

MASTER 'S PROGRAMME
MOLECULAR GENETICS
1ST YEAR OF STUDY, 1ST SEMESTER

COURSE TITLE	GENOMICS
COURSE CODE	BGM6101
COURSE TYPE	full attendance
COURSE LEVEL	2 nd cycle (master's degree)
YEAR OF STUDY, SEMESTER	1 st year of study, 1 st semester
NUMBER OF ECTS CREDITS	6
NUMBER OF HOURS PER WEEK	4 (2 lecture hours + 2 seminar hours)
NAME OF LECTURE HOLDER	Lucian Gorgan
NAME OF SEMINAR HOLDER	Lucian Gorgan
PREREQUISITES	Advanced level of English
A	GENERAL AND COURSE-SPECIFIC COMPETENCES
	<p>General competences:</p> <ul style="list-style-type: none"> → The usage of terms and in-depth concepts, working principles and methodologies characteristic for the field of study and specialization "Molecular genetics". → Investigation and interpretation of the molecular basis of organization and functioning of living matter for the elaboration of studies / reports that can be published and / or applied in a professional level. → The use of molecular analysis equipments and tools specific to different professional laboratories <p>Course-specific competences:</p> <ul style="list-style-type: none"> → to understand the structures of different genome types and the differences between them → to differentiate the influence of the main evolution factors on the individual status → to use genomics-specific scientific language → to understand the importance of knowing the mutational processes and the adaptability of the organisms → to know the main methods and techniques for genomic analysis
B	LEARNING OUTCOMES
	<ul style="list-style-type: none"> → Initiation into the knowledge of molecular structures and mechanisms at the genomic level. → Awareness of the influence of environmental factors on individual status. → The development of the skills needed to analyze nucleic acids and to correlate structures with the spatial and temporal factors of evolution.
C	LECTURE CONTENT
	<p>The concept of <i>Genome</i> The genome in prokaryotes and eukaryotes Comparative genomics Metagenome Evolutionary changes in amino acid and DNA sequences Molecular and adaptive variations Genetic diversity. Diversity indicators Molecular phylogenetics and modeling. Molecular phylogeography DNA-protein interactions Databases, sequences, annotations Functional and medical genomics</p>
D	RECOMMENDED READING FOR LECTURES
	<ol style="list-style-type: none"> 1. Avise J C., 2000 – Phylogeography: the history and formation of species, Harvard college. 2. Bertorelle G., Bruford M. W., Hauffe H. C., Rizzoli A. P., Vernesi C., 2009 - Population Genetics for Animal Conservation, Cambridge University Press. 3. Höglund J., 2009 - Evolutionary Conservation Genetics, Oxford University Press. 4. Lesk A., 2007 – Introduction to Genomics, Oxford University Press 5. Lewin B., 2008 – Genes, 10th ed., Oxford University Press
E	SEMINAR CONTENT

	Molecular markers Sampling and analysis techniques Methods for identifying polymorphisms Statistical methods used in comparative genomics Databases - DNA sequences, complete genomes Gene annotations. BLAST Algorithm Sequence alignment Phylogeny and molecular phylogeography. Phylogenetic trees, trees calibration
F	RECOMMENDED READING FOR SEMINARS
	<ol style="list-style-type: none"> 1. Nei M., Kumar S., 2000 – Molecular evolution and phylogenetics, Oxford University Press. 2. Saccone C., Pesole C., 2003 - Handbook of comparative genomics - Principles and Methodology, John Wiley & Sons.
G	EDUCATION STYLE
LEARNING AND TEACHING METHODS	systematic exposure; conversation; didactic demonstration
ASSESSMENT METHODS	Exam
LANGUAGE OF INSTRUCTION	English