

COURSE: **ANIMAL GENETICS AND TRACEABILITY SSD AGR/17**

ACADEMIC YEAR: **2016/17**

TYPE OF EDUCATIONAL ACTIVITY: **CHARACTERIZING**

TEACHER: **DI GREGORIO Paola**

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website:

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mobile (optional):

Language: **Italian**

ECTS: 8 CFU of Lesson 1 CFU of Exercise	n. of hours: 64 hours of Lesson 16 hours of Exercise	Campus: Potenza Dept./School: Scuola di Scienze Agrarie, Forestali, Alimentari, ed Ambientali (SAFE) Program: Tecnologie Agrarie	Semester: I
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EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The goal of the course is to provide the basic principles of genetics, the knowledge of gene transmission in relation to significant characters in livestock, to provide information on the molecules at the base of hereditary transmission, to provide knowledge on the genetic traceability of animal products for both the fraud prevention and to increase the value of quality certification.

PRE-REQUIREMENTS

Students must have acquired and assimilated the concepts about the structure of the cell provided by the course of "Botany" and the course "Anatomy and physiology of domestic animals"

SYLLABUS

BLOK 1 (8hours) Structure and replication of the genetic material. Identification of DNA as the inherited genetic material. Chemical structure of nucleic acids. Double helix model of DNA. DNA replication. DNA polymerase.

BLOK 2 (8hours) Protein synthesis and genetic code: RNA transcription, Types of RNA, Genetic Code, protein synthesis. Regulation of gene expression.

BLOK 3 (8hours) Organization and transmission of hereditary material. DNA and chromosomes: single sequences and repeated sequences. Chromatin organization. Structure and morphology of eukaryotic chromosomes. Mitosis and cell division. Meiosis and gamete formation. Meiosis and recombination.

BLOK 4 (8hours) Mutations: gene mutations, Principal chromosomal mutation. Mendelian principles: Material and experimental methods.

BLOK 5 (8hours) Wise Chi-square. Incomplete dominance and epistasis. Inheritance patterns of monogenic characters in livestock.

BLOK 6 (8hours) Association, exchange and genetic maps. The concept of association (linkage). Exceptions of independent assortment. Crossing-over and recombination of associated genes. Chromosomal mapping of associated genes. Map distance calculations by two and three points tests. Construction of genetic maps. Comparing genetic maps and physical maps.

BLOK 7 (8hours) Principles of: Southern Blot Hybridization (SBH), Polymerase Chain Reaction (PCR), microarray, DNA barcoding. Molecular markers.

BLOK 8 (8hours) Traceability: Individual traceability, Breed traceability (meat products, milk products), Traceability of species.

BLOK 9 (16hours exercises) Composition and DNA replication, transcription of DNA into RNA, protein synthesis. Effect of mutations on protein synthesis. Production of gametes. Cross between individuals heterozygous at one or more loci, determining the F1 and F2. Transmission to offspring of dominant and co-dominant characters. Analysis of pedigree. Two and three points test, construction of gene maps. Analysis of the products of a PCR. Analysis of the digestion of a PCR product with restriction enzymes.

TEACHING METHODS

The course is organized as follows:

- Theoretical lessons (64 ore);
- Classroom and Laboratory tutorials (16 ore)

EVALUATION METHODS

Oral examination.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- G. Barcaccia, M. Falcinelli - Genetica e genomica Vol I GENETICA GENERALE, Liguori (anche e-book)
- G. Barcaccia, M. Falcinelli - Genetica e genomica Vol III GENOMICA E BIOTECNOLOGIE GENETICHE (capitolo 17), Liguori
- AJF Griffiths et al. - GENETICA, Zanichelli
- International Journal Articles.
- Course notes

INTERACTION WITH STUDENTS

At the beginning of the course, after describing the objectives, program and evaluation methods, the professor provides students educational materials (shared folders, website, etc). Simultaneously, she collects a list of students who intend to enroll in the course (name and e-mail).

Tutorial hours:

Mondays from 9:30 to 12:30; Tuesdays and Wednesdays from 15:30 to 17:30; always at the professor's study.

In addition to weekly reception, the professor is available at all times for a contact with the students, through her e-mail.

EXAMINATION SESSIONS (FORECAST)¹

Febbraio 2017	16	Giugno 2017	15	Novembre 2017	16
Marzo 2017	16	Luglio 2017	20	Dicembre 2017	14
Aprile 2017	20	Settembre 2017	14	Gennaio 2018	18
Maggio 2017	18	Ottobre 2017	19	Febbraio 2018	15

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION

Examination board: Chairman prof. PAOLA DI GREGORIO

Member prof. ANDREA RANDO

Substitute member prof. ADRIANA DI TRANA

¹ Subject to possible changes: check the web site of the Teacher or the Department/School for updates.