



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	
ACADEMIC YEAR	
ANNO ACCADEMICO EROGAZIONE	
SUBJECT	
CODE	
SCIENTIFIC SECTOR(S)	
HEAD PROFESSOR(S)	MARTINELLI FEDERICO Ricercatore Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	
TERM (SEMESTER)	
ATTENDANCE	
EVALUATION	
TEACHER OFFICE HOURS	MARTINELLI FEDERICO Wednesday 14:00 - 17:00 Dipartimento di Scienze Agrarie Alimentari e Forestali Entrata Posteriore dell' Edificio - 2 piano - Ufficio del Prof. Martinelli

DOCENTE: Prof. FEDERICO MARTINELLI

PREREQUISITES	None.
LEARNING OUTCOMES	Acquisition of the basics of molecular genetics. Knowledge of the principles of inheritance of qualitative (Mendelian) and quantitative traits. Get the basics for understanding the methods for the genetic improvement of forest species through biotechnologies. Ability to define the basic principles of molecular, Mendelian and quantitative genetics. Understanding of the basic methodologies to perform biotechnology-based genetic improvement of forest species. Ability to expose, even to a nonexpert audience, the basics of agricultural genetics and innovative genetic improvement. Knowing how to identify the necessary tools for the protection and enhancement of biodiversity.
ASSESSMENT METHODS	The final exam will be an oral exam. The evaluation is expressed in grades up to thirty . The exam will be passed when the threshold of 18 will be reached . This will happen when the student will demonstrate knowledge and understanding of the topics at least in the general guidelines and has minimum application competencies in resolving concrete cases. The student have to exhibit capability of transmitting their knowledge to the examiner. Below this threshold, the examination is insufficient. The evaluation will be more positive if the student is able to interact with the examiner. The grades will correlate with his knowledge and capacity of application into the discipline.
EDUCATIONAL OBJECTIVES	The course is structured to provide only those essential bases of molecular, quantitative and mental genetics that will be applied in the second part of the course dealing with the biotechnological methodologies used in forest genetic improvement. The basic tools of modern biotechnology will be provided to teach the student on the currently available techniques for forest genetic improvement and environmental protection. The course provides practical laboratory experiences.
TEACHING METHODS	The course will consist of 21 frontal lectures. Classes will be held by projections of "slides" on the various topics. The course will include 9 hours of practical experience in a genetic laboratory. In the first part of the course, subjects will deal with molecular, mendelian and quantitative genetics. The second part of the course will deal with the use of innovative biotechnologies for the genetic improvement of forest species and for the improvement of environmental sustainability of agriculture.
SUGGESTED BIBLIOGRAPHY	Barcaccia, Falcinelli (2008) Genetica e Genomica (Vol I e III) - Liguori editore

SYLLABUS

Hrs	Frontal teaching
6	Introduction to the course. Mendelian principles and heredity (chromosome theory). Mendel's laws. The recombination of independent genes. Multiple alleles. Gene interactions and atypical segregation models: codominance and epistasis. Genetic associations.
6	Concepts of molecular genetics. Structure of nucleic acids (DNA and RNA). Central dogma of molecular biology. Mechanisms of gene regulation.
4	Heritability of quantitative traits. Characters with continuous distribution. The influence of environmental factors on quantitative traits. The variance composition. The heritability concepts and repeatability. Genetic mutations.
5	Genetic engineering. Restricting enzymes. Molecular biology techniques for forest genetic improvement. Genetic characterization using molecular markers. Genetic transformation. Forest biotechnology.
Hrs	Practice
5	Practical experience in a biotechnology laboratory. Analysis of gene expression by real time PCR.
4	Practical experience in a molecular genetic lab. Extraction, quantitative and qualitative analysis of nucleic acids.