

ANTY 515: Theory and Methods in Biological Anthropology

Syllabus

Dr. Randall Skelton 226 Social Sciences Building
Office Hours: MWF 10:00-11:00, TR: 8:00-9:00
Email: randall.skelton@umontana.edu

This course is intended to build a broad (not necessarily deep) foundation in graduate level theory and methods of physical/biological anthropology. This foundation will be assumed for other graduate classes in physical/biological anthropology, which will build upon this foundation in directions that are appropriate for that class.

The approach will be primarily lecture, though there will be some student discussion. There will be a considerable hands-on component, in that students will apply several methods to a set of data and interpret the results in light of theory.

This class is intended for MA and PhD students in physical/biological anthropology, though other students with an interest in the subject are welcome.

Outcomes

Students who do well in this class can expect the following outcomes.

- Develop familiarity with the terminology and basic principles of evolution at the population (microevolutionary) and species (macroevolutionary) levels.
- Master basic bioanthropological theory.
- Gain competence with a variety of techniques, approaches, and methods of analysis, including the use of common software.
- Build confidence and skill in interpreting the results of analyses within theoretical frameworks and presenting these results and interpretations professionally.
- Learn methods and standards for writing graduate level research papers.
- Become more comfortable with approaching anthropological phenomena at the level of process (why they are the way they are) rather than the level of description (what are they).

Administrivia

Readings are posted on Moodle. I expect you to have done the readings before coming to class. I would characterize the amount of reading required for this class as “medium”. For all the readings I indicate whether they should be read carefully for detail or read more cursorily for the main points. In general, a conceptual understanding is adequate for preparing you to follow my lectures, so don't get bogged down in details.

Assignments are assigned and due at irregular intervals. Some assignments are “short assignments” designed to be done between the class meeting at which it is assigned and the next class meeting. Other assignments relate to the class project and are more substantive.

Grading will be based on short assignments (20%) and the project (80%). This class is traditional grading mode, meaning that it may not be taken CR/NCR.

Class Projects

Class Projects will start very early in the semester and will result in a paper and presentation at the end of the semester. The projects will be based on a set of data that I supply. There are several assignments/activities that are part of the project, some of which will serve as milestones in your work toward completing the project.

- A. Very early in the term I will assign data sets to each student, partially based on student choice. The data sets will be subsets of the W. W. Howells craniometric data for one sex in some region of the world. Each data set will also include an outgroup (first population in the data set, having a population code of 1) that may be from a different region. Each data set will have between 7 and 10 populations (including the outgroup) some of which will be large samples and some probably very small samples. Each data set contains many measured variables for each individual. The available data sets are: African females, African males, Americas females, Americas males, Asian females, Asian males, Australian-Melanesian females, Australian-Melanesian males, China-Taiwan males, European females, European males, Japanese females, Japanese males, Micronesian males, Pacific Islands females, Polynesian males, Worldwide females, and Worldwide males.
- B. The first graded project assignment will be a description of the populations in your data set. This will count for 15% of your grade. Eventually, this will become part of the materials and methods chapter of your term paper. The description of populations should be written up and submitted via Moodle by the due date given in Moodle. Howells' (1973) monograph will be available on Moodle and should have some of the information for most populations. For the others you will need to hunt through the literature. For this assignment only, entries from encyclopedias (including Wikipedia) will be acceptable sources, though I prefer that you read such entries in order to find the primary literature from which the information presented is drawn. For each population in your data set you should determine and present:
 1. where the sample was recovered;
 2. the age (date) of the sample as closely as possible;
 3. the language family to which the pre-colonial language spoken by each population belongs;You should also provide the number of and a list of the measurements included in your data set.
- C. The second graded project assignment will be a regional literature review of what is known of the population history of your region. This will count 20% toward your grade. Eventually, this will form the bulk of the introduction chapter of your term paper. It should be written up and submitted via Moodle by the due date given in Moodle. This literature review should be organized (synthesized) chronologically with the oldest events first and most recent events last. The simplest way to organize/synthesize chronologically is to use a time line. The populations in your dataset should be related to this overall chronology of the region. The population history of a region should also synthesize several forms of data, including DNA and other genetic data, bioarchaeological data, archaeological data, and linguistic data, each of which has its own perspective, strengths, and weaknesses. I expect this literature review to be thorough, incorporating a minimum of 20 sources (more is better). The population history of your region should include at least the following:

1. when modern humans first arrived in the region;
2. the timing and nature of major migrations to or within the region;
3. any other evolutionary events or factors that you can identify, such as selective pressures, isolation of populations, etc.

