DEPARTMENT OF ANTHROPOLOGY
AND ARCHAEOLOGY
Faculty of Arts

# ANTH 506 (LEC 01)
# Anthropological Genetics

**GFC Hours 3-0**
**Fall 2023**


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| **Instructor:** | Associate Professor<br>Dr. Amanda Melin | **Lecture Location:** | Science A 109 |
| **Phone:** | 403-210-7579 | **Lecture Days/Time:** | Mon 14:00 - 16:45 |
| **Email:** | amanda.melin@ucalgary.ca | | |
| **Office:** | Earth Science 710F | | |
| **Office Hours:** | By appointment | | |
| **Website:** | Learn more about your instructor's research at www.amandamelin.com | | |
| **Teaching Assistant:** | Megan Mah | | |
| **TA Email:** | memah@ucalgary.ca | | |
| **Office Hours:** | In-person (Earth Science 722): Mon 13:00 - 14:00<br>Virtual (Zoom): Mon 13:00 - 14:00 or by appointment | | |


**PREREQUISITE(S)**

***ANTH 201, ANTH 311, and ANTH 350*** *or one additional senior primatology course and consent of the Department.* Courses in biological sciences may be substituted at the instructor's discretion. Advanced, prior knowledge of genetics is not expected for this course and we will cover a general introduction. However, this is a 500-level course and you are expected to seek out additional readings or assistance as needed to firmly grasp the basic biological principles we will build on. (It's a good idea to do this earlier, rather than later in the course!)

**COURSE DESCRIPTION**

This seminar course will examine the principles of evolutionary genetics with a focus on applications to current topics in Anthropology such as behavior, life history, adaptation, migration and disease. We will explore the contents of the primate genome as well as human and non-human primate genetic variation in an evolutionary framework and discuss the latest advances in molecular techniques and their applications to addressing fundamental questions in biology. Special topics may include sensory adaptations, gene flow and migration, and conservation genetics. Key concepts will be illustrated using examples pulled from literature on humans, non-human primates and other animals. We will use a textbook, as well as discuss primary literature and have several guest lectures by experts in evolutionary genomics.

As this is a small seminar, students are expected to be active participants in student-led presentations and discussions (see grading). The aim is to have students engaged with the literature at an advanced level and be introduced to the kind of critical analysis of current research that is typical of senior undergraduate and post-graduate studies.

**QUESTIONS ABOUT COURSE MATERIAL**

All questions about course material must be posted to the designated D2L page, and not via email to instructors or TA. This allows all students to review questions and answers. Questions must start with the Topic. Students are encouraged to answer classmates' questions and the TA/Instructor will check this page twice a week, and add to these answers as needed. Students providing answers must provide their names to be eligible for bonus marks (below). Office hours and before/after class are also a great time to ask questions.

**COURSE OBJECTIVES**

With the successful completion of this course, students should be able to:

1. Describe the components of the human genome
2. Explain different methods used for genetic investigations and analyses
3. Understand how concepts in evolutionary genetics are used to answer questions about human migration, diversity, adaptation and evolution
4. Identify some of the pitfalls and limitations of molecular-based approaches for answering questions about human and other primates
5. Be able to read, and understand at a basic level, data papers in the discipline
6. Critically evaluate and discuss primary literature and review articles
7. Write a well-organized, clear and structured essay

**LEARNING OUTCOMES**

The Department of Anthropology and Archaeology is committed to student knowledge and skill development. Below is a list of the key learning outcomes for this course, the program-learning outcomes to which they contribute, and the expected level of achievement:

1. Demonstrate an understanding of the basic concepts, terminology, methods, theoretical perspectives, issues, and contemporary concerns in biological anthropology and evolutionary genetics at an advanced level.
2. Brainstorm, obtain, organize, visualize and present primary research papers in an accessible way for classmates.
3. Ask questions and discuss ideas and information presented in a format appropriate for a specialized audience at an intermediate level.

**READINGS AND TEXTBOOKS**

Required text: Jobling et al. 2013 Human Evolutionary Genetics (2nd edition)

This book does a great job introducing many fundamentals and key concepts of the human genome and human genome variation. These principals are relevant for all downstream aspects

of the course. Reading assignments are provided for each lecture as indicated in the course schedule. For additional context and help with broader concepts, you may wish to read the entire book.

Students will also be responsible for accessing and reading **recent journal articles** that are assigned to each lecture and be prepared to discuss them in class. Some of these articles will be selected during the first two week of class.

