

**Language of Instruction:** English

**Professor:** David Comas & Jaume Bertranpetit

**Professor's Contact and Office Hours:**

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**Course Contact Hours:** 30 hours

**Recommended Credit:** 4 ECTS credits

**Weeks:** 2

**Course Prerequisites:** none

**Language Requirements:** Good English level

**Course Description:**

Brief description of the course.

The subject intends to give some basic knowledge to be able to understand the great debates that the present biology has generated in the society. Discussions that transcend the strict scientific field but which require some basic knowledge and serious discussion platforms. It intends to be of wide interest in humanities, law, economics, and every student with a humanistic aspect that is interested in this biological facet of humans in a social context. Special emphasis will be given at genomics and evolutionary biology views of it.

**Learning Objectives:**

At the end of the course, the student:

- will be able to understand in depth the main biological issues that are in our social environment
- will be able to read critically and understand the biological news in newspapers and magazines
- will be able to make critical statements on the main biological issues that are in our environment: genetic manipulation, selfish gene, genetically modified organisms, heredity of intelligence, races and racism, evolutionary processes, adaptation, gene-culture interactions, altruistic behavior....
- will be able to use the biological knowledge that may be of use by other disciplines, including the study of human past and archaeology, cultural anthropology, economics, philosophy and other social sciences and humanities.

**Course Workload**

The course is divided into lectures, discussions, and videos. Students should be prepared to read several scientific papers.

**Methods of Instruction:**

The course includes both lectures and discussion, with one visit to the zoo. In general, one hour lecture one hour discussion with videos and one hour lecture.

**Method of Assessment**

Class Participation: 10 percent

Paper/Journal: 30 percent

Midterm Exam: 30 percent

Final Exam: 30 percent

**Absence Policy (general for all Summer Courses)**

Attending class is mandatory and will be monitored daily by professors. The impact of absences on the final grade is as follows:

<b>Absences</b>	<b>Penalization</b>
Up to one (1) absences	No penalization.
Two (2) absences	1 point subtracted from final grade (on a 10 point scale)
Three (3) absences	The student receives an INCOMPLETE for the course

The BISS attendance policy does not distinguish between justified or unjustified absences. The student is deemed responsible to manage his/her absences.

Emergency situations (hospitalization, family emergency, etc.) will be analyzed on a case by case basis by the Academic Director of the UPF Barcelona International Summer School.

**Classroom Norms:**

- No food or drink is permitted.
- There will be a ten-minute break during the class.
- Students must come to class fully prepared.

## Course Contents:

### PART 1. THE BASES OF LIFE AND INHERITANCE

#### Day 1

Session 1 Jaume Bertranpetit JB

What is life? . The materialistic and scientific view of life. Properties from physics and chemistry. Philosophical implications. DNA, the basics of life

Session 2 JB

Biological bases of inheritance. Mendelian genetics. Molecular genetics The DNA, the life and inheritance. What is transmitted to offspring? The genetics of simple and of complex traits.

Session 3 JB

The genome in action. One genome, many cell types. Somatic and germ cells: the I and the offspring. Epigenetics and Genome regulation. Differentiation and de-differentiation. Stem Cells and their use in therapy.

#### Day 2

Session 4 JB

Implication of the knowledge on genes and genomes. Biological and social implications of the knowledge of the biological bases of humans. Genetic Determinism and Freedom Free access to the information. Challenges of the genome knowledge.

Session 5.- JB

Personal genomics. My own genome. What does it tell me and what does it tell to science and society?

Session 6.- JB

My genome and the genome of my family. Sharing genes and consanguinity. Why is it dangerous? Genome and forensics.

#### DAY 3

Session 7.- JB

The edition of the genomes. Terminology and history. Genomes are fluid, dynamics. Genetic engineering. Techniques and uses. Social problems

Session 8.- David Comas DC

Humans in Nature. The position of humans in nature in the light of evolution. Molecular evidence, morphological evidence Classical classifications. The human genetic and biological singularity.

#### Day 4

Session 9 JB

Evolution. How evolution works. The basis of evolutionary processes. Adaptation and natural selection. Bases of Darwinism. Laws of evolution. Evolutionary change

### PART 2. BEHAVIOR AND ECOLOGY OF PRIMATES

Session 10 DC

Introduction to primates. Why do we study primates? The primates and the scale of the evolution Ecology of primates. Activities in the life of primates. Territoriality. Depredation Violence What do primates teach us?

