

**Anthropology 6406.80 / Forensic Science 6246.80**  
**Human Genetic Variation**  
**95664/95698**  
**Spring 2014**  
**R 4:10 -06:00pm**  
**Ames B204**  
**Mount Vernon College Campus**

**Instructor**

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**Office Hours T and R 3:00-4:00 or by appointment**

**Prerequisites**

This course has no prerequisites; however courses in biological anthropology, genetics or population genetics are useful.

**Text:**

There is no textbook for this course. The course will be based on assigned readings found on Blackboard.

**Course Objectives**

This course is designed to give advanced undergraduates and graduate students an introduction to the genetic evidence of human evolution, as reflected by genetic differences among human populations. The genetic variation in human populations provides a framework for the measurement and analysis of genetic diversity and evolutionary process. The readings should acquaint the student with the basic theories of genetic variation. Readings will provide examples of genetic variation in human populations. The course is focused on the study of human variation and the possible roles of cultural change leading to adaptive / selective events have molded non-neutral genetic variation in modern humans. The questions of how much genetic variation is there between and within populations, are there "races", do all markers show the same patterns, how rapid can genetic change occur, what is the evidence for selection.

## **Learning Outcomes:**

By the end of the course students should be able to understand and explain the role of the evolution of culture as an ecological modifier creating selective opportunities that have led to genetic adaptations to diseases and cultural changes. These changes are overlaid on the basic variation between human populations.

## **Format:**

This course is being taught in a new format. The students in the class are a single discussion group. Discussions will be conducted on line (Blackboard) in the week before the topic is to be discussed in class to give the instructor information on areas that need to be discussed in greater details. There will be an assigned student leader for each week. Students will be expected to bring copies of the papers to class either on their computers, or in printed format. In place of examinations grading will be based on short papers and a final paper, and class participation following the rubric..

## **Short Papers**

**There will be two or three short papers, time permitting, which cover material covered during that period of the course; there will also be a cumulative paper. Each paper will include a discussion of the specific questions for the paper. Short papers will be on a delimited topic such as when modern man left Africa did they immediately disperse all over the world, single species versus multi-regional origins, or the role of cultural change in creation of selective events. Data on genetic variation will be used to support your arguments. The papers will be discussed in the class following the due date. A PowerPoint presentation or printed copy of paper will be useful for presentation which should not be longer than 10 minutes.**

## **Project / Term Paper**

**In place of a final exam there is a project / term paper due on Thursday April 24, 2014 at 4:00 PM.** Each student will pick an area of the world covered in the course. Projects will look at the variation in the area chosen and relate it to general world wide variation for the markers chosen, the effect of cultural changes in the area, and what selective consequences occurred. An example of this could be in the peopling of SE Asia, what were the consequences of the development of agriculture after the ice age, how did this change the disease patterns in the area, what were the genetic adaptations to the changes in disease patterns. As this course is not mathematically based there is no need to include mathematical examples or simulations. **Projects are due by 4:00 PM on Thursday April 24, 2014. Grades will be reduced one grade per day late.**

There is a class schedule attached however the course is based on the topics listed below. Readings will be provided in the form of PDF files on Blackboard.

**Participation:** Will be based on participation in on-line discussion on Blackboard. Students will alternate leading discussion based on the articles posted on Blackboard. As

the articles are in Black board discussion should begin on the Monday before class. Because there are a small number of students, I will act as a participant but not a discussion leader. Failure to participate will lose that weeks point.

### **Grading:**

<b>Basis of Final Grade</b>		<b>Final Grade Calculations</b>	
<b>Paper 1</b>	<b>15%</b>	<b>A</b>	<b>93% and higher</b>
<b>Paper 2</b>	<b>15%</b>	<b>A-</b>	<b>90 – 92.99%</b>
		<b>B+</b>	<b>87-89.99%</b>
<b>Project</b>	<b>40%</b>	<b>B</b>	<b>83-86.99%</b>
<b>Participation</b>	<b>30%</b>	<b>B-</b>	<b>80-82.99%</b>
		<b>C+</b>	<b>77-79.99%</b>
		<b>C</b>	<b>73-76.99%</b>
		<b>C-</b>	<b>70-72.99%</b>
		<b>F</b>	<b>&lt;69.99%</b>

