



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali
ACADEMIC YEAR	2016/2017
MASTER'S DEGREE (MSC)	FORESTRY AND AGRO-ENVIRONMENTAL SCIENCE AND TECHNOLOGY
SUBJECT	TREE ECO-PHYSIOLOGY
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50564-Discipline forestali ed ambientali
CODE	18462
SCIENTIFIC SECTOR(S)	AGR/03
HEAD PROFESSOR(S)	LO BIANCO RICCARDO Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	<p>LO BIANCO RICCARDO</p> <p>Monday 11:00 13:00 Dipartimento SAAF, edificio 4, ingresso H, studio 32. Ricevimento a distanza o in presenza su appuntamento via email.</p> <p>Wednesday 11:00 13:00 Dipartimento SAAF, edificio 4, ingresso H, studio 32. Ricevimento a distanza o in presenza su appuntamento via email.</p>

DOCENTE: Prof. RICCARDO LO BIANCO

PREREQUISITES	Knowledge of main plant biology and physiology concepts, including cell structure and tissue organization into plant organs. Basic knowledge of soil and aerial environment in which plants grow. Basic knowledge of physics, biophysics and plant biochemistry.
LEARNING OUTCOMES	Knowledge and comprehension: acquiring the scientific bases and instruments to study tree crop functioning for production of wood biomass and/or fruit. Ability to use the specific language. Applying knowledge and understanding: ability to evaluate the soil and climate adaptations and water and nutrient needs of tree crops. Ability to evaluate the different relationships among the components of a tree planting system and the possibilities of applying specific management techniques. Making judgments: ability to assess the effects of varying environmental conditions on tree growth and development. Communication skills: ability to use technical but simple language to interpret tree functioning in response to environmental inputs, highlighting the economic and environmental impact of cultivation practices. Learning skills: ability to connect and integrate all factors affecting tree functioning with main emphasis on genotype-environment interactions. Acquire updated information by reading scientific and technical publications. Ability to attend both scientific and industry-related seminars.
ASSESSMENT METHODS	<p>1) Two semi-structured written tests, a midterm and a final. Their structure includes: a) a comprehensive set of closed questions (matching and multiple choice); b) open questions that meet predetermined correction criteria. The test structure helps determine the score to be assigned to each question depending on the correct, incorrect or missing answer, at the time of its construction.</p> <p>2) An oral exam in addition (optional) or in place of the two written tests. In the first case, the examinees must answer specific questions on subjects for which they gave wrong answers during the written test and the exam is to improve the evaluation acquired with written tests. In the second case, the examinees must answer at least two / three questions posed orally, on all topics covered in class, with reference to the recommended text books. Final assessment aims to evaluate whether the student has knowledge and understanding of the topics, has acquired interpretative skills and independence of judgment in real cases. Evaluation is presented in scores out of 30 with a minimum score of 18 for passing, according to the following table:</p> <ul style="list-style-type: none"> - sufficient/basic knowledge and ability to connect, apply and analyze covered topics (score 18-21) - fair/intermediate knowledge and ability to connect, apply and analyze covered topics (score 22-25) - good/high knowledge and ability to connect, apply and analyze covered topics (score 26-28) - excellent/advanced knowledge and ability to connect, apply and analyze covered topics (score 29-30L)
EDUCATIONAL OBJECTIVES	The aim of the course is to provide knowledge on the functioning of woody plants and the genotype-environment interactions with main emphasis on the physiological mechanisms underlying these interactions, as well as on the ecological principles that govern the coexistence of various biological entities inside the arboretum. The acquisition of this knowledge ultimately aims at the implementation of specific choices and strategies during the design and management of tree plantings for obtaining environmentally and economically sustainable productions.
TEACHING METHODS	Lectures and exercises in class; instrument demonstrations in the field and in the laboratory; field demonstrations in the campus plots of the SAF department.
SUGGESTED BIBLIOGRAPHY	<p>Sansavini et al. 2012. Arboricoltura Generale. Patron Editore, Bologna</p> <p>Durner E. 2013. Principles of Horticultural Physiology. CABI</p> <p>Pallardy S. 2008. Physiology of Woody Plants. Elsevier</p> <p>Hopkins and Huner. 2009. Introduction to Plant Physiology. Wiley</p> <p>Lambers et al. 2008. Plant Physiological Ecology. Springer</p> <p>Reigosa Roger. 2001. Handbook of Plant Ecophysiology Techniques. Kluwer Academic Publishers</p>

SYLLABUS

Hrs	Frontal teaching
2	Lecturing and evaluation structure and presentation
8	Tree water relations: water uptake, lifting and transpiration
4	Light interception and utilization: intra- and inter-canopy light relations
6	Carbon cycle: photoassimilate production, translocation and partitioning. Source-sink relations.
2	Nitrogen cycle: availability and utilization
6	Mineral nutrition: role of macro- and micro-elements
8	tree metabolism, respiration and growth
8	Abiotic stress: effects of drought, salinity, temperature stress, photoinhibition and oxidative stress on tree growth

Hrs	Practice
6	Measuring water potential, osmotic potential and stomatal conductance
4	Measuring light, temperature, relative humidity and leaf gas exchange
2	Measuring trunk and fruit growth
Hrs	Others
2	Midterm exam: presentation, explanation and carrying out
2	Final exam: presentation, explanation and carrying out