#### Day 5

Session 11. DC

The intelligence of primates. What is intelligence? Why intelligence may be important for primates?

Evolutionary strategies and behavior in primates. Pairing systems.

Sociability: dominance, hierarchies and social structures. Lessons for humans.

The evolution of social behavior. Altruism. Sociobiology within the context of the evolutionary biology

Session 12 DC

Visit to the zoo to study primates

## **WEEKEND**

### **Day 6**

#### **PART 3. THE HISTORY OF HUMAN LINEAGE**

Session 13 DC

Human innovations. The human adaptive singularity and the evolutionary processes. Innovations: upright position, cephalization, dentition, culture and language. Culture as an adaptation.

Session 14. DC

The first hominids. The diversity of australopithecines. The emergence of gender Homo. The first lithic tools. Possible homogenous phylogenys. The life of first hominids.

Session 15 DC

The initial out of Africa expansion. Homo erectus. Neanderthals and their contemporaries: morphological characters, culture and lifestyle. Diversity of ancient humans in Eurasia in space and time.

### **Day 7**

Session 16 DC

The origin of modern humans. The Upper Palaeolithic: technology, culture, symbolism and social organization. Models of origin and expansion of modern humans.

Overview and presentation: Which are the social and philosophical main issues of the biological bases of humans? Which should be the main bases of knowledge to have not just opinions but criteria on biological related issues? Which are the main concerns and the main fears in our society?

Session 17 JB

Genetic evidence about the origin of today's humanity. How to see the Out of Africa origin of modern humans in the genome. Introgression by different extinct groups.

### **Day 8**

Session 18 DC

Introduction to human adaptations. Climate adaptations: temperature, humidity, altitude. The variation in cutaneous pigmentation as a paradigm of human adaptation. Nutrition Adaptation. Do humans drink milk? Appearance and evolution of language

#### **PART 4. CURRENT HUMAN DIVERSITY**

Session 19 JB

Evolution and the human life cycle. Prenatal growth and maternal-filial conflict during pregnancy. The evolution of menopause. Senescence. Aging and death: adaptive explanations. Is immortality possible?

### **Day 9**

Session 20 JB

Genes and environment. The study of twins. Monozygotic and dizygotic twins. The current state of the studies of the genetic bases of morphological, physiological and psychological characters. The inheritance of intelligence. Inheritance, behavior and cognitive abilities.

Session 21 DC

The disease in the human being. Genetic bases of diseases. Importance of genetic and environmental factors in complex diseases: the example of mental disease.

**Day 10**

## Session 22 DC

Biological diversity (morphology and genetics) of humanity. From sub-Saharan Africa to the colonization of the Americas and the Pacific. The impact of Neolithic and post-Neolithic migrations. Geographical distribution of current human populations.

## Session 23 JB

From the measure of difference to the reconstruction of history. Since the departure of Africa to today's diversity. Variation within groups and between groups. The concept of race and its biological and social meaning. The genetic future of humanity. The impact of growing migrations. Impact of cultural practices on human genes. Eugenesis. Ethical, healthcare and adaptive implications.

Presentation of your view on the problems: Which are the social and philosophical main issues of the biological bases of humans? Which should be the main bases of knowledge to have not just opinions but criteria on biological related issues? Which are the main concerns and the main fears in our society?

**Required Readings:** The professor will indicate mandatory readings.

**Recommended bibliography:**

Students are encouraged to consult the following sources on their own.

Robert Boyd, Joan B. Silk How Humans Evolved. Last edition (eighth) 2017 WW Norton & Company Inc, New York, Fifth Ed.

Jobling MA et al (2015) Human Evolutionary Genetics: Origins, People, and Disease. Garland Science, New York. Second Ed.

Nesse RM et al (1996) Why we get sick. Vintage Books, New York

Dawkins, R (2000) The selfish gene / El gen egoista  
The extended selfish gene. Oxford University Press, 2016

Daniel C. Dennett (2017) From Bacteria to Bach and Back: The Evolution of Minds. W. W. Norton Company

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