



COURSE: Environmental Hydrology			
ACADEMIC YEAR: 2018-2019			
TYPE OF EDUCATIONAL ACTIVITY: Characterizing (9 ECTS)			
TEACHER: Prof. Vito Telesca			
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phone: +39 (0)971 205149			
Language: Italian and English			
ECTS: 9	n. of hours: 81	Campus: Potenza School of Engineering Program: Master's Degree in Environmental Engineering	Semester: II

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The overall objective of this course is to familiarize students with criteria and methods to understand hydrological dynamics and to apply hydrological modelling at local, regional and global scales. The main knowledge areas cover theoretical, methodological and practical aspects of hydrological modelling.

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 procedures and techniques regarding to flood risk evaluation, even in condition of climate change.

EDUCATIONAL GOALS: The module aims to provide the basic knowledge regarding the notions of probability and statistics and how these can be applied to the hydrological data. In particular, starting from the role probability has in science and engineering, the course proceeds to outline the concepts of processes, variables, series, sample, and population, followed by a brief comment on the quality of data, as applied to hydrologic phenomena. Furthermore, standard modelling approaches and classifications, system concept for watershed modelling, overall description of different hydrologic processes, modelling of rainfall, runoff process, subsurface flows and groundwater flow, are described.

EXPECTED LEARNING OUTCOMES: At the end of the course the student will have demonstrated to know the topics of statistics, descriptive, exploratory and inferential, and will have acquired the ability to analyse them. The student will acquire the knowledge of how to concretely design statistical models applied to hydrological processes. Furthermore, the student shall be able to identify the main procedures and techniques regarding to hydrological modelling, even in condition of climate change.

knowledge and understanding: using the acquired statistical tools and the knowledge on hydrological phenomena, the student will be able to analyze experimental data and design hydrological models for flood risk evaluation.

making judgements: The student will be able, by collecting the data he will have learned to recognize as necessary and significant, to evaluate the performance of hydrological processes and to independently identify the appropriate improvement activities.

communication skills: The student will acquire the necessary tools to express, communicate and support conversations on the topics concerning the subject of the course and to propose solutions to specific problems.

learning skills: The student will have learned to use the tools of statistics to integrate them into the design of



hydrological models related to the analysis of flood phenomena. He will therefore be able, in full autonomy, to address and investigate the aforementioned topics and to develop appropriate solutions.

PRE-REQUIREMENTS

Course prerequisites include: knowledge of differential and integral calculus

SYLLABUS

- o statistical hydrology (20 hours)
 - o hydrological cycle at global, regional and local scales, hydrological and energy balance (5 hours)
 - o hydrological losses models and soil-vegetation-atmosphere transfer (25 hours)
 - o precipitation-runoff models at local and regional scale, flood risk evaluation (15 hours)
 - o hydrological extremes: precipitation and temperature (11 hours)
 - o climate change and hydrological modelling, global climate change models, regional climate models, statistical downscaling models (5 hours)
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TEACHING METHODS

The course is concerned with lectures and a suite of practical applications for a total of 81 hours. Students will perform numerical exercises in the classroom. These exercises will be collected in a project work to be submitted during the exam.

EVALUATION METHODS

The evaluation method consists of an oral examination based on the topics covered in the course and a discussion of the project work. 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 flood risk evaluation by hydrological models, even in condition of climate change. 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

- U. Maione, Le piene fluviali, La Goliardica Pavese
- On-line course notes (cloud)
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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 student class list containing: student ID, name, surname, and e-mail address will be set concurrently.

Professor's office hours are as follows: Tuesday from 10:00 AM to 12:00 AM. and Thursday from 10:00 AM to 12:00 AM at Macchia Romana Campus – School of Engineering (on the 5th Floor – professor's room). However, students can contact the professor at the end of each lesson.

EXAMINATION SESSIONS (FORECAST)¹

June 27, 2019; July 18, 2019; September 19, 2019; October 17, 2019; November 14, 2019; December 12, 2019; January 16, 2020; February 13, 2020; March 12, 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.



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