COURSE: Planning and management of wastewater treatment plants			
ACADEMIC YEAR:			
TYPE OF EDUCATIONAL ACTIVITY: Characteristic			
PROFESSOR: Ignazio M. Mancini and Salvatore Masi			
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phone: +39 0971 205155 (prof. Masi)		mobile (optional): +39 329 3178372 (Prof. Mancini), +39 329 3178377 (Prof. Masi)	
Language: Italian			
ECTS: (lessons e tutorials/practice) 9	n. of hours: (lessons e tutorials/practice) 90	Campus: Potenza School of Engineering Program: Master Degree in Environmental Engineering	Semester: I

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course focuses on the water and wastewater cycles, giving attention to the methodologies for planning and management of wastewater treatment plants (WWTPs). The main aim is to evaluate the potential environmental impacts of wastewater treatment, thus identifying the suitable plant configuration for each site specific situation.

The main items will be:

- Basic concepts of the environmental regulation about water cycle and wastewater treatment;
- Description of the biological and chemical-physical units for wastewater and sludge treatment;
- Criteria for the optimization of the integrated systems for a sustainable wastewater cycle;
- Biochemical processes during wastewater treatment;

The main skills will be:

- Analyze the site specific wastewater cycle;
- Identify the operational parameters influencing the wastewater treatment processes;
- Evaluate the technical and economic feasibility of WWTPs, giving attention to the available technologies for water and sludge treatment;
- Evaluate the Environmental and Sanitary Risks linked to the WWTP management.

PRE-REQUIREMENTS

In order to attend this course, the basic concepts of Chemistry and Sanitary-Environmental Engineering have to be well known (e.g. elements of organic and inorganic chemistry, biological processes, material properties, etc.)

SYLLABUS

Wastewater characterization, sewage design, WWTP configurations.

Methodologies for wastewater treatment, available plant configurations.

Primary treatment: pretreatment units (e.g. grit chamber) and primary settler.

Biological compartment: biological processes (oxidation tank and membrane technologies-MBR), biological nitrogen removal processes (i.e. nitrification and denitrification), phosphorus removal processes (both chemical and biological techniques).

Tertiary treatment: disinfection, filtration, activated carbon, ozonization.

Natural treatment processes: wetlands, phytotreatment.

Sludge treatment: thickening, dewatering, digestion, disposal.

WWTP planning: units design, economic and technical feasibility, energy footprint and carbon footprint evaluation.

TEACHING METHODS

90 hours for theoretical lessons and exercises. About 15 hours for technical visits in full-scale treatment plants.

EVALUATION METHODS

Oral examination:

- Environmental regulation about wastewater treatment, wastewater and sludge characterization, available technologies for wastewater treatment;
- Criteria for WWTP designing;
- Operation costs for energy consumption, chemicals, plant management.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Metcalf & Eddy. Wastewater Engineering Treatment and Reuse. McGraw-Hill.
- Luca Bonomo. Trattamenti delle acque reflue. McGraw-Hill
- Professor handbook.

INTERACTION WITH STUDENTS

- Firstly, the course aims, syllabus, and evaluation methods will be defined. Secondly, the professor's handbook will be provided by means of dropbox folders. Simultaneously, a student list will be done, including first name, last name, student ID, e-mail.
- Professor's office hours: Monday from 9.30 a.m. to 10.30 a.m.
- If there is the need to more explanations about the items argued during the course, further office hours could be defined subsequently.

EXAMINATION SESSIONS (FORECAST)[1]

Only an exam session for month will be provided. All the date will be published on the online platform at least 10 days before the exam date.

EVALUATION BOARD

Riportare la commissione inserita nella scheda in lingua italiana

SEMINARS BY EXTERNAL EXPERTS YES ■ NO □

FURTHER INFORMATION

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.