COURSE SYLLABUS
UNIVERSITY OF CALGARY
DEPARTMENT OF ARCHAEOLOGY

Anthropology 533 Introduction to Biomolecular Archaeology 2012

Instructor: Dr. Camilla Speller, **email:** cfspelle@ucalgary.ca
Class time and location: Tuesdays, Thursday 11:00am-12.14pm – **ES859, SS018**
Office: ES844 (Ph: 403-220-4857)
Office Hours: Tuesdays 9:00-10:30 & Thursday 1:00-2:30pm, and by appointment

Course Goals

The goals of this course are to provide students with an understanding of the benefits and challenges of ancient DNA techniques and applications, with a focus on anthropological and archaeological questions.

Course Content and Objectives

In the first half of the course, the students gain an understanding of the fundamental principles and methods in ancient DNA research, including DNA extraction, amplification and data analysis. The latter half of the course explores the application of this technique to questions of human evolution, health and disease, plant and animal domestication, reconstructing past environments, and forensic anthropology. By the end of this course, students will be familiar with the potential applications and limitations of DNA analysis; be able to critically evaluate the authenticity of ancient DNA results; and be able to analyze DNA sequences using multiple phylogenetic computer software. In addition to the lectures by the instructor, classes include a seminar component where students will discuss and evaluate recent literature in each of the covered areas.

The students are expected to develop an understanding of the benefits and limitations of ancient DNA techniques; they will be encouraged to select topics at the beginning of class and present a mock research proposal applying ancient DNA analysis to a currently unresolved question in bioanthropology, archaeology, or forensic anthropology. This problem-oriented approach will be facilitated through structured class discussion, and seminar participation. The course also includes a lab component where students will have to opportunity to extract and analyze their own mitochondrial DNA (mtDNA), and a computer-lab component which will allow students to gain hands-on experience in analyzing DNA sequences using a variety of computer programs. This class is designed for senior level undergraduate archaeology or anthropology students; no previous courses in genetics or biology are required.

Method of Evaluation

Midterm Exam	30%	16 Feb 2012
Lab Assignments (3)	30%	14 Feb, 1 Mar, 27 Mar 2012
Research Proposal Presentation	15%	3-12 April 2012
Written Research Proposal	15%	20 April 2012
Class Participation	10%	

Grading Criteria

94-100%	A+	64-67%	C+
87-93%	A	60-63%	C
80-86%	A-	55-59%	C-
76-79%	B+	50-54%	D
72-75%	B	0-49% F (Fail)	
68-71%	B-		

Course Materials

Required Text:
Biomolecular Archaeology, an introduction (2011) Brown and Brown. Wiley-Blackwell

Videos:
"Evolution of human mitochondrial DNA lineages" 2007 (38 min), The Biomedical & Life Sciences Collection, Henry Stewart Talks Ltd, London (online at http://hstalks.com/bio)

Supplementary Readings:
Hummel, S. 2003. Chaper 2: DNA Markers. Ancient DNA Typing: Methods, Strategies and Applications. Springer: Berlin

MacHugh D. E., C. S. Troy, F. McCormick, I. Olsaker, E. Eythorsdottir, D. G. Bradley. 2000. Extraction and analysis of ancient DNA from bone and teeth: A survey of current methodologies. *Ancient Biomolecules* 3:81-102.

Plus additional seminar readings to be announced

Readings

Each student is expected to carry out assigned readings on a weekly basis as a background to lecture materials. Supplementary readings will be made available on-line (Blackboard) when indicated by the instructor. Students are encouraged to read beyond the text book and supplementary readings.

Attendance

Students are expected to attend all classes. The mid-term exam will include material presented in class and in the assigned readings (including films shown in class). The instructor will upload Power Point slides to Blackboard at the end of each week, though detailed notes from each lecture will not be provided.

Academic Concessions

Students who are unable to complete tests or assignments due to unforeseen events must contact the instructor as soon as possible. In the case of ill health, a doctor's note or other documentation will be required to make allowances for missed exams or incomplete work. Assignments must be submitted on the due date presented in the Course Syllabus. Students who submit assignments after the due date may be penalized up to 10% for each assignment.

Plagiarism (Academic Misconduct) Policy

The U of C Calendar defines plagiarism as "submitting or presenting work as if it were the student's own work when it is not. Any ideas or materials taken from another source written, electronic, or oral must be fully and formally acknowledged" (http://www.ucalgary.ca/pubs/calendar/current/k-2-1.html). Plagiarism is a serious academic offence, and will be dealt with according to the policies and regulations of the U of

C Calendar. If you have questions regarding plagiarism or academic honesty, you are encouraged to visit to the U of C Honesty in Academics website (http://www.ucalgary.ca/honesty/students).

