UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	AGROENGINEERING AND FORESTRY SCIENCES AND TECHNOLOGIES		
INTEGRATED COURSE	WATER RESOURCES MANAGEMENT AND SOIL DEFENCE		
CODE	21735		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/08		
HEAD PROFESSOR(S)	SERIO MARIA ANGELA	Ricercatore a tempo determinato	Univ. di PALERMO
OTHER PROFESSOR(S)	SERIO MARIA ANGELA	Ricercatore a tempo determinato	Univ. di PALERMO
	AUTOVINO DARIO	Ricercatore a tempo determinato	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**AUTOVINO DARIO**		
	Wednesday 11:00 13:00	Si riceve per appuntamento. Viale delle scienze Ed. 4, Ingresso - E, Piano - primo, Studio - 129	
	Thursday 11:00 13:00	Si riceve per appuntamento. Viale delle scienze Ed. 4, Ingresso - E, Piano - primo, Studio - 129	
	SERIO MARIA ANGELA		
	Thursday 10:00 13:00	Viale delle ScienzeEd.4 Ingresso EPiano terra	

DOCENTE: Prof.ssa MARIA ANGELA SERIO

PREREQUISITES	Knowing the principles of hydraulic (pressure pipes and open channels) and on farm irrigation systems.
LEARNING OUTCOMES	Ability to design small ponds according to the available water sources. Be able to evaluate the crop water needs. Ability to use the specific language of the discipline. Ability to apply the acquired knowledge and understanding in occupational contexts. Learning skills: Be able, with autonomy, to follow further studies related to the management of water sources and small distribution systems. Communication skills: Be able to explain the treated problems to experienced and not experienced audit. Be able to support the importance and highlight the environmental impacts of the proposed solutions. Be able to update the acquired knowledge by consulting scientific publications and thematic seminars. Ability to follow specialized seminars in the fields of water sources and water distribution systems.
ASSESSMENT METHODS	The exam consists of an oral test, with two or three questions on the treated topics and on the problems solved during the course, aimed to verify the disciplinary knowledge and the ability to use the specific language of the discipline. Evaluation is expressed in thirtieths. The minimum threshold mark will be reached by students who show limited knowledge and comprehension of the treated topics and minimal skills to solve the proposed problems. Students have also to demonstrate the ability to transmit their knowledge. Below this threshold, the exam is considered insufficient. On the other hand, the more the students are able to interact with the examiners and express in detail their knowledge and application skills, the more positive will be the final evaluation. The evaluation (minimum grade is 18 and maximum is 30 cum laude) is stated using the following scheme: 1) Knowledge of the topics, capability to apply the learned knowledge, capability to analyze the studied problem, and ability to present the topic are judged sufficient (18-21); 2) Knowledge of the topics, capability to apply the learned knowledge, capability to analyze the studied problem, and ability to present the topic is judged fair (22-25); 3) Knowledge of the topics, capability to apply the learned knowledge, capability to analyze the studied problem, and ability to present the topic is judged good-high (26-28); 4) Knowledge of the topics, capability to apply the learned knowledge, capability to analyze the studied problem, and ability to present the topic is judged highly advanced (29-30 cum laude).
TEACHING METHODS	Lecturers and practical training on design in the classroom. Technical visits.

MODULE
WATER RESOURCES MANAGEMENT

Prof. DARIO AUTOVINO

SUGGESTED BIBLIOGRAPHY

Pumo D. 2008. L'approvvigionamento idrico per l'agricoltura. Aracne Ed. ISBN 9788854817081
INEA. Apparecchiature idrauliche per impianti irrigui a pressione (https://www.yumpu.com/it/document/view/13653295/apparecchiature-idrauliche-per-impianti-irrigui-a-pressione-inea) .
Diapositive ed appunti relativi agli argomenti trattati a lezione.

AMBIT	50562-Discipline della difesa e del riassetto del territorio
INDIVIDUAL STUDY (Hrs)	88
COURSE ACTIVITY (Hrs)	62

EDUCATIONAL OBJECTIVES OF THE MODULE

Acquire professional skills in the field of land improvement and related to the management of water sources and annexed water distribution networks. After completing the course, the students should be able to design small ponds and the distribution networks, including the choice of the necessary components for the plants. Students should also be able to evaluate crop water needs.

