

<b>Title</b> <b>Ingegneria sanitaria ambientale I</b> <b>MODULO</b> <b>Environmental and Sanitary</b> <b>Engineering I</b>	<b>Degree</b> <b>Corso di Laurea Magistrale in Ingegneria</b> <b>per l'Ambiente e l'Energia (DM 270/04)</b>	<b>Year</b> <b>1</b>	<b>Teaching</b> <b>Period</b> <b>2</b>	<b>Credits</b> <b>6</b>
Teacher: <b>Daniele Goi</b>		Academic year: <b>2012/2013</b>		

**Objectives:**

The module introduces fundamentals of water and wastewater engineering. Pollution and treatment technology of water and wastewater are the main topics. Problems of characterization and treatment of water and wastewater are discussed.

**Acquired skills:**

- Capability to evaluate technical-practical problems concerning water and wastewater
- Assess best technology to use in water pollution situations
- Preliminary design of conventional water and wastewater treatment plants
- To be familiar with the most important problems of water pollution
- To know main technologies in water treatment
- To know main technologies in wastewater treatment

<b>Lectures and exercises</b>		<b>hours</b>
<b>Topics</b>	<b>Specific contents</b>	
Environmental and water quality assessment	Normative aspects, environmental quality standards, Environmental Management, European and Italian basic environmental laws.	4
Drinking water I	Drinking water classification, origin and general features. Chemical, physical and microbiological characterization.	8
Drinking water II	Traditional and new drinking water treatments: chlorine, ozone and UV rays use in disinfection. Activated carbon technology, softening.	10
Wastewater I	Wastewater characterization, parameters and measures.	6
Wastewater II	Physical treatment: screening, equalization, aeration, mixing, settling.	8
Wastewater III	Chemical treatment: coagulation, flocculation, N and P chemical removal.	8
Wastewater IV	Biological treatment: aerobic systems, activated sludge technology, respirometry, trickling filters, biological rotating systems, anaerobic technology.	10
Sludge treatment	Stabilisation concepts, main sludge treatment technologies, sludge digestion.	6
<b>Total hours for lectures and exercises</b>		<b>60</b>
<b>for exercises only</b>		<b>20</b>
<b>Further educational activities</b>		<b>hours</b>
Labs		
Tutorials / Seminars		
Workshops		
Guided tours		
<b>Total hours for further educational activities</b>		<b>0</b>
<b>Total hours</b>		<b>60</b>

**Type of exam:** Oral

**References:**

- D. Goi INTRODUZIONE ALLA INGEGNERIA SANITARIA-AMBIENTALE, Hypertext - internal publication <http://www.mp-progetti.it/learning/ingsanitaria/start/login.php>.
- G. Tchobanoglous, E.D. Schroeder, WATER QUALITY, Addison-Wesley Publishing Company.
- P. Sirini INGEGNERIA SANITARIA-AMBIENTALE. Principi, teorie e metodi di rappresentazione McGraw-Hill, Milano.