

COURSE: Genetics

ACADEMIC YEAR: 2016 / 2017

TYPE OF EDUCATIONAL ACTIVITY: Characterizing

TEACHER: Prof.ssa Giuseppina Logozzo / Prof.ssa Gioia Tania

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Language: Italian

ECTS: 7

(5 lessons e 2
tutorials/practice)

n. of hours: 72

(40 lessons e 32
tutorials/practice)

Campus:Potenza

School: Scuola di Scienze Agrarie,
Forestali, Alimentari ed Ambientali
- SAFE
Program: Food Technology

Trimester: II

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Knowledge of the main aspects of genetics and breeding with emphasis on the mechanisms underlying the reproduction and transmission of characters. Knowledge of apply biotechnologies to improve quality and quantity production of food agricultural products.

At the end of the course students will be able to:

- understand and analyze the genetic and molecular mechanisms
- know and apply traditional and innovative genetic methods in the agro-food sector
- know the basics of plant and animal genetic breeding
- access and use sources of statistical information and genetic "tools" available on web side
- obtain information on using bibliographic research
- interact with the food industry and research institutions.

PRE-REQUIREMENTS

Students are advised to have a good knowledge of the courses attended in the previous trimester

SYLLABUS

Lessons

Mendel laws and chromosome theory of heredity. Linkage and genetic maps. Heredity and heritability of quantitative characters. DNA: composition and structure; replication; biochemistry of replication; extraction, purification and electrophoresis; restriction and ligation; amplification of DNA using the polymerase chain reaction; DNA sequencing; sequencing of genomes. The gene and its expression: RNA and protein synthesis. Organization and transmission of hereditary material. Transposable elements and mutations. Genetic engineering approaches. Inheritance of quantitative characters. Population genetics. Genetics applied to the improvement of plants and animals. Molecular traceability of food products. Genomic analysis and molecular markers applications: DNA fingerprinting, microsatellite and AFLP markers, definitions and classification of molecular markers. Applications: varietal identification, phylogeny, molecular maps development, marker assisted selection (MAS). DNA barcoding: application in food traceability, criteria for optimal barcode identification. Genetic modified organisms (GMO) and transgenic varieties.

Practises

Methods and techniques related to:

- DNA extraction, purification and electrophoresis
- DNA amplification by polymerase chain reaction
- primer design

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- use of genetic "tools" for analysis of genetic variability
 - use of genetic "tools" for analysis of genetic traceability in the food industry
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TEACHING METHODS

The course includes 72 hours of teaching between lessons and tutorials/practice. In particular, they are divided into 40 hours of frontal lectures and 32 hours of tutorials/practice in the laboratory tutorials and in the computer lab. The topics of the course will be treated with the help of multimedia equipment. During the tutorials/practice hours students actively participate in laboratory experiments that aim to provide the basic genetic tools useful in the agro-food sector.

EVALUATION METHODS

Learning will be assessed, in the first part of the course, through periodical discussion of the theoretical concepts and, subsequently, with an oral examination at the end of the course organized in at least three questions by which the student must demonstrate knowledge of the theory and to be able to connect each other for a lesson topics. To pass the test students must acquire at least 18 points out of 30.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- VERONESI F. Genetica Agraria (IV edizione), Pàtron Editore
 - BARCACCIA G., FALCINELLI M. Genetica e genomica, Volumi I, II e III, Liguori Editore
 - Lecturer's note of the course and PDF files, reprints, ect.
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INTERACTION WITH STUDENTS

At the beginning of the course, after describing the objectives, program and test procedures, teacher collects the list of students accompanied by name and email.

The teacher receives generally on Monday and Friday from 9.00 to 11.00 in the teacher's study (SAFE 4th floor-3A412 room, Viale dell'Ateneo Lucano, Potenza) and she is available at all times for a contact with the students, through its e-mail or telephone, Skype, Whatsapp.

EXAMINATION SESSIONS (PREDICTED)¹

24/03/2017, 31/03/2017, 08/04/2017, 26/05/2017, 23/06/2017, 21/07/2017, 22/09/2017, 06/10/2017, 10/11/2017, 01/12/2017, 12/01/2018, 09/02/2018, 09/03/2018

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION

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