SCUOLA DI SCIENZE AGRARIE, FORESTALI, ALIMENTARI ED AMBIENTALI

ACADEMIC YEAR: 2018-2019

COURSE: Cropping Systems Management

TYPE OF EDUCATIONAL ACTIVITY:
Course Characterizing of LT in Agricultural Technologies

Teacher: Michele Perniola

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Teaching linguage: Italiano

ECTS:	**n. hours**:	**Site**: Potenza **School**:SAFE **CdS**:	**Semester**:
5 lectures 1 practicals	40 hours lectures, 10 hours practicals	Course in Agriculture Technologies - University Cod. 0425 - L-25 Class– Agriculture and Forest Sciences and Technologies	I

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Content and knowledge:
The course, after giving the student the tasks of agronomy, will illustrate the factors of crop production and the structural and functional characteristics of agro-ecosystems. After explaining the eco-physiological bases contributing to plant production, the main cultivation techniques for farm management will be dealt with.
Based on the agroecosystem's operating mechanisms, the student will acquire the following:

- **applying knowledge and understanding skills**: soil-plant-atmosphere system; meteorological parameters of agrarian interest (solar radiation, temperature, hydrometeor, air humidity, wind) and their effects on crops; eco-physiological bases that regulate the growth and development of agricultural crops; management of the factors that determine l crop production (soil cultivation, irrigation, fertilization, crop systems, weed control, propagation of crops); influence of such management on the environment. Finally, after a brief description of the main widespread agro-ecosystems, we will analyze the interaction between the farm and the ecological, environmental and social context of the farm, by introducing the concept of multifunctionality of agricultural systems into an optic of environmentally and territorial sustainability and respect of the environment. The student must demonstrate that he is able to analyze factors influencing plant productions and knowing how to apply knowledge gained in different fields.
- **autonomy of judgment**: the student must be able to independently evaluate the most suitable agronomic strategies for obtaining quality crops and respect for the environment.
- **ability to communicate**: The student will need to develop the ability to easily and comprehensively understand acquired knowledge and skills in organizing them in a logical manner, using a correct language and using relevant math and graphical means.
- **Ability to learn**: Ability to access statistical data sources and to interpret and summarize the data. Ability to document on issues related to the sustainable management of crops.

PRE-REQUIREMENTS
Basic knowledges concerning botany.

SYLLABUS

Topics covered	n. ECTS lecture	n. ECTS practical	evaluation
- definition and tasks of agronomy .	0,1		Oral test
- the agroecosystems: factors, resources, processes, material flows, energy flows, energy balance	0,5	0,2	Oral test
- The fundamental biological processes of crop production Potential, achievable and actual productivity; Quantitative and qualitative response of crops and biota to the production factors.	0,4		Oral test
- climate and crops: Radiation, temperature, humidity, rain, wind, evapotranspiration. Their effects on crops. Climatic classifications, climatic zones and phenology.	0,6	0,1	Oral test
- Soil Natural and cultivated soil; soil profile Chemical soil characteristics: constitution, composition, pH, soil water solution, cationic and anionic exchange capacity, salinity and sodicity; Physical soil characteristics: texture, porosity and aggregate stability, tenacity, soil physical states; Organic matter and soil microbiological activity	0,4		Oral test
Crop management and resources use efficiency - Soil tillage aims and tillage classification, machineries and performance; new tillage proposal: minimum and zero tillage. -Excess water management waterlogging and its effect; flat land set-up, drainage. Water flow on hilly lands and erosion: hilly land set-up; erosion control.	0,6	0,1	Oral test
- Irrigation Hydrology: water potential, soil hydrological parameters, soil moisture	0,6	0,1	Oral test

