



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Promozione della Salute, Materno-Infantile, di Medicina Interna e Specialistica di Eccellenza "G. D'Alessandro"		
ACADEMIC YEAR	2022/2023		
BACHELOR'S DEGREE (BSC)	PREVENTION TECHNIQUES FOR THE ENVIRONMENT AND WORKPLACE		
INTEGRATED COURSE	ENVIRONMENTAL SAMPLING TECHNIQUES - INTEGRATED COURSE		
CODE	15175		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	ICAR/03, MED/50		
HEAD PROFESSOR(S)			
OTHER PROFESSOR(S)	CAPODICI MARCO	Ricercatore a tempo determinato	Univ. di PALERMO
	MIRULLA NOEMI	Professore a contratto	Univ. di PALERMO
CREDITS	8		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>CAPODICI MARCO Monday 10:00 12:00 Viale delle Scienze Edificio 8 - Dipartimento Ingegneria - area ex Idraulica</p> <p>MIRULLA NOEMI Monday 09:00 11:00 ASP Palermo, via Massimo d'Azeglio, 8</p>		

DOCENTE:

PREREQUISITES	The student will possess the basic knowledge of environmental hygiene matters, with particular reference to environmental component (air, water and soil), organic and inorganic chemistry.
LEARNING OUTCOMES	<p>Knowledge and understanding. The student knows the main feature of fresh water (for supply) and wastewater, the sampling techniques for different environmental matrices, he/she can read and understand the results, he/she will be able to know the laws regulating the issues of environmental pollution (air, water, soil). He/she has basic knowledge about the systems used for water, waste and air treatment. The assessment of the course topic learning is carried out with a final oral test preceded by group work and discussion of cases presented in the classroom.</p> <p>Ability to apply knowledge and understanding of the main environmental pollution issues. The student knows how to perform the main control techniques for the environmental assessment of pollution (air, water, soil). He/she knows how to detect the risk factors in the living environment, be able to apply the expected administrative measures. The assessment of the course learning is carried out with a final oral test; preceded by group work and discussion of cases presented in classroom.</p> <p>Judgement autonomy. He/she will be able to program monitoring plans for environmental pollution evaluation. He/she knows how to evaluate the quality of water bodies. He/she can cope with the problems related to the disposal of solid waste.</p> <p>Communication skills. He/she has the ability to work in a group by competing with colleagues in solving real environmental problems presented and discussed in classroom.</p> <p>Learning ability. He/she has the ability to deepen his expertise through knowledge updating in environmental issues, useful for their profession or for access to master degree courses, first-level masters and other postgraduate training activities.</p>
ASSESSMENT METHODS	<p>The candidate will have to answer at least two/three orally posed questions for each module that constitutes the integrated course, on all parties of the program, in compliance to the recommended texts. The final examination aims to evaluate whether the student has knowledge and understanding of the topics, has acquired the ability and independent judgment to interpret concrete cases. The sufficiency will be threshold when the student shows knowledge and understanding of the issues at least in broad outline, and has minimal application skills in order to solve concrete cases; It must also possess skill in exhibition and argumentative to allow the transmission of his knowledge to the examiner. Below this threshold, the examination will be insufficient. The more, however, the examinee with his ability 'argumentative and expository able to interact with the examiner, and the more his knowledge and ability applications go into detail of the discipline of verification, the more assessment will be positive. The assessment is carried out of thirty.</p> <p>In detail, the vote will be based on the following principles:</p> <p>Excellent (30-30 Honors) - Excellent knowledge of the topics, excellent properties of language, good capacity analytic, students and able to apply knowledge to solve problems proposed.</p> <p>Very Good (26-29) - Good knowledge of the topics, full ownership of the language, the student and able to apply knowledge to solve problems proposed.</p> <p>Good (24-25) - Basic knowledge of the main topics, discrete properties of language, with limited ability to independently apply the knowledge to the solution of the proposed problems.</p> <p>Satisfactory (21-23) - has not fully mastered the main teaching subjects but it has the knowledge, satisfactory property language, poor ability to independently apply the knowledge gained.</p> <p>Sufficient (18-20) - Minimum basic understanding of the main topics of teaching and technical languages, very little or no ability to independently apply the knowledge gained.</p> <p>Insufficient - It does not have an acceptable knowledge of the contents of the topics covered in the teaching.</p>
TEACHING METHODS	Frontal lectures and discussions on real cases, group work and guided tours.

