



DESIGN OF STRUCTURES FOR HYDRAULIC RISK MITIGATION

Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	ICAR/02 (MARITIME HYDRAULIC CONSTRUCTION AND HYDROLOGY)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	CIVIL ENGINEERING
Curriculum	Idraulico
Year of study	2°
Period	2nd semester (07/03/2022 - 17/06/2022)
ECTS	6
Lesson hours	45 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	BARBERO GIUSEPPE - 6 ECTS
Prerequisites	Principles of Hydrology. Rainfall and depth-duration curves. Hydrological losses. Rainfall-runoff models. Elements of statistics applied to hydrology. Probability distributions. Statistical Regression Analysis. Statistical Tests. Open channel flow. Normal flow and steady flow. Steady flow profiles computation. Hydrodynamic force on a plane surface. Shear stresses. Hydraulic erosion
Learning outcomes	The course aims to develop the design of some hydraulic works on natural water for flooding and river erosion control. The course gives some basic elements about hydrology and applied hydraulics. A river structures design for streams, rivers and canals will be developed by the students (also in groups). It will therefore be the task of the students to determine all the technical elements that contribute to the design of the

	<p>works: hydrological analysis, hydraulic analysis, graphic representation of the works, etc.</p> <p>The course will also provide some elements of the main national and regional regulations that deal with the aspects related to the defense of the soil and to the mitigation of the hydraulic risk.</p>
Course contents	<p>General: overview of the problems of flooding and risk mitigation structures.</p> <p>Geometric representation of basins and watercourses: cartography, characteristic representations of basins.</p> <p>Elements of hydrology: processing of precipitation measurements: depth duration frequency curves, design hyetograph, etc.; hydrological losses, hydrological flood models, flow measurements, basic hydrograms and full hydrograms.</p> <p>Elements of hydraulics: steady state flow (uniform and permanent) in natural watercourses, weirs, drop structures, erosion downstream of drop structures, etc.</p> <p>Small mountain rivers. Transversal structures for the stabilization of mountain streams: check dams and drop structures; longitudinal structures for bank erosion protection: riprap, gabions, geogrids, geonets, naturalistic techniques, spur dykes, etc.. Notes about fishways design.</p> <p>Structures for flood mitigation risk. Levees, structures of banks reinforced (green coverings, cliffs, geogrids, geonets, etc.). Flood control: retention basin or stormwater management pond, detention basin, etc.</p> <p>Examination of the main European, national and regional regulations concerning the hydraulic defense of the territories: regulatory framework relating to the works and to risk planning.</p> <p>Development of the design of the hydraulic works: application to a real case.</p>
Teaching methods	<p>Frontal lessons (hours/years): 21</p> <p>Exercises (hours/years): 40</p> <p>Practical activities (hours/years): 0</p>
Recommended or required readings	<p>Da Deppo, Datei, Salandin "SISTEMAZIONE DEI CORSI D'ACQUA", Ed. Libreria Cortina - Padova</p> <p>Ferro, Dalla Fontana, Pagliara, Puglisi, Scotton, "OPERE DI SISTEMAZIONE IDRAULICO-FORESTALE A BASSO IMPATTO AMBIENTALE", McGraw-Hill</p>
Assessment methods	<p>The course final exam consists of an oral test and a discussion about the developed design</p>
Further information	
Sustainable development goals - Agenda 2030	<p>\$ibl legenda sviluppo sostenibile</p>