COURSE Paesaggio, Ambiente e Verde Urbano (PAVU)

TEACHING ACTIVITY _TREE CULTIVATION AND ORCHERD SUSTAINABLE MANAGEMENT __

ACADEMIC YEAR: 2019-2020

TYOE OF TEACHING ACTIVITY: BASE

TEACHER: _Vitale NUZZO_

e-mail: vitale.nuzzo@unibas.it	Web site: http://docenti.unibas.it/site/home.html?
phone: **0835 351403**	Mobile phone: **+39 329 3606254**

TEACHING LANGUAGE: Italian

N° CFU	**6**	**N° ORE**	**56**
Of which		of which	
Lesson	4	Lesson	40
Execises	2	Exercises	16
Laboratory		Laboratory	

Offices: Matera – via Lanera, 20	**Department: DiCEM**

PERIOD: I semester

TEACHING AIMS AND LEARNING OUTCOMES

Aims of the course are to introduce students to the study of arboriculture, to cultivation and management of tree plants both in rural and urban environments, to orchard design within a reference territory indicating sustainable management solutions preliminary to environmental analysis and assessment processes.

The study will focus on: the morpho-anatomical structure and functions of the various plant organs (roots and root system, leaf, branches and foliage, conductive system and water and assimilated flows, etc.), the main physiological processes (photosynthesis, respiration, distribution of assimilates, endogenous and environmental regulation), the annual and ontogenetic cycle of the plant and orchard, organization and management of the orchard.

Students will learn the main methods of optimizing the use of environmental resources, including unconventional ones, and the interactions tree - orchard - natural resources.

Students will know the peculiarities of the cultivation of some tree species: olive trees, grapevine, stone fruits, citrus fruits, pome fruits).

Knowledge and understanding: Students who pass the Tree Cultivation and Sustainable Orchard Management exam will know and understand: (i) the scientific-methodological significance of classical arboriculture terminology; (ii) the morphology, anatomy, functions and organization levels of a fruit tree plant; (iii) reproductive biology (pollination, fertilization, sterility, fruit set), growth kinetics and fruit composition; (iv) the role of phytohormones and the endogenous and environmental mechanisms of regulation of some fundamental plant processes; (v) water and mineral absorption, primary metabolism and distribution of assimilated, water and mineral needs; (vi) the plant's response to stress factors (water or mineral deficiency; heat waves; radiative excesses); (vii) Organization of the orchard (forms of farming and pruning, reproductive biology of the species / variety); (viii) sustainable orchard management methods (processing, irrigation, fertilization) and reflections on orchard or land dynamics.

Ability to apply knowledge and understanding: Students will have to apply acquired knowledge also in contexts different from those specific to the fruit tree sector, deducing the fields of practical application, supporting their arguments and devising solutions with particular reference to the previously exposed topics.

The achievement of these competences will help to achieve some of the CdS learning outcomes reported in the A4.b.2 section of the SUA-PAVU form and in particular those relating to the basic knowledge and the principles of land management and the preparation of papers and project documentation;

Communication skills: the student must have the ability to communicate the competences clearly and completely, even to a non-expert public, write an internship report, prepare and present, also with the help of slides and electronic presentations, an original paper using appropriately the scientific language.

Learning skills: The student must be able to keep up to date continuously, by consulting texts and publications specific to the sector in order to formulate original experimental hypotheses as well as being able to acquire further knowledge from

supplementary courses, seminars, etc. specialist and Masters, etc.

BASIS

It is necessary to have acquired and assimilated the following knowledge provided by the courses followed in secondary schools or by zeroing courses organized in the University or other basic courses.

- elementary concepts of plant biology (plant cell);
- knowledge of the fundamental concepts of (mathematics, physics).

SYLLABUS

ORGANOGRAPHY - Parts of the plant: (i) under ground part: roots (root types and functions) and root system (density, turn-over, depth); (ii) above-ground part: stump, root sucker, pedal sucker, collar, trunk, and branch definition and hierarchy; (ii.i) one yar shoot, buds: vegetative, reproductive; apical, axillary, adventitious; wood, fruit, flower, mixed; dormant, ready, latent; main shoot and side shoots; vegetative bud, anticipated, sucking – one year shoot, vegetative spurs, vegetative dart; productive: mixed, flower; stone fruit: floriferous dart, sprig, mixed branch - pomaceous: spurs, sprig, bourses, mixed one year shoot; structures bourses, rooster legs. (ii.ii) flower: receptacle, petals, sepals, stigma, pistil, ovary, pollen, anther, stylus, inflorescence, pollination, fertilization, sterility, fruit set, types of fruit set, fruit types. (ii.iii) Leaf (stomata, photosynthesis, respiration, stomatal conductance, intrinsic water use efficiency) and leaf apparatus (LAI).

THE PHYTOHORMONS - The main phytohormones (endogenous and synthetic) will be presented also with reference to their influence on phenological, physiological and cultivation aspects .

