                                                                                                                                                                          |      |                                 |
| **On site orientation course** | Introduction to Swahili & local cultures  
- Learn basic Swahili  
- Visit local village & market  
- Geologic setting of Olduvai system.  
- Overview of human origin in Africa.  
- Olduvai the cradle of humankind: history of discoveries.  
- Guided tour to the Human Evolution & Olduvai exhibitions.                                                                                                                                                                                                             | 1    | Naura Springs Hotel, Arusha     |
| **Geology**                   | The significance of plate tectonics & continental rifting to human evolution  
Arusha-Olduvai road trip with stops on the way. Field observations of features associated with rifting i.e., volcanism, faults, lake basins, archaeological deposits, and evolution of the wildlife ecosystems & cultural landscapes.  
- Introduce the concept of *graben* & *half-graben* in rift formation.  
- How Lake Manyara environments are used as modern analogue for hominin adaptation at prehistoric Olduvai lake basin.                                                                                                                                                                                      | 1    | Geological formations of Manyara rift  
**Overnight at Mto wa Mbu, Manyara** |
|                               | Regional overview of Olduvai system.  
- Brief recap of volcanism, formation of collapse caldera & evolution of Olduvai system.  
- How Ngorongoro Crater environments are used as modern analogue for Olduvai hominin environments.                                                                                                                                                                                                                           | 2    | • Ngorongoro Crater             |
|                               | Basin structure.  
- Formations in sedimentary rocks  
- How sedimentary Beds or rock packages reflect depositional environments  
- Age of nearby volcanoes and Precambrian rocks.                                                                                                                                                                                                                      | 6    | Olduvai                        |
|                               | Stratigraphic correlation  
- Syn-depositional faulting  
- Geochronology  
- Evolving environments of Olduvai Beds  
- Faults & GPS elevation.                                                                                                                                                                                                                                                   |      | Olduvai                        |
|                               | Lithology & environmental contexts.  
- Precambrian basement & source of crystalline rocks in the basin.  
- Tanzania craton & sedimentary formations (e.g., of cross-bedding)  
- Evolution of Olduvai Basin  
- Unconformity between Precambrian and Ignimbrite and Quaternary sedimentary rocks.  
- Sand dunes, fluvial deposits, re-worked airfall tuffs.                                                                                                                                                                                                               | 2    | Olduvai  
**Serengeti** |
|                               | Sources of raw material for stone tool making.  
- Difference between volcanic vs. meta-sedimentary outcrops.                                                                                                                                                                                                                                                                       |      | Olduvai                        |
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| **Paleoanthropology** | - Hominid evolution & emergence of prehistoric people in Africa.  
- Origins & evolution of stone age technology | 6 | Olduvai |
| | - Evolution of vertebrate fauna and early human behavior in geological context. | | Olduvai |
| | - Biological & cultural evolution from Bed I to Beds II, III & IV times.  
- Faunal turnover during basal Bed II.  
- Environmental contexts of Beds I-IV  
- Establishment of recent fauna communities.  
- Origin of meat eating behavior by human ancestors and archaeological evidence. | | |
| | - Bone identification, analysis, and fossil discovery.  
- Taphonomy | 1 | Olduvai |
| | - Skeletal and fossil bones identification.  
- Classification of taxa groups  
- Characteristics of hominin bones  
- Bone taphonomy | | Lake Masek, Ngorongoro |
| | - Techniques in lithic analysis  
- Cultural-chronology of Olduvai  
- Stone knapping experiments | 1 | Olduvai |
| | - Identification of artifact types  
- Classification of tool industries.  
- How artifact tied to sedimentary Beds  
- Tool making and raw material choice  
- Butchery experiments using experimentally made tools | | Maasai Boma (village) |
| | - Paleoenvironmental reconstruction. | 4 | Ol Doinyo Lengai, L. Natron, Peninj |
| | - Volcanism  
- Faults  
- Seismic & earthquake hazards  
- Geological structures  
- Fluvial processes and sedimentary basins | | |
| | - The role of African Museums in science & education.  
- Human-environment interaction. | 1 | Olbalbal Maasai village, Ngorongoro |
| | - Exhibition: Human evolution in context.  
- The role of Maasai community in conservation of natural and cultural resources | | |
| **Field techniques & exercises** | - Tools and techniques in field geology and paleoanthropology  
- Data recovery, curation of specimens and publication of scientific reports. | 5 | Olduvai |
| | - Measuring a detailed section  
- Geophysical surveys  
- Archaeological & paleontological field surveys & techniques  
- Excavation and fossils and artifacts recovery methods  
- Documentation, data & curatorial management & presentation. | | |
| **Revision sessions** | - Recap what learnt in the course  
- Students finish projects & organize field journal  
- Students- 1 day off (optional visit to Nasera rock shelter). | 3 | Olduvai |
| **Breaking camp** | Return to Arusha via Ngorongoro | 1 | Overnight at Naura Springs, Arusha |