Mid-term Examination Formats

The students will complete a midterm exam on February 16th, 2012 (30%). The exam will test the students' knowledge concerning information presented in lectures, videos and in the assigned readings. The mid-term exam includes short answer and essay questions; these questions will be designed by both the instructor and the students.

Lab Assignment

Students will complete three assignments based on computer and DNA laboratory exercises in order to gain experience in DNA methods and analysis (30% of final grade). The lab exercises and assignment criteria will be posted on Blackboard. The assignments will be due 14 Feb, 2012 (Computer lab 1 - 5%), 1 March, 2012 (Computer lab 2 - 5%) and 27 March, 2012 (Computer lab 3 - 20%).

Research Proposal – In class presentation and final written assignment

Students will work together in small groups to complete a mock research proposal applying ancient DNA analysis to a currently unresolved question of their choice in bioanthropology, archaeology, or forensic anthropology. The mock research proposal will be evaluated in two stages. Student groups will first present their research proposal to the class in a short presentation, and will receive verbal feedback on their proposals from their peers. Students will also receive written feedback from the instructor within two days of their presentation. The groups will also submit a written research proposal to the instructor, incorporating the peer and instructor feedback. Students are encouraged to contact the instructor via e-mail or during office hours for advice on suitable subject matter. Groups must inform the instructor of their chosen their topic by 20 March, 2012

Group research proposal presentations will take place in class from April 3-12, 2012 (15% of final grade). Presentations will be approximately 20min long, with 15 min for questions from class. Further information concerning the evaluation criteria for the group presentations will be made available through Blackboard.

The written research proposal is due on April 20th, 2012 (15% of final grade). One research proposal will be submitted per group. The research papers are expected to be approximately ten pages in length (2500 words); papers must be typed and double-spaced. Papers must be submitted in hard copy form (no electronic submissions) though the pages may be double-sided. Further information concerning the evaluation criteria for the completed paper will be made available through Blackboard.

All students are encouraged to visit the U of C writing centre for additional resources on researching and writing academic papers (http://www.ucalgary.ca/pubs/calendar/current/writing-centre.html)

Class Participation

Class participation will account for 10% of the final grade and students will be evaluated on the quality, as well as the quantity of in-class participation. At the end of each lecture (Week 1-5), students will submit one to two potential exam questions based on the material presented in class. Students have the option of submitting written comments or questions concerning the seminar material (Week 6-14) after each class if they wish. The class participation grade will incorporate both the quality of verbal comments and questions raised in the lectures and seminar discussions, as well as the written comments and questions submitted to the instructor after each class. *Written comments and questions must be submitted within 24 hours of the lecture or seminar in order to be counted towards the participation grade.*

Date	Topic	Reading
Week 1 10 Jan 12 Jan	**Introduction to Biomolecular Archaeology** Introduction to class, History of aDNA analysis DNA Structure and function	B&B: Chap 1&2 pp. 1-23
Week 2 17 Jan 19 Jan	**Ancient DNA** Sources of DNA, DNA degradation & preservation *Computer Lab 1a*: Intro to public databases, multiple alignments **(SS18)**	B&B : Chap 7 & 8
Week 3 23 Jan 26 Jan	**Extracting and Amplifying DNA**: DNA extraction and amplification methods *Computer Lab 1b:* Editing and comparing aDNA sequences **(SS18)**	B&B: pg 23-38 MacHughes et al. 2000
Week 4 31 Jan 2 Feb	**Analyzing the Data**: Choosing appropriate loci; visualizing DNA, *Computer Lab 2***:** Phylogenetic analyses **(SS18)**	Hummel 2003
Week 5 7 Feb 9 Feb	**Challenges of Biomolecular Archaeology** DNA contamination, authenticating results *DNA Lab*: Extracting your own mtDNA	B&B: Chap 9
Week 6 14 Feb 16 Feb	**Other Biomolecular Markers** Carbs, Proteins, Lipids, etc. (*Comp Lab 1 Assignment due – 5%*) ***Mid Term Exam***	B & B: Ch 3-6
Week 7 21 Feb 23 Feb	**READING WEEK – NO SCHEDULED CLASSES** *Possible continuation of DNA lab: Extracting mtDNA*	
Week 8 28 Feb 1 Mar	**Phylogeography and the origin of modern humans** *Video: "*Evolution of human mitochondrial DNA lineages" Seminar – (*Computer Lab 2 Assignment due – 5%*)	B&B: Chap 16
Week 9 6 Mar 8 Mar	**aDNA and Paleopathology**: Past human health and disease seminar *Computer Lab 3:* Analyzing mtDNA sequence results **(SS18)**	B&B: Chap 15
Week 10 13 Mar 15 Mar	**Plant and animal domestication**: Seminar Seminar and Student group work	TBA
Week 11 20 Mar 22 Mar	**Environmental Archaeology & Conservation Biology** Seminar (*Inform instructor of research proposal topic*) Seminar and Student group work	B&B : Chap 13
Week 12 27 Mar 29 Mar	**Forensic Applications & Ethics in ancient DNA analysis** Seminar – (*Computer lab 3 assignment due – 20%)* Seminar and Student group work	TBA
Week 13 3 Apr 5 Apr	Class presentations of mock research proposals Class presentations of mock research proposals	
Week 14 10 Apr 12 Apr	Class presentations of mock research proposals Class presentations of mock research proposals	
	Written research proposals due – April 20, 2012	

