



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2020/2021
BACHELOR'S DEGREE (BSC)	ENVIRONMENTAL ENGINEERING
SUBJECT	HYDRAULICS
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50277-Ingegneria civile
CODE	03769
SCIENTIFIC SECTOR(S)	ICAR/01
HEAD PROFESSOR(S)	TERMINI DONATELLA Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	144
COURSE ACTIVITY (Hrs)	81
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	TERMINI DONATELLA Monday 11:00 13:00 Stanza propria Tuesday 09:00 13:00 Stanza propria Wednesday 09:00 13:00 Stanza propria Thursday 09:00 13:00 Stanza propria Friday 11:00 13:00 Stanza propria

DOCENTE: Prof.ssa DONATELLA TERMINI

PREREQUISITES	Integral and differential calculus - Kinematics and Dynamics
LEARNING OUTCOMES	Knowledge and understanding skills. The student will obtain the basic skills to understand and analyze the more relevant hydraulic phenomena in the civil and environmental engineering. Skills to apply knowledge and understanding Main objective of the course is to provide the students with the necessary tools for solving basic problems in hydraulic engineering and, specifically, those related to the steady flow of incompressible fluids in pipelines and cylindrical riverbeds. Making judgments The variety of the problems discussed during the course requires that the student, rather than the mere ability to apply methodologies, achieves the ability to combine the solution of specific methodologies independently of each addressed problem. Communication skills During the exercises in the classroom and in the lab, the student will be invited to discuss the used procedures and methodologies, thus acquiring the ability to explain the meaning of their work. Such capacity will be directly evaluated in the final exam. Learning skills The provided knowledge will allow the students to analyze and study basic hydraulic engineering problems (other than those covered in the course), thus acquiring the ability to further deepen their expertise throughout their subsequent professional or university experience.
ASSESSMENT METHODS	Written and oral test. The written test consists of three exercises, to be solved on the computer on the topics: fluid hydrostatic ; pipe flows; channel flows. The oral examination consists of the discussion of the written test and of the basic principles of fluid mechanics. The final assessment takes into account equally the result of the written and oral tests and is based on the following requisites: a) knowledge and presentation skills of the fundamental principles; b) ability to apply the principles to practical problems ; c) skills in solving new problems. The examination is passed if the student meets the requirement a) and, at least for simple problems, the requirement b). The requirement c) is a necessary condition to obtain an excellent rating (28 and up). The score is given in thirtieths.
EDUCATIONAL OBJECTIVES	The main objective of the course is to provide the basic skills of the Fluid Mechanics required to address simple hydraulic problems considering both the steady-state and the flow currents (with reference to confined pipe flows and free-surface channels). The achieved skills are also relevant for the applications of weakly compressible and incompressible flow problems in the following courses.
TEACHING METHODS	Lectures and exercises
SUGGESTED BIBLIOGRAPHY	Curto – Napoli. Idraulica Vol 1 (2005). Editrice BIOS Dispense a cura del docente

SYLLABUS

Hrs	Frontal teaching
2	Incompressible fluid physical properties
5	Momentum and continuity equations
3	Bernoulli theorem and applications
4	Fluid hydrostatics
6	Laminar and turbulent regimes
8	Steady pipe flow
4	Pumping station
10	Steady channel flows
Hrs	Practice
6	Exercises on fluid hydrostatics
3	Exercises of ideal fluids
12	Exercises on pipe flows
3	Exercises on pumping stations
9	Exercises on channel flows

Hrs	Practice
3	Exercises on groundwater flows