



WATER AND WASTEWATER TREATMENT PLANTS PROJECT

Enrollment year	2018/2019
Academic year	2020/2021
Regulations	DM270
Academic discipline	ICAR/03 (ENVIRONMENTAL AND HEALTH ENGINEERING)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	CIVIL AND ENVIRONMENTAL ENGINEERING
Curriculum	Ingegneria per l'ambiente e il territorio
Year of study	3°
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	<p>WASTEWATER TREATMENT</p> <p>Characteristics of wastewater.</p> <p>Pre-treatment of urban wastewater (screening, grit and oil removal, ...).</p> <p>Primary settling (technologies and design criteria).</p> <p>Biological treatments: conventional activated sludge process (hydrodynamic models and management issues).</p> <p>Treatments for nutrient removal (plant schemes and fields of</p>

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