Most importantly, you should highlight at least one issue, set of alternative hypotheses, debate, or disagreement about the population history of your region. Having identified this issue, the rest of the assignment for the paper should be geared toward taking a side on or adding a perspective to this issue.

- D. We will be having some workshops in the SSRL during which you will analyze your data sets. You are certainly welcome to do other analyses as well.
- E. The third graded project assignment will be a description of the methods of analysis and a presentation of the results (without discussion). This will count 15% toward your grade. Eventually this will form the methods section of the materials and methods chapter and the results chapter of your term paper. This assignment should be written up and submitted via Moodle by the due date given in Moodle.
- F. The fourth graded project assignment will be the paper itself. This will count 20% toward your grade. It should be submitted via Moodle by the due date given in Moodle. From previous assignments you should have at least most of the introduction, materials and methods, and results chapters of your paper done. You should revise your work from previous assignment for inclusion in your paper, and I will give you back points that you lost on the previous assignment for well done revisions. What remains to be done for the paper is to interpret your results in a discussion section and to come to one or more conclusions in a conclusions section. The discussion section should interpret the results of your analyses in terms of whether they agree with what is known about the population history of your region and whether they support or refute one or more of the issues you identified for your region. You should use the theory presented in this class to frame your discussion in such a way that you convince me that you have learned it. It is also conventional to discuss problems with the analysis and directions for future research in the discussion section. The conclusion section should present your formal evaluation of whether certain hypotheses related to issues in your region have been rejected or supported.
- G. The fifth graded project assignment will be a short presentation of your results (10 minutes) during the scheduled final exam period. This will count 10% toward your grade. In your presentation you should present the issues that you identified to test with your analyses, a brief summary of your results, a brief summary of your discussion, and any conclusions you drew. You do not have to describe your methods, since these will be the same for everybody, unless you have done additional analyses beyond what is required in the assignments.

Communication Resources:

Moodle The class will utilize a Moodle supplement as our primary communication and document submission system. I'll give a brief demonstration of Moodle but if you have trouble you should visit the IT Central Help Desk in SS 120. I am not a Moodle administrator or tech person, so I can only be responsible for content on Moodle – not for issues of access or technical problems.

Email I will probably email a lot through Moodle. This seems like the only convenient way to return your graded assignments to you. You should plan to check your official email address (as listed by Moodle) often.

My Philosophy on Graduate Education

Graduate education is designed to help graduate students make the transition between two modes of learning. As undergraduates you participated almost entirely in a mode of learning that was instructor driven. That is, the instructor determined every detail of what the material of the class was going to be. Then the instructor lectured, you read the textbook, you took notes, and at some point you took an exam designed to “capture” the amount you had learned as a number that was combined with other such numbers to eventually give you a grade for the class.

In contrast, observe how your professors learn things. If they want to learn something new do they take a class? Usually not. Instead, they go to the library and the internet to find books and articles on the subject, read these materials, and therefrom gain the knowledge they are seeking. Further, your professors engage in research, in which they actually generate new knowledge – the raw material for all those books and articles.

One view of graduate education sees a field (say anthropology) as a geographic region (say Missoula County). Introductory classes are like a brief tour of the region (say pointing out Missoula, Mount Jumbo, the Clark Fork River, etc.). Upper level undergraduate classes explore certain parts of the region in more detail (say a detailed study of the Clark Fork river system). In this view, graduate education is partly a continuation of this trend of exploring an ever more detailed part of the region (say Rattlesnake Creek). However, the most important part of a graduate education is not the details of the region but learning how to use certain tools (say GPS units and compasses) to explore the region on your own. If you know how to use those tools you can explore any part of the region to any level of detail you desire. Eventually, as the culmination of your graduate experience, your mentor will ask you to choose an unexplored (or underexplored) part of the region and send you out to explore and map it (i.e. write a thesis or dissertation).

Therefore, in my view, graduate education is about learning how to use the tools of an academic. These tools are many, but pretty obvious. I also consider it part of my job to challenge you in such a way that you improve in your use of these academic tools. In evaluating your performance I give higher weight to your ability to use these tools than I do to your detailed knowledge of a certain area of the field.

