SCUOLA DI SCIENZE AGRARIE, FORESTALI, ALIMENTARI ED AMBIENTALI

ACADEMIC YEAR: 2018-2019

COURSE: Hydraulics and Agro-Irrigation System Design

TYPE OF EDUCATIONAL ACTIVITY: characteristic

TEACHER: Vincenzo COMEGNA

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Phone:	mobile:

Language: Italian

ECTS: 8 - 7 frontal lectures; - 1 practice.	n. of hours: -56 hours lectures. -16 hours practice.	Campus: Potenza School: SAFE Program: LM Agricultural Science	Semester: II

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Through basic notions in hydraulics and hydrology, the course aims to provide the necessary skills in the field of irrigation engineering. Particular attention is paid to enhance knowledge of hydrostatic and fluid dynamics, water flow in pipes, and in open channels. The necessary skills are also provided for making a proper choice of irrigation methods as well as the tools required for a correct design of field networks for surface, sprinkler and drip irrigation.

- **Knowledge and understanding**: the course provides the general principles of hydrodinamics, hydrology and irrigation. A Part of the course is focused on the understanding of the laws that regulates the water flow in pipes and in open channels. Furthermore during the practise unit the general tools for design of the hydraulic of surface, sprinkler and drip irrigation methods will be deeply explained.
- **Applying Knowledge and understanding**: at the end of the course the student will acquire the necessary skills for a rational approach to the different hydraulics of the examinated irrigation methods, as well as the ability for a proper use of the necessary tools required for a correct irrigation design and practice.
- **Making judgements**: ability to evaluate, select and apply the most appropriate procedures to solve irrigation enginnering problems at farm scale.
- **Communication skills**: ability to organize in a rational way the concepts developed during the whole course, using suitable mathematical and computer tools.
- **Learning skills**: ability to assemble and to classify in a functional manner the explained information, in order to be able to define the best design practices of irrigation networks.

PREREQUIREMENTS

- Mathematics and Physics

SYLLABUS

CFU-1

Introduction to hydrostatics, fluid characteristic, basic equation of hydrostatics, absolute and relative pressure, measurement of pressure, pressure diagram.

CFU-2

Introduction to hydrodynamics, current, velocity, flux, density flux definitions, principles, theorems and basic equations of hydrodynamics, loss equations, hydraulic gradient, pipe and channel design problems.

CFU-3

Introduction to hydrology, soil water balance, estimation of potential and effective evapotranspiration and measurements.

CFU-4

Introduction to soil hydrology, soil water status, important soil characteristics relevant to irrigation, water status in plants, water transfer from soil and the vegetation to the atmosphere.

CFU-5

Water resources, water quality, irrigation with waste and saline waters.

CFU-6

Farm water delivery systems, farm pumps, farm water distribution systems.

CFU-7

Evaluating irrigation systems and practice, irrigation water management, irrigation scheduling, hydraulic of surface irrigation, hydraulic of sprinkler irrigation, hydraulics of trickle irrigation.

CFU-8

Design and operation of gravity systems, design and operation of sprinkler systems, design and operation of trickle systems.

TEACHING METHODS

The course is divided into three teaching units: the first part is composed by lectures on hydraulics, the second is about irrigation engineering and the third teaching unit includes the necessary tools required for appropriate design of irrigation networks.

EVALUATION METHODS

Examination at the end of the course. Three questions will be drawn, and will be discussed the year-project carried out.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Tournon G. Le irrigazioni. Manuale di Ingegneria Civile-Cremonesi, vol I, 446-481.

Nebbia G. Dispense di Idraulica. Liguori Editore.

INTERACTIONS WITH STUDENTS:

-In the office at planned days/hours (usually on Wednesday)

-E-mail and telephone.

EXAMINATION SESSIONS (Forecast)

Usually the second Wednesday of every month (except August)

EVALUATION BOARD

Vincenzo Comegna

Antonio Coppola

SEMINARS BY EXTERNAL EXPERTS NO