



WATER AND WASTEWATER TREATMENT PLANTS PROJECT

Enrollment year	2019/2020
Academic year	2020/2021
Regulations	DM270
Academic discipline	ICAR/03 (ENVIRONMENTAL AND HEALTH ENGINEERING)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	CIVIL ENGINEERING
Curriculum	Idraulico
Year of study	2°
Period	2nd semester (08/03/2021 - 14/06/2021)
ECTS	6
Lesson hours	56 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	COLLIVIGNARELLI MARIA CRISTINA (titolare) - 6 ECTS
Prerequisites	Chemistry. Fundamentals Of Sanitary-Environmental Engineering
Learning outcomes	At the end of the course students will have acquired the knowledge related to main technologies and fields of application for: wastewater treatment, drinking water treatment, recovery/disposal of solid waste; students will also be able to perform the design of these plants (wastewater and drinking water treatment plants, waste treatment plants).
Course contents	WASTEWATER TREATMENT Characteristics of wastewater. Pre-treatment of urban wastewater (screening, grit and oil removal, ...). Primary settling (technologies and design criteria). Biological treatments: conventional activated sludge process (hydrodynamic models and management issues). Treatments for nutrient removal (plant schemes and fields of

	application). Secondary settling (sedimentation theory and design criteria). Effluent disinfection (design and choosing). Start-up procedures for activated sludge processes. Preparation of ad hoc monitoring protocols and management data processing criteria. Treatment of sewage sludge (technologies and design criteria). Regulation and legislation. Laboratory tests: Sludge Volume Index (SVI), respirometric tests, foaming tests, ... Technical tour to a wastewater treatment plant. DRINKING WATER TREATMENT Overview on drinking water. Drinking water treatments: conventional processes. Plant schemes for the treatment of groundwater and surface water. Design of drinking water treatment plant. Laboratory tests: jar tests, Freundlich adsorption isotherm, . MUNICIPAL WASTE TREATMENT Regulatory aspects in solid waste classification and management. Conventional and separate collection of municipal solid waste. Solid waste incineration (kilns, gaseous emission characteristics, gas cleaning technologies). Sanitary landfill (classification, design and management criteria). Design of a mass burning kiln for municipal solid waste incineration. Landfill design.
Teaching methods	Lectures (hours/year in lecture theatre): 40 Practical class (hours/year in lecture theatre): 8 Practicals / Workshops (hours/year in lecture theatre): 5
Reccomended or required readings	A copy of the course slides will be distributed. Collivignarelli Carlo, Bertanza Giorgio. Ingegneria Sanitaria-Ambientale. Città Studi Edizioni. Collivignarelli Carlo, Sorlini Sabrina. Potabilizzazione delle acque - Processi e tecnologie. Dario Flaccovio Editore.
Assessment methods	The exam consists of a written test and an oral exam. The students have to pass the written test with 18/30 at least, and then they will take the oral exam.
Further information	Experimental theses are available on the topics explained in the course. For further information, please contact the Professor via email.
Sustainable development goals - Agenda 2030	<u>\$lbl_legenda_sviluppo_sostenibile</u>