**REQUIRED TECHNOLOGY AND EQUIPMENT**

Students are required to have reliable access to the following technology:

- A computer with a word processor
- A current and updated web browser
- Reliable, broadband internet connection

**CLASSROOM NORMS**

On the first day of class, we will discuss and negotiate norms of seminar participation, including the following areas:

- Punctuality and conduct
- Questions and participation
- Respectful engagement during discussion of readings
- Acknowledgment and Respect for Diversity in the classroom

**CONDUCT AND COURSE MATERIALS**

Students should make every effort to attend each class flagged for in-person attendance. There will be short take-home quizzes on the current week's assigned textbook readings and previous week's lecture materials due at the start of most classes. Students should work on these on their own. **Students will be allowed to drop their two lowest quiz grades, including missed quizzes**; make-up quizzes are not permitted. Participation in discussions is required for the participation component of grading. Students may be granted permission to submit written discussion materials **ahead of the class for partial marks** if they must miss a class. This should be discussed with the instructor ahead of time.

*Students may provide supporting documentation for an exemption/special request. This may include, but is not limited to, a prolonged absence from a course where participation is required, a missed course assessment, a deferred examination, or an appeal. Students are encouraged to submit documentation that will support their situation. Supporting documentation may be dependent on the reason noted in their personal statement/explanation provided to explain their situation. This could be medical certificate/documentation, references, police reports, invitation letter, or a statutory declaration, etc. The decision to provide supporting documentation that best suits the situation is at the discretion of the student. Students will not be required to provide specific supporting documentation, such as a medical note.*

*Students can make a Statutory Declaration as their supporting documentation (available at ucalgary.ca/registrar). This requires students to make a declaration in the presence of a Commissioner for Oaths. It demonstrates the importance of honest and accurate information provided and is a legally binding declaration. Several registered Commissioners for Oaths are available to students at no charge, on campus, please see ucalgary.ca/registrar.*

*Falsification of any supporting documentation will be taken very seriously and may result in disciplinary action through the Academic Discipline regulations or the Student Non-Academic Misconduct policy.*

**GRADING**

There will be weekly quizzes most classes during the semester. Participation in weekly critical discussions will also count towards the course grade, and there will also be a final written assignment. Finally, there is an optional bonus assignment, described below.

As this is an upper division course, to the greatest extent possible the multiple-choice questions will require basic knowledge of the information presented in class and (most importantly) a strong grasp of relevant underlying concepts.

**Weekly quizzes (50% total):** Quizzes must be submitted before the start of each lecture. They are open book and students can use lecture material and the textbook to answer the questions. Questions will be based on assigned readings for that week (i.e., to reward students for being prepared for class) and also on integration of the previous weeks' lecture and/or journal article materials (to reward to students for mastering content previously introduced). Each quiz will have **10 questions** worth one point each. Quizzes will be posted by Friday at 10am each week and the instructor may draw from suggestions submitted in class or **posted before 2pm the previous day (Thursday)** on D2L by students. Students will be allowed to drop their two lowest quiz grades, including missed quizzes. Students will not be allowed to submit late quizzes. Make-up quizzes will not be provided. **The expectation is that students will complete the quizzes independently.**

**Participation in Critical Discussion of Journal Articles (30%).** Students will receive a score of "1" (minimal participation), "2" (engaged participation), or "3" (excellent participation) during each discussion period for demonstrating they have carefully read the assigned papers and are prepared to discuss their methods, results, and importance. We ask that people are considerate and do not dominate the conversation, allowing other students to share their thoughts. Questions and comments can be posted in the chat or shared by raising hands. Instructors will contribute and moderate. **Students absent from class due to illness or other excused absence must notify instructor before class and will be permitted to submit a written discussion of the assigned articles.**

**Course Assignment – Genomics Essay (20% total grade- distributed as follows).**

- **Detailed outline 30%**
- **Peer-editing session 10% - in class written feedback on peers' essays**

- **Written paper 40%**
- **Final presentation 10%**
- **Bibliography 10%**

The final assignment, a 3-to-5-page essay, will allow students to conduct research in an area of their interest and to iteratively improve their writing content and structure by working on the essay with feedback from the instructor and their peers.

**The detailed outline will be worth 30% of the grade.** This should provide a detailed framework outlining the structure of the essay. You should include the headings you will use for each section, topic sentences of each paragraph and relevant bullet points of the key points. This sets the foundation for your entire paper and is critically important. **10%** of the paper grade will be based on participating in the peer-editing session (see calendar). An accurate, appropriate and well-formatted bibliography **will make up 10%.** The lightning presentation on the last day of class (maximum 2 power point slides) on your research **will make up 10%** of the final assignment grade, The presentation should state your **Research Question**, show your **Figure**, and summarize your **Conclusions,** and discuss your **comments on Ethics in the personalized genomics era**.

