



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	
ACADEMIC YEAR	
ANNO ACCADEMICO EROGAZIONE	
SUBJECT	
CODE	
SCIENTIFIC SECTOR(S)	
HEAD PROFESSOR(S)	MARRA FRANCESCO Professore Ordinario Univ. di PALERMO PAOLO
OTHER PROFESSOR(S)	
CREDITS	
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	
TERM (SEMESTER)	
ATTENDANCE	
EVALUATION	
TEACHER OFFICE HOURS	MARRA FRANCESCO PAOLO Monday 09:00 11:00 Sede polo decentrato di Caltanissetta Tuesday 09:00 13:00 Ed. 4 H PT-98 Thursday 09:00 13:00 Ed. 4 H PT-98

DOCENTE: Prof. FRANCESCO PAOLO MARRA

PREREQUISITES	Knowledge of Botany and General Agronomy and general horticulture are strongly suggested
LEARNING OUTCOMES	Knowledge and ability 'to understand The course aims to give at the students scientific and technical knowledge necessary to know the specificity of biotencologies applied to fruit tree nurseries. Students will acquire theoretical and practical knowledge in the field of propagation of the main fruit tree species and molecular biology techniques applied to fruit nursery. Making judgments be able to harmonize all production factors and suggest innovative solutions to facilitate the best outcome of plant production. Enable 'communicative: the student, once acquired the specific technical vocabulary and being in possession of fundamental knowledge about the processes of vegetative and reproductive biology, He can advise managers in the most' appropriate technical choices in order to the economic success of the plant production. Capacity 'Learning Is expressed in acquiring the ability to relate the different factors that go into determining the productive results in the sector of biotencologies applied to fruit tree nurseries, adapting the choices to changing socio-economic conditions of the market, the destination of the product taking into account the most recent technical innovations that can contribute to the achievement of production targets.
ASSESSMENT METHODS	The Assessment method will be the oral exam.The student will have to answer at least two / three questions, on all parts of the program, with reference to the topics discussed in the lectures, in exercises, the textbooks and teaching materials provided by the teacher. Final assessment aims to evaluate whether the student has knowledge and understanding of the topics, has acquired interpretative competence and independence of judgment in concrete cases. Sufficiency (18/30) will be reached when the student shows knowledge and understanding of Topics at least in general terms, and has minimal application expertise that can speak about biotechnology; It will also have presentation skills and argumentative as to allow the transmission of his knowledge to the examiner. Below this threshold, the examination will be insufficient. The more, however, the examinee with its argumentative and presentation skills can interact with the examiner, and the more his knowledge and application capabilities go into detail on the subject of discipline occurs, the more the assessment is positive until the degree of excellence (30/30 with honors). The assessment is carried out of thirty Compensatory tools and dispensatory measures will be guaranteed by the Disability and Neurodiversity Center - University of Palermo (Ce.N.Dis.) to students with disabilities and neurodiversity, based on specific needs and in implementation of current legislation.
EDUCATIONAL OBJECTIVES	The course is intended to provide a theoretical and practical knowledge of molecular biology and applications of in vitro technologies relevant to the woody plant species, such as in vitro mass propagation, production of virus free plants, cell and plant organ manipulation and plant genetic transformation. Laboratory activities will support the theoretical competence, in order to encourage the self-directed capacity of the student.
TEACHING METHODS	Lecture and field trip in commercial farms and experimental orchards
SUGGESTED BIBLIOGRAPHY	Plant propagation, principles and practices. Harmann and Kester's Hartmann; Kester; Davies, Jr.; Geneve. Biotecnologie delle colture frutticole. Sussidio didattico a cura di S. Sansavini e M. Pancaldi. Clueb Bologna Appunti delle Lezioni

SYLLABUS

Hrs	Frontal teaching
1	Introduction, objectives and description of the course
4	Seed Propagation: Seed Production Systems. Seed-Propagated Cultivars and Species. Seed quality, collection and conservation, Dormancy, Germination, Seedling Production Systems. Vegetative Propagation: Cuttings, factors affecting rooting. Grafting, Seedling and Clonal Rootstock Systems, Graft Incompatibility, Layering Clones, Mutations, Chimeras, Apomixis.
4	In vitro morphogenesis: organogenesis, somatic embryogenesis. Micropropagation: steps, objectives, methodologies, perspectives. Somaclonal variation
4	Molecular markers applied to nursery and fruit crop breeding. Fingerprinting. MAS
2	Elements of plant biotechnology and genetic engineering.
2	Regulatory aspects of nursery activity
Hrs	Practice
5	Technical visits to commercial nurseries
Hrs	Workshops
6	Culture Media preparation. Explant sterilization and culture. Micropropagation. Embryo rescue. Synthetic seed preparation. In vitro shoot-tip grafting. Somatic embryogenesis. In vivo plantlet acclimatization.

Hrs	Workshops
2	Nucleic acid extraction and manipulation techniques.