

# Introduction to Human Evolution

## Anthropology 102

KY150



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Evolution is one of the central, unifying theories of biological science. As Theodor Dobzhansky wrote "Nothing in biology makes sense except in the light of evolution." This course pursues an integrative approach to the study of human evolution. We will begin by introducing the scientific method and discussing how it applies to the study of biological evolution. This discussion is followed by an introduction to the fundamentals of evolutionary theory. We will examine forces that affect populations of living organisms, leading to evolutionary change over time. This portion of the course is illustrated by examples of human variation and discussion of the extent to which this variation can be explained by the forces of evolution. After the first exam, we will introduce the Primate Order and discuss its origins. We will continue by discussing morphological and behavioral variation among nonhuman primates in order to gain perspective on the evolution of human biology and behavior. Then we trace the fossil record leading from the first primates to modern humans, focusing on the biological and behavioral changes that have occurred during the course of human evolution. Finally, we will look at evolutionary factors that have defined biological and genetic variation among modern humans.

The goals of this course include:

1. To demonstrate how biological anthropology and evolutionary biology create knowledge and understanding, this course introduces the students to the scientific method and its role in developing our understandings of how evolution has shaped our species and produced biological variation among modern humans. This course aims to make students aware of the investigative roles of observation, construction and testing of research hypotheses, experimental design, and data analysis.
2. To position biological anthropology and evolutionary biology within the liberal arts and the larger society, using human evolution as a central theme. Liberal arts refer to a college or university curriculum aimed at imparting general knowledge and developing general intellectual capacities in contrast to a professional, vocational, or technical curriculum. This course illustrates how core biological concepts relate to our understanding of the origins of our species, as well as exposing the connections between humans and non-human primates. Throughout the course there will be an emphasis on the ways in which scientists learn about human evolution and the significance of human evolution for understanding humans today.
3. To introduce students to a body of knowledge at the core of the natural sciences: the biological basis of life, the basics of cell biology and molecular genetics, Mendelian genetics, population genetics, systematics, molecular phylogeny, cladistic analysis, behavioral studies, biomechanics, and analysis of the fossil record.
4. To enhance quantitative reasoning among students through assignments that employ quantitative exercises in the context of evolutionary theory.
5. To introduce students to the primary sources of literature on human evolution and other primary materials such as the skeletons of non-human primates and replicas of fossils related to human evolution.

6. To reveal the existence and importance of change through time, the natural processes that result in biological change across the generations are the primary focus of this course. The course discusses how natural selection, mutations, gene flow, and genetic drift result in biological change over time. The course also examines the fossil record as a direct source of evidence of biological change.

7. To illuminate diversity, as well as the nature and construction of forms of difference, this course considers how the forces of evolution have shaped biological variation in modern humans and examines how environmental variation around the world, as well as the distribution of pathogens, has affected stature and body proportions, pigmentation, and the distribution of other heritable traits in different human populations.

### **Textbook**

TEXT: Jurmain, Kilgore, Trevathan: *Introduction to Physical Anthropology* (2007)

OTHER READINGS: To be found on electronic reserve in the library.

- 1) Charles Darwin (1859), *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. Chapters 3 “struggle for existence” and 4 “natural selection”
- 2) Kevin N. Laland, William Hoppitt (2003) Do animals have culture? *Evolutionary Anthropology* 12: 150-159.
- 3) Bernard Wood (2002) Palaeoanthropology: Hominid revelations from Chad. *Nature* 418: 133 – 135.
- 4) Erik Trinkaus, Pat Shipman. (1993) Neandertals: Images of ourselves. *Evolutionary Anthropology* 1: 194-201.

### **Grading**

Your grade will be based on three exams, as well as homework assignments. A total of nine homework assignments will be distributed, of which you must turn in a minimum of seven. If you are unable to attend class on a day when an assignment is due, you may submit it via e-mail or fax. Late assignments submitted before the final examination will receive a maximum of 80% credit. In other words:

-- **TWENTY PERCENT WILL BE DEDUCTED FROM ALL LATE ASSIGNMENTS.**

-- **EXAMS CAN BE MADE UP ONLY ON THE DAY OF THE FINAL EXAMINATION.**

### **Lecture /Exam Schedule**

Assignments		15%	
Exam 1	3/6	25 %	
	covers weeks 1-5	-	
Exam 2			4/17
Final Exam			5/25

**Lateness** Arriving late to class disrupts the lecture and is disrespectful to others. Attendance sheets will be available for signing only at the beginning of each class period, so you will lose participation points if you are more than 5 minutes late to class.