### **Class Policies**

#### **Late Work:**

**Sometimes illness of emergencies occur and assignments cannot be turned in on time. The only excused late submission of homework or papers will occur if the Professor is notified in advance of the due date, not after the material is due. Illness will require a note from a physician either in the form of a fax, or e-mail. Family emergencies will require similar documentation from a parent.**

**Papers can be submitted late for the following reasons, medical emergency (doctor's note required), death or illness in immediate family (documentation required). For papers in course the paper can be extended to the end of the course. As the final project is due during exams, this will constitute and incomplete.**

**For an incomplete to be issued the student has to sign a contract stating when the paper will be completed. A grade of "I" will be entered. When the paper is completed the grade will be changed to the corrected grade and reflected on the transcript as "IX" where X is the letter grade. Incompletes do not go away. After one year if the incomplete is not made up the grade changes to an "F"**

#### **University Policy on Religious Holidays:**

- 1. Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance;**
- 2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations;**

**3. Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions for their course-related activities**

### **ACADEMIC INTEGRITY:**

I personally support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: <http://www.gwu.edu/~ntegrity/code.html>

### **SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM:**

#### *DISABILITY SUPPORT SERVICES (DSS)*

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: <http://gwired.gwu.edu/dss/>

#### *UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300*

The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:

- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals

<http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices>

### **SECURITY**

In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location. **MVC policy requires that in the event of an evacuation a uniformed UPD officer will lead us to our evacuation location**

## Topics

### 1. Human Genetic Variation and Genetic Concepts

Mendelian Inheritance, Mutation, Single Nucleotide Polymorphisms, Insertion Deletion Polymorphism, Variable Number Tandem Repeats, copy number variation, Genetic linkage, X linked inheritance, Y linked inheritance, Mitochondrial DNA polymorphism, Effective population size, Genetic drift, Selection

No readings, too broad a literature

### 2. Man's nearest neighbors: Non-Human Primates

**Assigned reading: Gene Losses during Human Origins  
Critical Analysis of Human Chimp Differences**

### 3. Man's nearest neighbors: Neandertal, Denisovans, Cro-Magnon

**Assigned reading: Draft Sequence of the Neandertal Genome  
Models of Neandertal Cromagnon interaction  
Genetic history of archaic Denisovans  
Denisovan high coverage sequence**

### 3. Out of Africa

Modern African Variation: Khoi / San, Pygmy, Bantu  
Who left Africa?

Assigned Reading: On Blackboard

### 4. Subspeciation or human races

Australia and New Guinea  
East Asia  
    Northeast Asia  
    Americas  
    Southeast Asia  
    Pacific  
Indo-Europeans  
    South Asia (Indian subcontinent)  
    Southwest Asia / North Africa  
    Europe

Reading Assignments: On Blackboard

### 5. Level of Cultural Complexity and genetic differentiation

Reading assignment: On Blackboard

## 6. Culture, Genetics and Disease

Selection and Disease

Nutritional Adaptation (nutritional genomics)

Environmental adaptation (pharmacogenetics)

Environment adaptation (physical traits)

Reading assignment: On Blackboard

## 7. Language, locations and genetic distance

Reading assignment: On Blackboard

**Class Calendar Dates may be changed to accommodate lecture schedule.**

**January 16<sup>th</sup>                      First Day of Class**

**January 23<sup>rd</sup>**

**January 30<sup>th</sup>                      Paper topic and annotated bibliography due by 4:00 PM**

**February 6<sup>th</sup>**

**February 13<sup>th</sup>**

**February 20<sup>th</sup>                      No Class AAFS meeting Seattle, work on Paper**

**February 27<sup>th</sup>**

**March 6<sup>th</sup>**

***March 15<sup>th</sup>                      Spring Break No Class***

**March 20<sup>th</sup>**

**March 28<sup>th</sup>**

**April 3<sup>rd</sup>**

**April 10<sup>th</sup>                      Anthropology Meeting Calgary, Alberta- work on term paper**

**April 17<sup>th</sup>**

**April 24<sup>th</sup>                      Last class, Project / Term Paper Due at 4:00 PM**