

## DNA & Human Society

Instructor: Raquel Fleskes PhD Candidate, Biological Anthropology

#### Session & Time Slots:

Module I, AM: 9:30-12:00pm, & Module I, PM: 1:30-4:00pm

# Enrollment Maximum:

20 students

#### Abstract:

DNA & Human Society offers students an introductory survey on the application of DNA technologies in our contemporary society. In this course, students will gain a basic understanding of DNA, genetic inheritance and gene expression. But, different than a classical biology class, this course will explore *how* this information is used to understand topics such as human evolution and genetic disease, as well as contemporary discussions about race, identity, and bioethics. During this module, students will listen to lectures, partake in multi-modal learning activities and read academic papers to meet learning goals.

This module is divided into two thematic sections, each with a *Principles* and *Ethics & Implications* sub-section. The *Principles* sub-section focuses on teaching students the fundamental genetic theories needed to be able to discuss their implications in the *Ethics* sub-

section. During each day, students will watch a (1) pre-recorded video lecture, (2) complete a daily activity worksheet, and (3) read a scientific article with an accompanying reading guide, which pertain to the daily topic. In this way, students will (1) listen, (2) engage, and (3) read about each topic to promote learning and retention in an online environment.

# **Learning Goals:**

- 1. Students will gain a basic understanding of DNA structure, inheritance, gene expression, selection, and the evolution of human diversity.
- 2. Students will be able to engage in debates surround the implications fundamental genetic principles to relevant issues in today's contemporary society.
- 3. Student will increase their scientific literacy and research skills in an academic environment by reading and comprehending academic journal articles pertaining to course topics.

## **Online Structure of the Course:**

This course is designed to run completely asynchronously using Canvas Modules. Each daily class will have its own canvas module, with a pre-recorded video lecture, activity worksheet, and daily Academic Paper Reading Bootcamp guided reading. Students will move through the daily module during the allotted class session time at their own pace. *For each class, the activity worksheet and academic paper guided reading will be due at Midnight EST*, submitted via Canvas.

<u>Video Lecture</u>: This will consist of a 30-minute pre-recorded video lecture on the daily topic, via Panopto on canvas. Students will begin their daily module by watching the video lecture, which will help them complete the activity and academic paper reading.

<u>Daily Activity</u>: Activities will allow students to dive in deeper into the daily lecture topic, by engaging in critical thinking discussion questions, watching comparative videos, or completing at-home activities. Students will have a daily worksheet pertaining to the activity that they will be required to submit at the end of the day. The daily activity should take about an hour to complete.

<u>Academic Paper Reading Bootcamp</u>: In this course, students will be responsible for reading one academic article per day, which pertains to the daily lecture and activity. This allows students to become familiar with how to read and understand an academic paper, which is a critical skill at the University level. This will also help students understand how the daily topic is discussed in the primary academic literature. A daily guided reading worksheet will be given to students to assist with reading and comprehension skills, that they will be required to submit at the end of the day. The daily reading should take about an hour to complete.

<u>Online Requirements</u>: You will need a computer with internet access, and access to Canvas. We will be using activities that require flash. For Mac users, using Safari is the best option.

Day	Theme	Topics & Activity
		1. Lecture: Class Introduction & Course Overview
1	Introduction:	2. Lecture: What is Biological Anthropology & the
	What is	Anthropological Mindset
	Biological	3. Lecture: How to Read a Scientific Paper
	Anthropology?	4. <u>Paper</u> : 'Unraveling ancestry, kinship, and violence in a Late
		Neolithic mass grave' (Schroeder et al., 2019)
2	<i>Principles:</i> What is DNA?	1. <u>Lecture:</u> What is DNA, and how do we study it?
		2. <u>Activity</u> : DNA Extraction, PCR, and Gel Electrophoresis
		3. <u>Paper:</u> 'Next-generation DNA sequencing' <u>(Shendure &amp; Ji,</u>
		2008)
3	Principles: DNA and Disease	1. <u>Lecture:</u> Genetic Mutations, Protein Expression, and
		2 Activity DNA Mytotions Lob Activity
		2. <u>Activity</u> : DNA Mutations Lab Activity 3. Paper: 'Molocular analysis of new mutations for
		5. <u>raper</u> . Molecular analysis of new initiations for Huntington's disease: intermediate alleles and sex of origin
		effects' (Goldberg et al. 1993)
		1. Lecture: Gene Editing Technology
4	Ethics & Implications: CRISPR	2. Activity: TEDTalks & Scenarios: CRISPR
		3. Paper: 'The new frontier of genome engineering with
		CRISPR-Cas9' (Doudna & Charpentier, 2014)
5	Principles:	1. Lecture: DNA & Inheritance: The basis for evolution
	DNA and	2. <u>Activity:</u> What Darwin Never Knew Video & Response
	Evolution	
6		1. Lecture: Epigenetics: How does the environment shape our
		genes?
	Ethics &	2. <u>Activity:</u> Epigenetics Lab
	Epigenetics	3. <u>Paper:</u> 'Biological memories of past environments:
		Epigenetic pathways to health disparities' (Thayer &
		Kuzawa, 2011)
7	Principles:	1. <u>Lecture</u> : Human Variation
	Human	2. <u>Activity</u> : Genetics & Human Variation Lab
	Variation	3. <u>Paper:</u> Worldwide Human Relationships Interred from
	Ethica &	Genome-wide Patterns of variation (Li et al., 2008)
8	Implications:	In <u>Lecture</u> . Race, Skill Color Adaptation, and the Diological Implications of Pacism
	The	2 Activity: The Biology of Skin Color
	Embodiment of	3. Paper: 'How Race becomes Biology' Embodiment of Social
	Race	Inequality' (Gravlee, 2009)
	Ethics &	1. Lecture: Commercial Genetic Ancestry Testing
	Implications:	2. <u>Activity</u> : Critical Thinking: DNA Testing Commercials
9	Genetic	3. Paper: 'Inferring Genetic Ancestry: Opportunities,
	Ancestry	Challenges, and Implications' (Royal et al., 2010)
	Testing	