COURSE: PRACTICE ON HYDRAULIC STRUCTURES DESIGN			
ACADEMIC YEAR: 2018/2019			
TYPE OF EDUCATIONAL ACTIVITY: Affine			
TEACHERS: Prof. GIUSEPPE OLIVETO [6 ECTS] and Prof. VITO TELESCA [3 ECTS]			
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Language: Italian/English			
ECTS: 9	n. of hours: 81 [48 hours of lessons and 33 hours of tutorials]	Campus: Potenza Dept./School: School of Engineering Program: Master's Degree in Civil Engineering	Semester: II

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The overall objective of this course is to familiarize students with criteria, methods, and models for design of complex hydraulic systems mainly using free public domain software extensively applied in hydraulic engineering. The main knowledge areas cover theoretical, methodological and practical aspects of numerical modelling of complex hydraulic systems like: (i) water pipe networks, (ii) stormwater and sewer pipe networks, (iii) stream and river networks, (iv) hydraulic structures like bridges, culverts, and weirs and (v) hydraulic works to control or mitigate river floods like inline-gates and levees. At the end of the course and when the exam has been passed, the student shall be able to identify, independently, and argue, clearly and technically, the main parameters that control many complex hydraulic systems; s/he shall also be able to apply suitable numerical models to design significant hydraulic structures. The main abilities the student will acquire consist of planning, designing, and controlling the following hydraulic systems: (i) hydraulic systems for water-flow storage and distribution, (ii) stormwater and sewage systems, (iii) hydraulic structures like bridges, culvert and weirs, and (iv) hydraulic systems to control or mitigate river floods.

PRE-REQUIREMENTS

Course prerequisites include: Fluid Mechanics, Hydraulic Structures I, and Hydraulic Structures II. Students should be familiar with fundamental aspects of: (i) water distribution piping systems; (ii) hydrology of river basins and catchment areas; (iii) open-channel hydraulics; and (iv) man-made hydraulic works in rivers.

SYLLABUS

The structure of the course is in four facets, and each consists of detailed design of hydraulic structures or systems by applying 1D and/or 2D numerical models. **Part A** [9 hours of lessons + 6 hours of tutorials]: Using the free public domain software EPANET, this part of the course deals with hydraulic modeling of real water distribution piping systems; **Part B** [9 hours of lessons + 6 hours of tutorials]: Using the free public domain software HEC-HMS this part of the course deals with simulation of the complete hydrologic processes of dendritic watershed systems; **Part C** [9 hours of lessons + 6 hours of tutorials]: Using the free public domain software EPA-SWMM this part of the course deals with simulation of runoff quantity and quality from primarily urban areas; and **Part D** [21 hours of lessons + 15 hours of tutorials]: Using the free public domain software HEC-RAS (1D model) and CCHE2D (2D model), this part of the course deals with the hydrologic and hydraulic modeling of real open channel networks and with the study and design of hydraulic works in rivers as well.

TEACHING METHODS

The course is concerned with lectures and a suite of practical applications for a total of 81 hours. In particular, it consists of 48 hours of theoretical lessons and 33 hours of classroom tutorials.

EVALUATION METHODS

The evaluation method consists of an oral examination based on the topics covered in the course. The examination aims to evaluate the degree to which student learning outcomes meet the educational goals of the course with particular attention to the student's skill in designing and modelling hydraulic structures in urban and fluvial

environments. The oral examination will last approximately 1 hour. The maximum grade is 30, the lowest is 18 out of 30. Brilliant exams are graded as 30 “cum laude”.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

(1) EPANET 2, United States Environmental Agency, Cincinnati, OH, USA; **(2)** SWMM, Storm Water Management Model, United States Environmental Agency, Cincinnati, OH, USA; **(3)** HEC-HMS Hydrologic Modeling System, US Army Corps of Engineers, Hydrologic Engineering Center, Davis, CA, USA; **(4)** HEC-RAS River Analysis System, US Army Corps of Engineers, Hydrologic Engineering Center, Davis, CA, USA; **(5)** CCHE2D, National Center for Computational Hydroscience and Engineering, School of Engineering, The University of Mississippi, MS, USA.

INTERACTION WITH STUDENTS

After describing educational goals, syllabus, teaching and evaluation methods, textbooks and on-line educational materials will be made available to the students at the beginning of the course. A students class list containing: student IDs, name, surname, and e-mail address will be set concurrently.

Professor’s office hours are as follows: Tuesday 3:00 P.M. – 5:00 P.M. and Friday 9:00 A.M. – 11:00 A.M. at *Macchia Romana* Campus – Engineering Building (on the 5th Floor, room #6). However, students can contact the professor via email at any hour of the day.

EXAMINATION SESSIONS (FORECAST)[1]

17/07/2019, 24/07/2019, 12/09/2019, 17/10/2019, 12/11/2019, 10/12/2019, 13/02/2020, 16/04/2020, 11/06/2020

SEMINARS BY EXTERNAL EXPERTS YES × NO □

FURTHER INFORMATION

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.