UNIVERSITY"ISMAIL QEMALI" VLORA
FACULTY OF TECHNICA AND NATURAL SCIENCES
DEPARTMENT OF BIOLOGY

Subject: Genetics (BIO 312)

Subject	Genetics
Lecturer	Dr. Blerta Laze
Hours per week	Lessions 3 hours, Seminars 2 hours
Tipologjia e lëndës	Characteristic formation disciplines of the program
Course/ semester	III/II
Role of the subject	Obligatory
Program	Bachelor
Credites	8
Code of the subject	BIO 312
Lecturer email	blerta.laze@univlora.edu.al

Description:
Content of Genetics provides a general background of the field of genetics research starting with a short introduction to the history of genetics and the three areas of genetics: Mendelian genetics, molecular genetics and population genetics. Mendel laws deviations, the chromosomes features and mutations that may occur will be handled. Topics to be treated further are related to the recognition of the heritage elements, laws of inheritance, cell division, inheritance chromosome theory, the relationship of genes and construction of eukaryotic genetic maps, antigenic sites mutations and repair, chromosomal mutations, DNA genetic material, structure, replication, genetic code, structure and function of eukaryotic chromosomes, gene expression control, genetics and development, gene regulation and differentiation. Finally, the main aspects of population concept, the Hardy-Weinberg law, inbreeding, genetic drift and exceptions and applications of population genetics will be treated.

BASIC CONCEPTS:

1. **To study mendelian genetics**
2. **To study molecular genetics**
3. **To study population genetics**

COURSE TOPICS:

Lessions course topics:

Topic 1 Introduction-Asexual and sexual reproductionl, characteristics of chromosomes, human karyotype, behavior of chromosomes in the human life cycle. Meiosis, crossingover in prophase I.

Topic 2	Genetic variation produced in the sexual life cycle contributes to genetic evolution, gametogenesis, The importance of genetic variation in evolution within populations. Mendelian genetics, Mendel's experiments, Mendel's laws.
Topic 3	Test cross, exceptions and applications of Mendelian genetics, different levels of dominance, relationship between dominance and phenotype, multiple allelism, Pleitropy, epistasis. Polygenic inheritance, lethal alleles.
Topic 4	Influence of environment on phenotype, pedigree analysis. Recessive and dominant inherited diseases. Genetic tests. Chromosomal basis of inheritance. Morgan's study of the chromosomal theory of inheritance, inheritance of genes linked to sex chromosomes, inactivation of the X chromosome in females.
Topic 5	Linked genes, genetic recombination and gene linkage, recombination of independent genes and linked genes, genetic mapping. Linkage of three genes. Genomic imprinting.
Topic 6	Inheritance of extranuclear genetic material. Molecular basis of inheritance, data from the study of DNA in bacteria, genetics of bacteria, data from the study of DNA in bacteriophages, structure of nucleic acids.
Topic 7	DNA replication, an overview of the nucleus. DNA packaging into chromosomes.
Topic 8	Protein synthesis
Topic 9	Control of gene expression in prokaryotes. Control of gene expression in eukaryotes
Topic 10	Structural chromosomal mutations. Numerical chromosomal mutations.
Topic 11	Gene mutations and their molecular basis. Factors that cause mutations. DNA repair.
Topic 12	Detection of mutagens and mapping of genetic defects in humans. Recombinant DNA technology. Cloned gene expression methods. Techniques used in molecular genetics..
Topic 13	Genes and cancer. Transportable elements. Transposons.
Topic 14	Concept of population and types of genetic variation. The Hardy-Weinberg principle. Inbreeding, calculation of the Inbreeding coefficient.
Topic 15	Gene drift. Natural selection. Heterozygous advantage. Exceptions and applications of population genetics.

Seminars course topics:

Topic 1	Introduction-Asexual and sexual reproductionl, characteristics of chromosomes, human karyotype, behavior of chromosomes in the human life cycle. Meiosis, crossingover in prophase I.
Topic 2	Genetic variation produced in the sexual life cycle contributes to genetic evolution, gametogenesis, The importance of genetic variation in evolution within populations. Mendelian genetics, Mendel's experiments, Mendel's laws.
Topic 3	Test cross, exceptions and applications of Mendelian genetics, different levels of dominance, relationship between dominance and phenotype, multiple allelism, Pleitropy, epistasis. Polygenic inheritance, lethal alleles.
Topic 4	Influence of environment on phenotype, pedigree analysis. Recessive and dominant inherited diseases. Genetic tests. Chromosomal basis of inheritance. Morgan's study of the chromosomal theory of inheritance, inheritance of genes linked to sex chromosomes, inactivation of the X chromosome in females.
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EVALUATION OF THE SUBJECT

TEST	EVALUATION
Test I	30%
Annual assessment: Attendance and Seminars	10%
Final test	60%

Grade evaluation is based on the conversion of the total grade to %, grade 5-10 progressively 41-100%. The student who has less than 75% attendance during the semester will not be included in the final exam, as he will be graded with M (Absence). If the student has attended the course, but does not appear in the next exam, he is assessed NP (Did Not Appear). The course will be evaluated on the basis of the annual evaluation and the final exam. Points earned will be cumulative. Exams will not be repeated for any reason. If you miss the final exam without a valid reason, then you will lose points for the exam you missed.

Grade	4	5	6	7	8	9	10
Vlerësimi	-40	41-50	51-60	61-70	71-80	81-90	91-100

LITERATURE

a) **Basic literature:** "Gjenetika e përgjithshme", Dr. Blerta Laze. ISBN: 978-9928-4528-1-8

b) Recommended literature:

1.Campbell Biology / Lisa Urry, Michael Cain, Steven Wasserman, Peter Minorsky, Jane Reece, 2016.
2."Genetics", Robert F. Weaver, Philip W. Hedrick, 2006

Lecturer

Dr. Blerta Laze

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