*You are expected to observe the University’s standards for academic behavior.*

**Homework and exam answers must be your own.**

## Schedule

week	date	topic	readings	assignments
1		Introduction, Scientific inquiry, hypothesis testing Evolutionary theory, historic overview	Ch. 1: 2-14; Ch. 2: 29-37	
2		The central dogma of molecular biology Mitosis-meiosis, Introduction to Mendelian genetics	Ch. 1: 14-17; p134 Ch. 3: 58-64, 66	Assign. 1
3		Mendelian genetics Population genetics, Hardy-Weinberg Theory	Ch. 3: 67-71	
4		Forces of evolution: natural selection Forces of evolution: mutation, genetic drift, gene flow	Ch. 3: 51-58, Darwin Ch 3 Ch. 4: 77-81	Assign. 2
5		Human variation as a result of microevolution From microevolution to macroevolution	Ch. 4: 90-93, 87, Darwin Ch 4. Ch 4:81-82, 86-88, 89-90	Assign. 3
6		<b>EXAM 1</b> The fossil record – an overview	Ch4: 95-97	
7		Mesozoic mammals, primate origin Order Primates, overview	Ch 5: 119-133 Ch. 6: 135-146	Assign. 4
8		Primate taxonomy Primate taxonomy (continued).	Ch. 7: 163-182 Ch. 7: 183-192	
9		Cladistics The primate ecological niche	Ch. 8: ALL Ch. 8, Ch 13: 361-363	Assign. 5
<b>SPRING RECESS</b>				
10		Primate adaptations  Primates review	Laland and Hoppitt (2003)  Ch. 7, 8, 13	Assign. 6
11		<b>EXAM 2</b> Intro to Hominids	pp. 461-463 (anatomy)	
12		Family Hominidae, adaptations to bipedality Australopithecines	Ch. 10, Wood (2002) Ch. 10: ALL	Assign. 7
13		Genus <i>Homo</i> ; <i>Homo habilis</i> Early Pleistocene Hominids: <i>Homo erectus</i>	Ch. 11: 277-290 Ch. 11: 290-309	
14		Middle & Late Pleistocene Hominids: archaic <i>Homo sapiens</i> and Neanderthals Anatomically Modern Humans	Ch. 12: 311-331 Trinkaus and Shipman Ch. 12: 331-345	Assign. 8
15		Multiregional continuity vs. Single Origin Replacement The first farmers; Review	Figs. 12-17&12-18.	
<b>FINAL EXAMINATION:</b> <b><u>Friday, 5/25; 1:15 to 3:15 PM, Kiely 150</u></b>				

QUEENS COLLEGE CUNY  
DEPARTMENT OF ANTHROPOLOGY

ANTHROPOLOGY 102

**INSTRUCTOR:** Dr. Sara Stinson  
**OFFICE HOURS:** Powdermaker 312C Tuesday 1:00-2:00 or other times by appointment,  
phone: 718-997-2893, email: sara.stinson@qc.cuny.edu

The purpose of this course is to provide a general introduction to human evolution. The course is divided into three major sections. The first third of the course deals with the general principles of evolution and their application to living human populations. The second part of the course is devoted to the study of our relationships to our closest relatives, the monkeys and apes. The final section of the course deals with the fossil record of human evolution over the last four million years. Throughout the course there will be an emphasis on how biological anthropology contributes to the ways in which scientists learn about human evolution and the significance of human evolution for understanding humans today.

**TEXT:** Jurmain, Kilgore, Trevathan: *Introduction to Physical Anthropology* (2007)

**OTHER READINGS:** To be found on electronic reserve in the library.

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CLASS	TOPIC	READING
1-2	Introduction	Chapt. 1-2; Darwin Chapters
3-5	Basic Principles of Genetics	Chapt. 3, pp. 45-47, 58-67; Chapt. 4, pp. 75-92
5-6	Molecular Genetics	Chapt. 3, pp. 47-58, 67-73
7-8	Population Genetics	Chapt. 4, pp. 92-105; Chapt 14, pp. 409-415
8-9	Human Variation	Chapt. 14, pp. 396-409, 416-421; Chapt. 15
10	**EXAM I**	
11	Macroevolution and Biological Classification	Chapt. 5
12-15	The Living Primates	Chapt. 6
16-18	Primate Behavior	Chapt. 7; Laland and Hoppit article
18-19	Primate Evolution	Chapt. 9, pp. 236-240; Chapt. 10, pp. 257-262
20	**EXAM II**	

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21-24	Australopithecines	Chapt. 9; Chapt. 10, pp. 262-297; Wood Article
25-26	<i>Homo erectus</i>	Chapt. 11
26-28	<i>Homo sapiens</i>	Chapt. 12-13; Trinkaus and Shipman article

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Final Exam Period	**EXAM III**
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## COURSE REQUIREMENTS

- 1) Class attendance. It is expected that you will attend class regularly. If you miss a class, it is your responsibility to get the lecture notes for that class from another student. I will be happy to answer any questions you have about a lecture you missed after you have reviewed the notes.
- 2) Reading. The reading assignments from the textbook and on electronic reserve are indicated on the first page of the syllabus. The assignments will not be announced in class, so make sure you keep up with the reading.
- 3) Three in-class exams. The dates of the exams also are indicated on the first page of the syllabus. Each exam is worth 90 points (30% of your total grade). A study guide will be handed out before each exam, and should be used as the name implies - as a guide for studying. If you know everything that's on the study guide you should get 100% on the exam. The exams will be primarily objective (multiple choice, true-false, matching) in format. If you miss an exam, you should get in touch with me as soon as possible to schedule a make-up. Make-up exams will be essay and short answer exams.
- 4) Assignments. There will be four short assignments during the semester. Each assignment is worth 10 points and you can get a maximum of 30 points for assignments.

## GRADING

There are a total of 300 possible points in this course: 270 from the exams and 30 from the assignments. The number of points necessary for each grade is:

A	279 (93%)
A-	270 (90%)
B+	261 (87%)
B	249 (83%)
B-	240 (80%)
C+	231 (77%)
C	219 (73%)
C-	210 (70%)
D+	201 (67%)
D	180 (60%)