**This will be the general guideline for the course but I reserve the right to make changes to the syllabus when necessary.

ADDITIONAL CONTENT OF THE COURSE OUTLINE

Writing Across the Curriculum
Writing skills are not exclusive to English courses and, in fact, should cross all disciplines. The University supports the belief that throughout their University careers, students should be taught how to write well so that when they graduate their writing abilities will be far above the minimal standards required at entrance. Consistent with this belief, students are expected to do a substantial amount of writing in their University courses and, where appropriate, instructors can and may use writing and the grading thereof as a factor in the evaluation of student work. The services provided by the Writing Centre in the Effective Writing Office can be utilized by all undergraduate and graduate students who feel they require further assistance.

Academic Accommodation Policy
The purpose of academic accommodation is to provide students with documented disabilities equal opportunity to master the essentials of a post-secondary education. Students with disabilities at the University of Calgary have met all admission requirements but may have done so with the use of accommodations. Similarly, they are expected to meet all academic and non-academic requirements. Adaptive technology and other academic accommodations do not relieve students of their responsibility to develop the essential skills and abilities expected of all students. Please refer to the following web link for detailed information: http://www.ucalgary.ca/drc/node/71

Disability Resource Centre Accommodations
It is the responsibility of the student to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at (403)220-8237.

Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. Students are also required to discuss their needs with the instructor no later than fourteen (14) days after the start of the course.

Freedom of Information and Protection of Privacy Act
The University of Calgary is committed to protecting the privacy of individuals who work and study at the University or who otherwise interact with the University in accordance with the standards set out in the Freedom of Information and Protection of Privacy Act.

Please refer to the following link for detailed information:
http://www.ucalgary.ca/secretariat/system/files/foip%20overview.pdf

Academic Misconduct
Academic dishonesty is an unacceptable activity at the University of Calgary and students are **strongly advised** to read the Student Misconduct section of the University Calendar. Quite often, students are unaware of what constitutes academic dishonesty or plagiarism. The most common are:

1) Presenting another student's work as your own
2) Presenting an author's work or ideas as you own without proper referencing
3) Using work completed for another course

This activity will not be tolerated and students conducting themselves in this manner will be dealt with according to the procedures outlined in the University Calendar.

For detailed information on what constitutes academic misconduct, please refer to the following link:
http://www.ucalgary.ca/pubs/calendar/current/k-2-1.html

Emergency Evacuation Assembly Points
In the event of an emergency that requires evacuation, please refer to the following link to become familiar with the assembly points for the class: http://www.ucalgary.ca/emergencyplan/assemblypoints

Safewalk Information
Campus Security, in partnership with the Students' Union, provides the Safewalk service, 24 hours a day to any location on Campus including the LRT, parking lots, bus zones and University residences. Contact Campus Security at (403) 220-5333 or use a help phone, and Safewalkers or a Campus Security Officer will accompany you to your campus destination.

Faculty of Arts Program Advising and Student Information Resources

- Have a question, but not sure where to start? The new Faculty of Arts Program Information Centre (PIC) is your information resource for everything in Arts! Drop in at SS110, call us at 403-220-3580 or email us at artsads@ucalgary.ca. You can also visit the Faculty of Arts website at http://arts.ucalgary.ca/undergraduate which has detailed information on common academic concerns.
- For program planning and advice, contact the Student Success Centre (formerly the Undergraduate programs Office) at (403) 220-5881 or visit them in their new space on the 3rd Floor of the Taylor Family Digital Library.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at (403) 210-ROCK [7625] or visit them at the MacKimmie Library Block.

Contact Information for Student and Faculty Representation

Student Union Vice President – Academic
Phone: (403) 220-3911
Email: suvpaca@ucalgary.ca

Student Union Faculty Representative
Phone: (403) 220-3913
Email: socilscirep@su.ucalgary.ca

Student Ombudsman's Office
http://www.su.ucalgary.ca/services/student-services/students-rights.html

Students Union Representatives for the Faculty of Arts
arts1@su.ucalgary.ca
arts2@su.ucalgary.ca
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arts4@su.ucalgary.ca