BUDS DORMANCY - Definition - Para-dormancy, Endo-dormancy (deep and shallow), Eco-dormancy - Physiological aspects, hormonal balance, state of water, structure of membranes, anabolic potential - Chill requirements - Agents for dormancy removal - Method for calculating Chill requirement. Satisfaction of chill requirements and climate change.

ONTHOGENETC and ANNUAL CYCLE OF TREE PLANTS - Difference between stage and phase. Life cycle stages: youth, maturity, senescence - Youth, definition, duration, manifestations characterizing youth - Maturity stage - definition, characteristic manifestations of the stadium. Annual Cycle: shoot and fruit growth.

BASIS OF SOIL CARATERISTICS - Texture: sand, silt, clay; - aggregates - structure - organic substance - cation exchange capacity - bases of exchange; water in the soil (hydrological characteristics: maximum water capacity, field water capacity, withering point, available water, maximum reserve, useful reserve, hydraulic conductivity).

ORCHANIZATION OF THE ORCHARD: choice of the combination of grafting, orientation of the rows, distances of planting, reproductive biology and arrangement of the plants of self-compatible cultivars, self-sterile or with separate sexes, criteria for choosing the training system, pruning methods.

ELEMENTS OF SUSTAINABLE ORCHARD MANAGEMENT: calculation of water and mineral needs; Water and mineral balance and calculation of the irrigation volume and the quantity of mineral elements to be returned; irrigation and irrigation methods; fertilizer types and distribution methods. Efficiency indexes for the use of water and mineral resources.

ENVIRONMENTAL RESTRICTIONS TO VEGETATIVE AND REPRODUCTIVE GROWTH: water stress, heat waves, radiative excesses; methods of measurement of the water status of the plant, of gas exchange, of other environmental variables.

ASPECTS OF THE CULTIVATION OF SOME ARBOREIC SPECIES: the salient aspects of the cultivation of: olive, grapevine, drupaceous, citrus, pomaceous and kiwifruit will be addressed.

METODI DIDATTICI

The course includes 56 hours of teaching between lessons and classroom exercises. In particular, 40 hours of classroom lectures are scheduled and 16 hours of guided classroom exercises with the preparation of electronic presentations and papers written in the form of a report. Lectures or exercises can be attended by seminars held by experts in the field.

MODALITA' DI VERIFICA DELL'APPRENDIMENTO

The verification of the learning results will be carried out by oral examination at the end of the course.

During the test, which lasts about 30-45 minutes, the student must demonstrate to have acquired knowledge and learning skills on the topics proposed during the course program, to be able to apply this knowledge on concrete cases of interpretation of environmental data, physiological processes of plant, orchard management. The degree of independence of judgment and the ability to learn will be assessed on the basis of additional knowledge learned from sources other than those provided by the teacher. While the use of appropriate terminology and language properties will be taken into account to evaluate communication skills.

The final evaluation (exam grade): the mark will be expressed in thirtieths.

The exam will be evaluated positively starting from the vote of 18/30, awarded when the knowledge / skills of the subject are at least elementary, up to the grade of 30/30 with possible praise, as the knowledge is excellent.

MATERIALE DIDATTICO

The reference educational material consists of reference texts, supplemented with teaching material produced by the teacher.

The latter is provided on time through the e-learning platform of the University of Basilicata.

Texts:
Peano C., Sottile F., Principi di Arboricoltura. EDISES, pp. 274. ISBN 978-88-3319-037-2.
Sansavini S., Costa G., Gucci R., Inglese P., Ramina A., Xiloyannis C. Arboricoltura generale. Patron Editore, pp 532 ISBN: 978-88-5553-189-4.

Journals and web site links:
Frutticoltura
Terra e Vita (Edagricole),
L´Informatore Agrario., http://www.informatoreagrario.it/
http://listevarietali.imagelinenetwork.com/
http://www.fao.org/hortivar/index.jsp
http://www.agraria.it/isf/ Publ.htm
http://www.caf.wvu.edu/kearneysville/wvufarm7.html
http://www.ismea.it

Lecture notes provided by the teacher.

METODI E MODALITA' DI GESTIONE DEI RAPPORTI CON GLI STUDENTI

At the beginning of the course, after describing aims, program and verification methods, the teacher share teaching material with the students (website, etc.). At the same time, the list of students intending to enroll in the course is collected, complete with name, surname, registration number, e-mail and telephone number.
Relations with students will be managed through institutional e-mail and telephone

Office hours:

Day	Hour	Address
All day after appointment		Via Lanera, 20 Office A312

e-mail: vitale.nuzzo@unibas.it or personal e-mail: nuzzo.vitale@gmail.com

DATE OF EXAMINATION [1]
16/09/2019, 14/09/2019, 11/11/2019, 09/12/2019, 14/01/2020, 11/02/2020, 11/03/2020, 15/04/2020, 13/05/2020; 10/06/2020; 15/07/2020; 16/09/2020; 14/09/2020; 11/11/2020; 09/12/2020

SEMINARS: YES ☒ **NO** ☐

[1] Potrebbero subire variazioni: consultare la pagina web del docente o del Dipartimento/Scuola per eventuali aggiornamenti