UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

FLOOD PROPAGATION

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 FOR MITIGATION OF RISK FROM NATURAL HAZARDS
Curriculum	Hydrogeological risk assessment and mitigation
Year of study	2°
Period	(20/09/2021 - 13/10/2021)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	PETACCIA GABRIELLA (titolare) - 6 ECTS
Prerequisites	The Course of deals with theoretical and application matters chiefly referred to the Teaching Fields of : Hydraulic and Fluid Mechanics .It is useful for the students a preliminary frequency of the teaching Matters above mentioned, for an easier understanding of the object of the Course
Learning outcomes	Give the concepts necessary to use one and two dimensional unsteady flood propagtion models. The last part of the course is dedicated to the use of ORSADEM software
Course contents	Introduction: steady and unsteady flow, uniform and varied flow, pipe flow vs open channel flow De Sant Venant equations (1d), divergent and non divergent form,

	supplementary terms and coefficients Initial and boundary conditions Discontinuous solutions: Bores Simple wave, Dam break waves Italian Regulations on Dam safety Simplified channel flow equations Numerical solution of the unsteady flow equations (method of characteristics, explicit and implicit finite differences methods, numerical integration schemes: predictor corrector, flux splitting, upwind and downwind; accuracy of the numerical method, stability analysis Shallow water equations (2D) Mesh generation (structured/non structured) Simulation of flow in natural streams (1d vs 2D models, topological and hydraulic discretization, some computational problems in rivers and floodplains, flooded area mapping techniques) Models calibration and data needs Flood wave propagation through hydraulic singularities Introduction to the use of ORSADEM code Case study: analysis of Sella Zerbino dam break (Italy)
Teaching methods	Oral and practical lessons
Reccomended or required readings	V.T. Chow 1959 Open Channel Hydraulics Mac Graw Hill Book , New York J.A. Cunge, F.M. Holly, & A.Vervey, Practical aspects of Computational River Hydraulics. 1980. Pitman Publ. Inc, London K. Mahmood , V.Yevjevich 1975. Unsteady flow in open channel, Water Resources publications, Colorado, 1975. H. Chanson 2004 The Hydraulics of Open Channel Flow: An

	Introduction, Second Edition, Elsevier Oxford T.W. Sturm. 2001. Open Channel Hydraulics, Mc Graw Hill, Singapore ORSADEM reference manual Slides of the course (see Kiro: http://kiro2014.unipv.it/idcd/)
Assessment methods	Modalità di verifica dell'apprendimento MOD_VER_APPR 8000 Sì L’apprendimento viene verificato mediante esame orale finalizzato all'accertamento del conseguimento degli obiettivi formativi dell’insegnamento. Oggetto dell’esame sono i contenuti dei testi di riferimento, i contenuti delle lezioni frontali e delle lezioni svolte in laboratorio informatico. The final exam is Oral and is aimed at ascertaining the achievement of the educational objectives of teaching. The subject of the examination are the contents of the reference texts, the contents of the lectures and the lessons carried out in the computer lab.
Further information	-
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile