



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche
ACADEMIC YEAR	2021/2022
MASTER'S DEGREE (MSC)	BIODIVERSITY AND ENVIRONMENTAL BIOLOGY
SUBJECT	BIOLOGICAL AND MOLECULAR ANTHROPOLOGY
TYPE OF EDUCATIONAL ACTIVITY	D
AMBIT	20490-A scelta dello studente
CODE	19788
SCIENTIFIC SECTOR(S)	BIO/08
HEAD PROFESSOR(S)	SINEO LUCA Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	SINEO LUCA Thursday 12:00 - 14:00 Studio - Via Archirafi 18 - Dip. STEBICEF - Biologia animale e Antropologia

DOCENTE: Prof. LUCA SINEO

PREREQUISITES	<p>In this course, we will explore how molecular data can be used to illuminate anthropological question concerning human origins, evolution and biological variation. Some of the specific topics to be covered in this course are the phylogenetic relationships among primates, kinship in apes and monkeys, the hominoid trichotomy, modern human origins, human diversity and migrations, Neanderthal and Denisovan admixture with modern humans, the physiology and genetics of skin color, and physiological, phenotypic and disease adaptations. particular attention will be attributed to the study of brain evolution, with a morphological, genetic and functional approach.</p> <p>At the end of the course, the student has the basic knowledge on human evolution and variability at the morphological, cellular and molecular level. In particular, the student will be able to: understand the most important differences between ape and human genomes; discover, assay and make inferences from the patterns of human genetic variation. Further the student will meet software for population genetics data analysis. Exercises in microscopy and human histology will be included.</p>
LEARNING OUTCOMES	<p>Knowledge and ability to understand Knowledge of basic evolutionary phenomena; knowledge of basic paleoecological phenomena; knowledge of the molecular mechanisms underlying the evolution of genomes. Ability to apply knowledge and understanding Ability to perform analysis and models for the study of the evolution of the Homo genus with particular regard to H. sapiens. Autonomy of judgment Ability to understand the scientific importance of the analysis of endogenous and exogenous processes and of the evolution of the forms and molecules and their environmental and social impact. Communication skills The student will acquire the ability to compare and pass on his knowledge and skills in the analysis of the processes that have affected and will affect the genus Homo and the environment he modified. Learning skills Through the attendance to lectures and exercises the student will develop his / her own learning and analysis skills of the processes with a comparative perspective with the other disciplines of the course of study.</p>
ASSESSMENT METHODS	<p>The exam is oral . The test evaluates the ability to correct expression and processing of basic concepts of the discipline and of the learner's capacity for critical analysis . The score will be the result of the critical evaluation of the specific preparation and the ability to exhibit a reasoned synthesis of the arguments. The 18/30 vote will be attributed to the least sufficient evidence. From 19 to 22 the vote will be indicative of poor preparation; a vote from 23 to 25 will be an index of discrete evidence; The votes from 27 to 29 will be a good test; the excellent test will be evaluated with the highest marks and, if the learner has demonstrated great ability to synthesize and criticize it, it will be commended with the attribution of the laudem.</p>
EDUCATIONAL OBJECTIVES	<p>The student learns the biological origin of man and cultural foundations. The course provides the input for the understanding of biological and genetic evolution and distribution of Homo sapiens.</p> <p>The course includes: Introduction to Human Evolution Aims of Molecular Anthropology Fundamentals of Population Genetics; Microevolution and genetic factors: non random mating, genetic drift, gene flow, mutation, natural selection Uniparental Markers -Mitochondrial DNA and Y chromosome phylogeny; applications in Homo sapiens Origins of modern humans; multidisciplinary evidences Geographical distribution of diversity; Out of Africa model and Multiregional model. Recent alternative hypothesis. Brain functions and evolution. Extended Mind Theory. Making inference from diversity (measures of molecular diversity, neutrality test, mismatch distribution, phylogenetic trees) Ancient DNA problems and perspectives. The Genographic Project and the 1K Genome Project;</p> <p>Basics of software analysis and application in human population genetics The ability of learning is examined with exercises held during the hours of lectures.</p>
TEACHING METHODS	<p>The course is organized in 48 hours of lectures in which practical exercises on the use of computerized analysis programs will be carried out.</p>
SUGGESTED BIBLIOGRAPHY	<p>Jobling M.A., Hurler M.E., Tyler-Smith C., Human evolutionary genetics, Garland Science, 2014 - SECONDA EDIZIONE! Material and tools will be provided as an integration to the information given</p>

during the lectures
Scientific articles, reference and tools will be provided weekly during the course.

SYLLABUS

Hrs	Frontal teaching
4	Biogeography, Systematics and Evolution of living primates
6	The evolution of Anatomically modern Homo sapiens, theories and models. Evolution of morphology; bipedalism and vestibular system; Mirror Neurons System and Extended Mind Theory.
20	Molecular Anthropology. Studies of Haplotypes and Uniparental markers. Human Genetic and genomic Variability. Study of genetic and genomic variability in Homo. normal and pathological variants. Examples of balanced polymorphism. Molecular applications to the study of human variability: genetic codification of human phenotypes. Human Genomics; Human Genetics; Comparative cytogenetics.
10	Molecular applications in human phylogeny. Several examples of genomics in Homo. From Brain evolution to the evolution of the human reproductive system. The genomes of H. neanderthalensis and H. spp. Denisova. Molecular applications to human Biology and Ecology and to the study of human migrations. Examples of genographic analysis projects.
8	Exercises of population genetics with special attention to normal and pathological human genetics. Practical lessons on genome analysis using specific software. Microscopy and histology on human tissues.