The final paper itself will constitute the **remaining 40%.** Late papers – submitted after the due date, will be decreased by one letter grade per day late. (E.g. an A- paper submitted one day late will receive a B-). Write a **3-5 page essay (not including references). Students must include one figure visualizing a main point of their essay. This doesn't count towards the page limit. 11 point Arial font, 1 inch margins, 1.5 line spacing, on a topic in personalized genomics** describing the methods and results from one or more papers analysing genotype and phenotype data together to understand the genetic basic of disease risk or trait expression, drawing links to concepts covered in the course. Essays should detail EACH of these components: What were the questions the authors asked? What data did they collect? What did they learn? What are the broader impacts of this research?

Importantly, your essay should **also include** a separate section with **2 or so paragraphs** discussing the benefits and potential problems of the personalized genomics era more broadly. There are papers published on this that can inform your understanding, but the student should also present their unique perspective and thoughts on this complicated topic. Where possible, try to draw links or examples to the main body of the research paper.

**The final assignment should be submitted by email to the instructor by 11:59pm on the due date using the email header: "Anth 506 Final Essay".** We will exchange papers for peer editing and instructor feedback earlier in the semester. In the final lecture of the semester, students will be asked to briefly discuss their research and their thoughts on the personal genomics future.

**Bonus Assignment (up to 3% final grade):** - This optional assignment will **be due on last day of class.** Students may earn an additional 1%, 2% or 3% towards their overall course grade by submitting a transcript of their answers to student questions posted on D2L. Grades will be

assigned based on both quality (correctness, thoroughness), consistency (answering throughout course) and quantity of questions answered. Assignments should be printed and handed to the instructor at the beginning of class, with the student ID in the top right-hand corner.

Please see the University's policies for grade disputes.
**Reappraisal of Graded Term Work:** http://www.ucalgary.ca/pubs/calendar/current/i-2.html
**Reappraisal of Final Grade:** http://www.ucalgary.ca/pubs/calendar/current/i-3.html

**Department of Anthropology and Archaeology Grading Scheme:**

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| A+ | 95 – 100% | B+ | 80 – 84.9% | C+ | 67 – 70.9% | D+ | 55 – 58.9% |
| A | 90 – 94.9% | B | 75 – 79.9% | C | 63 – 66.9% | D | 50 – 54.9% |
| A- | 85 – 89.9% | B- | 71 – 74.9% | C- | 59 – 62.9% | F | < 50% |

Please note that apart from the bonus assignment, no extra credit or 'make up' work is available in this class . You do not need to pass each course component to earn a passing grade in the class.

**Land Acknowledgement**
The University of Calgary, located in the heart of Southern Alberta, both acknowledges and pays tribute to the traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy (comprised of the Siksika, the Piikani, and the Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda (including Chiniki, Bearspaw, and Goodstoney First Nations). The City of Calgary is also home to the Métis Nation of Alberta Region 3.

**Acknowledgment and Respect for Diversity**
The Department of Anthropology and Archaeology views diversity of identity as a strength and resource. Your experiences and different perspectives are encouraged and add to a rich learning environment that fosters critical thought through respectful discussion and inclusion.

**Inclusivity Statement**
As instructors we recognize that systemic racism against Black, Indigenous, and other People of Color exists in academia. As instructors we will strive to build an inclusive community among course participants. We will not tolerate discriminatory, racist, or sexist behaviour or comments in discussions, on assignments, or in D2L.

In an effort to amplify the voices and work of Black, Indigenous, and other People of Color within biological anthropology, we strive to assign readings from these researchers throughout the course. We recommend that when students are considering which readings they would like to research that they take race and ethnicity of the authors into account.

## COURSE POLICIES

**Communication Etiquette (e.g., Email, D2L Questions)**

- Please use your university account for email. If forwarded to another service (e.g. gmail), and account visible use an account with an appropriate name (Example of an unacceptable email: geneticsgrrrrrrl@gmail.com).
- Use a clear subject line that includes the course name/section and the topic of the email such as "ANTH 506 Question about the course schedule"
- Please be respectful (i.e., not too casual) when addressing me in an email. Use an appropriate greeting (acceptable: "Dear Prof Melin"; unacceptable: "Hey there"). Please proof-read, spell check and use complete sentences. The instructor will respond respectfully as well.
- On D2L please try to keep the question(s) short and to the point. Questions may be anonymous. **Show that you have made an effort to find the answer first in the text and lecture material (or even an outside source).** State what you know in relation to what you are having a difficult time understanding. Replies should be tactful, supportive and helpful. Responses should **not** be anonymous and can be used for the bonus assignment (see section on bonus assignment).
- Allow 48 hours for an email response, excluding weekends and holidays. The instructor or TA will check D2L twice weekly and moderate discussions as needed.

REMINDER – **Instructor will NOT answer questions about course content by email** – these questions should be posted to D2L.

