COURSE: Waste management and contaminated site remediation			
ACADEMIC YEAR:			
TYPE OF EDUCATIONAL ACTIVITY: Characteristic			
PROFESSOR: Salvatore Masi			
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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: II

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The waste composition and waste hazard are the basic concepts of the presented course. The different methodologies for plants management are investigated, giving attention to mechanical, chemical-physical, and biological treatment plants. The course focuses on the composition of different type of waste, the potential environmental impacts linked to their production and disposal, and the available treatment technologies for a sustainable waste cycle. Regarding the contaminated site remediation, the course deals the available environmental control systems, suggesting also the suitable remediation activities.

The main items will be:

- Basic concepts of the environmental regulation about waste management and site remediation;
- Methodologies for waste classification and environmental matrices characterization;
- Description of the most important systems used for waste treatment, as well for the remediation of contaminated matrices;
- Criteria for the optimization of the integrated systems for a suitable waste management;
- Biochemical processes during waste stabilization, waste combustion and waste disposal.

The main skills will be:

- Analyze the site specific waste production and identify novel strategies for an integrated waste management;
- Identify the operational parameters influencing the waste treatment;
- Evaluate the technical and economic feasibility of waste treatment and site remediation;
- Evaluate the Environmental and Sanitary Risks linked to the waste treatment and site remediation.

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

1) Waste management
   Environmental Regulation about waste management, solid waste classification, methodologies for waste analysis, waste treatment technologies, criteria for a suitable integrated waste cycle, landfill, bio-mechanical treatment systems, waste combustion.
2) Contaminated site remediation
   Environmental Regulation on contaminated site remediation, pollution phenomena, environmental control systems, chemical-physical analysis on environmental matrices, risk assessment modelling, groundwater remediation, treatment technologies of contaminated soil.

TEACHING METHODS

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

EVALUATION METHODS

Oral examination. The exam focuses on:

- Environmental regulation about waste management, methods for waste characterization, systems for waste collection and transportation;
- Technologies for waste treatment, reuse, and disposal;
- Methodologies for environmental analysis and site remediation.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Piero Sirini, George Tchobanoglous, Rosario Carlo Noto La Diega. Ingegneria dei rifiuti solidi McGraw-Hill.
- Luca Bonomo. Bonifica di siti contaminati - Caratterizzazione e tecnologie di risanamento. McGraw-Hill.
- Professor's 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

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.