SYLLABUS

Hrs	Frontal teaching
1	Introduction of the course. Content and scope. Description of final exam and evaluation criteria.
4	Water sources in Sicily. Irrigation Association and irrigation districts. Distribution networks with pipes and channels. Materials and tools for distibution networks.
18	Water sources for agriculture. Water ponds and dams. Evaluation of the annual outflow of small watersheds and determination of the maximum discharge. Design of ponds and annexed infrastructures. Use of groundwater.
12	Management of water sources at district and farm levels. Irrigation scheduling based on the control of soil and crop water status. Plant deficit indicators. Irrigation under regulated deficit conditions. Agro-hydrological models and application of FAO-56.
5	Design of pumping systems. Characteristic curves of a pump and operating point. Cavitation. Coupling of pumps in parallel or serial. Maximum suction height of a centrifugal pump. NPSH and operating condition without cavitation. Evaluation of the performance of a pumping system. Energy consumption. Introduction of water hammer and design of the air chambers.

Hrs	Practice
12	Design of a water pond for irrigation. Design of pumping systems and evaluation of energetic consumes. Design of a small irrigation network operating on turn or on demand.

Hrs	Others
10	According to the availability of funds, technical visits will be organized to view small water ponds and drainage facilities. If organization of the visits will not be possible, the corresponding hours will be additionally dedicated to additional lectures and practical training.

MODULE
AGRICULTURAL SOIL HYDRAULIC PROTECTION

Prof.ssa MARIA ANGELA SERIO

SUGGESTED BIBLIOGRAPHY

Bagarello V., Ferro V. (2006). Erosione e conservazione del suolo. McGraw-Hill, Milano, 539 pp., ISBN 88-386-6311-4.
Appunti delle lezioni.

Suggeriti per approfondimenti - Suggested for more details
Bagarello V., Iovino M. (2010) Conducibilità idraulica del suolo – Metodi di misura nelle applicazioni idrologiche. Ulrico Hoepli Editore S.p.A., Milano, ISBN 978-88-203-4411-5, 382 pp.
Angulo-Jaramillo R., Bagarello V., Iovino M., Lassabatere L. (2016) Infiltration Measurements for Soil Hydraulic Characterization. Springer International Publishing, Switzerland, ISBN 978-3-319-31786-1, 978-3-319-31788-5 (eBook), doi: 10.1007/978-3-319-31788-5, 386 pp.
Bagarello V., Iovino M. (2012) 5. Qualità Fisica del Suolo. In “Monitoraggio della qualità dei suoli e rischio di desertificazione”, a cura di V.Ferro e V.Bagarello, McGraw-Hill, Milano, ISBN 978-88-386-7326-9, 131-159.

AMBIT	50562-Discipline della difesa e del riassetto del territorio
INDIVIDUAL STUDY (Hrs)	43
COURSE ACTIVITY (Hrs)	32

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to allow the student to (i) interpret and mathematically simulate the soil erosion phenomena occurring at the plot and field scales, (ii) assess soil physical quality, and (ii) plan and realize soil conservation measures.

SYLLABUS

Hrs	Frontal teaching
1	Objectives and organization of the course
4	Soil water erosion processes. Soil loss and sediment yield
4	The Universal Soil Loss Equation (USLE). Rainfall, soil erodibility, topographic, crop cover and management, support practice factors
1	Soil loss tolerance
2	Alternative methods for predicting plot soil loss
1	Measurement of soil loss at the plot scale
6	Soil conservation practices. Prediction of the antierosive effects of soil conservation practices
2	Soil physical quality. Parameters of soil physical quality. Rapid methods for estimating the soil physical quality. Methods for improving soil physical quality
1	Soil water repellency. Fire effects on hydrological and erosion processes

Hrs	Practice
4	Applying the USLE for estimating plot soil loss
4	Predicting antierosive effects of different soil conservation measures at the plot scale
1	Field application of simple methods to determine soil physical quality and soil erosion
1	Assessment of soil physical quality for a case study