and water potential measurements, soil water conductivity; soil water relations. Irrigation aims. Irrigation water requirements; crop response to water; irrigation variables; irrigation scheduling, seasonal and specific irrigation volumes. Irrigation methods (surface irrigation, furrow irrigation, rain irrigation, drip irrigation, sub-surface irrigation). Water quality Rain fed systems				
- Soil fertilization Mineral fertilization Physiology of plant nutrition and soil nutrient availability; Classification of mineral fertilizers; Macro and micro elements for crop nutrition; Yield response to fertilizers and computation of fertilizer dose; fertilization scheduling and soil application. Organic fertilization; soil organic matter balance and computation of organic fertilizer dose; Classification of organic fertilizer and their performance. Bad soil reclaim	0,4	0,2	Oral test	
- Cropping systems crop rotation; criteria for crop species choice; crop consociation.	0,5	0,3	Oral test	
- Sowing and crop planting plant density; seed quality; seed certification.	0,2		Oral test	
- Weed Control definition, crop completion and damage, weed control; chemical and organic weed control.	0,2		Oral test	
-Territorial Agronomy	0,5		Oral test	

Land use capailability, agronomic land use classification, environmental impact of agricultural activity				
ECTS total	5	1		

TEACHING METHODS

Lectures (40 h), laboratory and farm practices (10 h)

EVALUATION METHODS

Oral exam, consisting of questions based on theoretical knowledges and laboratory practices. To pass the exam the students have to achieve at least 18 points on 30.

TEXTBOOKS AND LECTURE MATERIAL

Luigi GIARDINI, L' Agronomia per conservare il futuro, Patron Editore.

Francesco BONCIARELLI, Agronomia, Bologna.

BONARI E. e P. CECCON – Verso un approccio integrato allo studio dei sistemi

colturali. Franco Angeli, 2002.

Slides projected during the lessons available on line on teacher web page.

INTERACTION WITH STUDENTS

During the first lesson, after describing the aims, contents and exam procedures, teaching materials will be provided on line on the teacher web page. Students may contact the teacher anytime by mobile phone or e-mail for any clarifications or to set an appointment in his office at SAFE, II floor. The teacher will meet the students on Monday and Tuesday, from 10.00 to 13.30.

EXAMINATION SESSIONS

online https://unibas.esse3.cineca.it/Home.do

Generally monthly except August.

EVALUATION COMITTEE

Michele PERNIOLA (president) Stella LOVELLI and Mariana AMATO (member)

SEMINARS BY EXTERNAL EXPERT: NO

OTHER INFORMATIONS:

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Curriculum prof. M. Perniola:

Michele Perniola is full professor at University of Basilicata and teaches Agronomy, Irrigation and water management and Microclimatology. From October 2014 he is Pro-Rector of University of Basilicata. He is editor of Italian Journal of Agronomy, President of Italian Group of Study on Irrigation, and Vice-President of International Council of Irrigation and Drainage. He has been Dean of Faculty of Agriculture and Director of School of Agriculture, Forest, Food and Environmental Science (SAFE) of University of Basilicata. He has a Master Degree in Agricultural Science, with the maximum score, University of Bari (1984). He started his scientific activity in 1986 as a researcher at the Department of Plant Production of University of Basilicata. In 1980 he won a one-year-scholarship at the Department of Agronomy and Range Science of Davis (California, USA). He has been working as a component and as a coordinator in many research project financed by Italian Government, Basilicata Region, European Community and private farms as well. His scientific activity is mainly related to the study of: Water relations in herbaceous crops; Ecophysiology of plant water stress; measurement and modelling of crop evapotranspiration; Irrigation scheduling and water use efficiency of herbaceous crops; Growth analysis in response to abiotic stress; Light interception and radiation use efficiency in relation to plant water status; Effect of soil- and irrigation water salinity on ecophysiological and agronomic behaviour of some herbaceous crops; Adoption of alternative biomass crop for energy production in the environment of South Italy; Influence of different cropping techniques (irrigation, sowing date, fertilization. etc.) on ecophysiological and agronomic behaviour of some oil-, industrial- and vegetable crops; Analysing environmental impact of different cropping systems with a particular irrigation and fertilization method. Sustainable intensification of crop production. His scientific activity is proved by more than 150 papers on national and international journal.