



COURSE DETAILS

"PLANT GENETICS"

SSD AGR/07

DEGREE PROGRAMME: VITICULTURE AND ENOLOGY

ACADEMIC YEAR 2021-2022

GENERAL INFORMATION – TEACHER REFERENCES

TEACHER: RICCARDO AVERSANO

PHONE: 081-2532124

EMAIL: RAVERSAN@UNINA.IT

GENERAL INFORMATION ABOUT THE COURSE

CHANNEL (IF APPLICABLE):

YEAR OF THE DEGREE PROGRAMME: I

SEMESTER: II

CFU: 9

REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE “ORDINAMENTO”)

PREREQUISITES (IF APPLICABLE)

LEARNING GOALS

The course aims to provide students with the basics of the flow of genetic information contained in DNA, the transmission of hereditary traits, and the variability of the traits observed in prokaryotes and eukaryotes, with particular reference to the grapevine.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The course aims to provide students with the knowledge and basic methodological tools necessary to understand the genetic and molecular basis of the transmission of heritable traits and their variability. These tools, together with the understanding of some biotechnological applications, will allow the student to critically recognize the potential of genetics in guaranteeing the quality, defence and sustainability of agricultural productions and grapevine in particular, in enhancing and protecting plant genetic resources, in use new technologies (e.g. genome editing) to produce improved grape varieties for direct human consumption or for wine production. The knowledge acquired during the course will also allow students to rework the notions acquired in more complex reflections related to the life, health and evolution of all living organisms.

Applying knowledge and understanding

The course aims to transmit the skills and the methodological/operational tools necessary to design genetic interventions and manipulations to improve agricultural productions and grapevine in particular from a qualitative and quantitative point of view and solve problems concerning environmental sustainability. The student must also demonstrate to apply the knowledge acquired to the sectors of human health and environmental protection.

COURSE CONTENT/SYLLABUS

1. Introduction to the course and description of the final exam.
2. Organization of the genetic material, chromosomes, mitosis, meiosis, 1CFU.
3. Mendelian genetics (Mendel's law, chromosomal theory of heredity, extensions of Mendel's laws, genic associations and genetic maps, multiple alleles, codominance, quantitative traits, cytoplasmic inheritance) – 3 CFU.
4. Molecular structure of nucleic acids and DNA replication (chemistry of nucleic acids, DNA and RNA structure, organization of nucleic acids, DNA replication) – 1 CFU.
5. Transcription, translation and genetic code (RNA synthesis, protein synthesis, genetic code, the gene, regulation of gene expression, gene structure and function, genic, chromosomal and genomic mutations) – 2 CFU.
6. Class and lab practical activities (microscopic observations, controlled pollinations, problems on Mendelian genetics, DNA extraction and amplification, analysis of DNA sequences) – 1 CFU.
7. Interdisciplinary seminars on selected topics held by Department teachers.

READINGS/BIBLIOGRAPHY

- Handouts and digital files provided during the course.
- Genetica agraria - genetica e biotecnologie applicate all'agricoltura. F. Lorenzetti, S. Ceccarelli, D. Rosellini, F. Veronesi, 2011 Patron ed.
- Genetica agraria. Busconi M. Consonni G. Porceddu A. Portis E. Rao R., 2016 Edises ed.

TEACHING METHODS

The teacher will use a) lectures for about 70% of the total hours, b) exercises to practically deepen theoretical aspects for 20% of the total hours c) seminars for 10% of the total hours. This breakdown is indicative and will be modulated according to the progression of the course and the number of attaining students.
Instrumentation adopted: multimedia supports, online material, specialized software.

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

Exam type	
written and oral	x
only written	
only oral	
project discussion	
other	

In case of a written exam, questions refer to:	Multiple choice answers	
	Open answers	x
	Numerical exercises	x

The written and oral tests are scheduled at the end of the course. The written test learning outcomes relate to the knowledge and interpretation of the Mendelian bases underlying the transmission of heritable traits. The oral exam learning outcomes relate to the knowledge and interpretation of the molecular bases underlying the expression and transmission of heritable traits as well as their connection with Mendelian laws.

b) Evaluation pattern:

Passing the written test is binding to access to the oral exam. The written test has a weight of about 30% on the final score; the oral exam has a weight of about 70% on the final score. The oral exam will be assessed based on the following indicators: completeness, clarity of presentation, ability to make connections. Further details are reported on the teacher's website.