*Please note: The instructor may choose not to respond to emails that do not follow the format outlined above so please be thorough and respectful when raising a concern and in return, and the instructor will try their very best to get back to you as soon as possible to accommodate your needs.

## UNIVERSITY POLICIES

### ACADEMIC ACCOMMODATIONS

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit https://live-ucalgary.ucalgary.ca/student-services/access. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor or the Department Head. The full policy on Student Accommodations is available at https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure.

### ACADEMIC INTEGRITY POLICY

Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. The University Calendar includes a statement on the principles of conduct expected of all members of the university community (including students, faculty, administrators, any category of staff, practicum supervisors, and volunteers), whether on or off

university property. This statement applies in all situations where members of the university community are acting in their university capacities. All members of the university community have a responsibility to familiarize themselves with the principles of conduct statement, which is available at: www.ucalgary.ca/pubs/calendar/current/k.html.

**ACADEMIC MISCONDUCT**

The University of Calgary is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect.

Academic dishonesty is not an acceptable activity at the University of Calgary, and students are **strongly advised** to read the Student Misconduct section in the University Calendar at: www.ucalgary.ca/pubs/calendar/current/k-3.html. 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 your own without adequate citation, and (3) using work completed for another course. Such activities will not be tolerated in this course, and students suspected of academic misconduct will be dealt with according to the procedures outlined in the calendar at: https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-procedure

For students wishing to know more about what constitutes plagiarism and how to properly cite the work of others, the Department of Geography recommends that they attend Academic Integrity workshops offered through the Student Success Centre: https://www.ucalgary.ca/student-services/student-success/learning/academic-integrity

**INSTRUCTOR INTELLECTUAL PROPERTY**

Course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor(s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing. Information on Instructor Intellectual Property can be found at https://www.ucalgary.ca/legal-services/university-policies-procedures/intellectual-property-policy

**FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT**

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

**COPYRIGHT LEGISLATION**

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (https://ucalgary.ca/legal-services/university-policies-

procedures/acceptable-use-material-protected-copyright-policy) and requirements of the copyright act (https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks, etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

**SUPPORTS FOR STUDENT LEARNING, SUCCESS, AND SAFETY**

Please visit the Registrar's website at: https://www.ucalgary.ca/registrar/registration/course-outlines for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success Centre
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk

**TENTATIVE CLASS SCHEDULE**

***May be subject to modifications**

| **DATE** | **First half of class (2-3:15)** | **Assigned Text Chapters** | **Second half of class (3:30-4:45)** |
|---|---|---|---|
| Sept 11 | Introduction to course and instructor | Ch 1 | Lecture: Evolutionary concepts, history of human genetics |
| **Sept 18** **Asynchronous- Not in class** | Lecture Posted online: Organization of the human genome. You are welcome to watch it during class time or earlier at your convenience | Ch1, Ch 2 | Dedicated time to read and research possible papers for course discussions. |
| Sept 25 | Lecture: Sources of variation in the genome and phenotypic effects | Chapter 3 & Chapter 15 | Discussion 1: two thematically linked and current papers TBA |
| Oct 2 | Guest Lecture: The Microbiome – contributions to human phenotypes (Dr. Webb) | | Discussion 2: two thematically linked and current papers TBA |
| Oct 9 | Thanksgiving Day - no classes | | |
| Oct 16 | Lecture: Simple and complex traits | Chapter 3 (43-46), Chapter 15 (483-4) | Discussion 3: two thematically linked and current papers TBA |
| Oct 23 | **In person meeting and discussion** about research project ideas; time for individual research. **In person lab tours in small groups** (optional) | Ch 4 – genomics technologies | **In person meeting and discussion** about research project ideas; time for individual research. **In person lab tours in small groups** (optional) |

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| Oct 30 | Lecture: Evolutionary theory and population genetics | Chapter 5, 16(523-26) | Protected research time. Independent meetings with instructor available. |
| Nov 6 | Lecture: Human variation and evolution (**Assignment outline due**) | Chapter 6 (6.1, 6.2, 6.7, 6.8), 10 (335-8) | Discussion 5: two thematically linked and current papers TBA |
| Nov 13 | Fall Break – no classes | | |
| Nov 20 | **In person peer review** of independent papers – **print out copies of your draft paper or share electronically** | | Protected writing time to integrate feedback |
| Nov 27 | Lecture: Ancient DNA and human evolution **OR** Epigenetic mechanisms and research | Chapter 4 (123-8), 8(272-3), 9(303-13) **OR** 20, 29, 56, 85-8; 483-5 | Discussion 6: two thematically linked and current papers TBA |
| Dec 4 | Lighting presentations on independent research (**Revised assignment due; bonus assignment due**) | | Lighting presentations on independent research |