Student Conduct

The most important thing I expect is mutual respect and tolerance. Respect for, and cultivation of diversity is a fundamental value for anthropologists. In fact, the UM faculty exhibits a large amount of intellectual diversity. I disagree with my colleagues about many things, yet I have deep respect for all of them and tolerance of those cases in which their views differ from mine. I do not feel that I (or they) or my views (or theirs) are in any way diminished by the fact that a colleague disagrees. Further, we should value the diversity of viewpoints that exist – we are all much better because of it. In this class we are not members of different “teams” – we are all colleagues. We are not in competition – we are in cooperation to gain as deep an understanding of the topic of this class as possible. Our understanding will be deeper because of differences in opinions and viewpoints. The class session must be a safe environment in which to speak or share an idea, no matter how far out it may seem to anyone else. I will enforce this. I encourage people to respectfully “talk out” their differences in opinions about an issue. However, if a comment or idea seems too inappropriate it is often best to simply ignore it and move on.

Graduate students are expected to follow the student conduct code, located at http://life.umt.edu/vpsa/student_conduct.php.

My Policy on Collaboration

Students are encouraged to work together, including working together on completing the assignments. There is never a penalty for working with or consulting other people so long as you acknowledge them. I have two requirements for collaboration – (1) in your write-up you must acknowledge your collaboration with other students or faculty, and (2) that every student produces a unique individual write-up or analysis. The second requirement will probably take care of itself since every student will be working with their own unique data set, but if I receive assignments from two or more students that are “too similar” I will split the credit for the assignment between them.

Readings on Moodle

In general, do the readings in the order listed on Moodle. For example, for the first class meeting read Leslie & Little (2003) before reading Cavalli-Sforza et al. (1994) section 1.1, and read Richerson & Boyd (2002), last.

I use the following notations to guide you as how a particular reading should be read.

* = Read carefully before class,

= Read for main points before class,

% = For reference – don't read it, but keep it handy as you will need to refer to it.

Provisional Schedule

The full, detailed schedule for this class is presented in the weekly organization of the Moodle shell for the class. What follows here is a rough topical summary. The details of this schedule may change due to unforeseen circumstances, but will always be current in Moodle.

WEEK	LECTURES	WORKSHOPS AND LONG ASSIGNMENTS	SHORT ASSIGNMENTS
Week 1	What is Theory in Biological Anth History of Physical Anth		
Week 2	Scientific Writing	Workshop on Library Research	
Week 3	DNA, Mendelian Traits, Quantitative Traits, and Heritability Evolutionary Theory, Population Genetics, HardyWeinbergCastles		Short Assig 1 Short Assig 2
Week 4	Mutation and Selection Gene Flow and Genetic Drift	Population Description are Due	Short Assig 3 Short Assig 4
Week 5	Non-Random Mating, Pedigrees, & Inbreeding		Short Assig 5

	Variability in Gene Expression		Short Assig 6
Week 6	Polymorphism, Neutralism and Selectionism		Short Assig 7
	Statistical Reasoning and Inference		Short Assig 8
Week 7	Principal Components, Distance, Clustering, et al.		Short Assig 9
	Models of Population Formation & History		Short Assig 10
Week 8	Diffusionist Approach: Population Structure	Workshop on Data Processing	Short Assig 11
Week 9	Cladistic Approach: Phylogenetics	Workshop on RMET	Short Assig 12
Week 10	Ethnogenetic Approaches: Mixed Strategies and Networks	Workshop on UPGMA and NJ Regional Literature Review Due	Short Assig 13
Week 11	Election Day		Short Assig 14
	Macroevolution Speciation		Short Assig 15
Week 12	Taxonomy and the 2 nd & 3 rd Laws	Analytical Methods and Results Due	Short Assig 16
	Evolutionary Analysis		Short Assig 17
Week 13	Demographic Theory		
	Thanksgiving		
Week 14	Demography and Paleodemography		Short Assig 18
	Theory of Working With Individuals In Paleoanthropology		Short Assig 19
Week 15	Theory of Working With Individuals in Forensic Anthropology	Term Paper Due	Short Assig 20
	Genetics of Behavior		Short Assig 21
Week 16		Presentations on Projects	