MODULE
ENVIRONMENTAL SANITARY ENGINEERING

Prof. MARCO CAPODICI

SUGGESTED BIBLIOGRAPHY

Dispense e materiale bibliografico verranno distribuiti durante il corso. Per ulteriori approfondimenti, si suggerisce la consultazione dei seguenti testi:

C. Collivignarelli, G. Bertanza: "Ingegneria sanitaria-ambientale". Ed. CittaStudi, 2012
ISBN:9788825173710

L. Bonomo: "Trattamenti delle acque reflue", ed. McGraw-Hill, Milano, 2008. ISBN: 88-386-6518-4

P. Sirini, G. Tchobanoglous, R.C. Noto La Diega: "Ingegneria dei Rifiuti Solidi" ed. McGraww-Hill, Milano, 2010 EAN: 9788838665271

W. Restani, R. Mari: "Tutela dell'ambiente atmosferico", ed. Pirola, 1995.

M. Gorla: "Siti contaminati". Ed. Flaccovio, 2012. ISBN 978-88-579-0136-7

AMBIT	10367-Scienze interdisciplinari
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

Provide students with the tools that will enable them to properly handle sampling activities, for the assessment of the optimal operation of the systems for water, waste and air treatment. He/she will know the main regulations regarding environmental pollution.

SYLLABUS

Hrs	Frontal teaching
3	Generalities. The water cycle. Review of basic knowledge about water supply, wastewater collection and transportation.
9	Waste water. Definitions. Sampling. Characteristics of waste water. Regulatory references. Treatment cycle setting. Mechanical treatments. Biological treatments: activated sludge, percolating beds, MBBR. Sludge treatment: aerobic and anaerobic digestion, thickening, dehydration. Final disposal of sludge. Agronomic reuse of mud. Plant schemes for the biological removal of nitrogen and phosphorus. Disinfection. Refinement treatments. The reuse of waste water. Imhoff tanks. Tools and techniques for plant management.
6	Supply waters. Waters intended for human consumption. Water reuse Normative references. Characteristics of natural waters. Water requirements according to uses. Treatment cycle setting. Clariflocculation. Filtration. Disinfection. Sludge treatment.
6	Refusals. Normative requirements. Waste classification. European List of Waste. Composition, sampling and analysis. RU production. Conferment. Collection. Recycling. Transport. Transfer stations. Controlled landfills. Thermal treatments. Selection and recovery plants. Production and use of compost and secondary solid fuel (CSS). Sanitary waste.
3	Air pollution. Basic knowledge on the main mechanisms of pollutants production and emission. Emission sources (particulate and gaseous). Pollutants diffusion and transportation. Techniques for pollutants removal. Reference legislation.
3	Receiving water bodies. Characteristics of the receiving water bodies toward pollution phenomena. Monitoring and classification of RWB. Tools for RWB monitoring. Submarine pipelines. Lake Eutrophication. River autodepuration. Contaminated soils. Criteria for soil quality. Characterization of contaminated sites. Conceptual models. Sanitary risk analysis. Interventions for the reclamation and the securing of land and ground water. The landfills remediation. The asbestos removal. Legislation.

**MODULE
APPLIED TECHNICAL AND MEDICAL SCIENCES 1**

Prof.ssa NOEMI MIRULLA

SUGGESTED BIBLIOGRAPHY

Dispense e materiale bibliografico verranno distribuiti durante il corso.

AMBIT	10360-Scienze della prevenzione nell' ambiente e nei luoghi di lavoro
INDIVIDUAL STUDY (Hrs)	75
COURSE ACTIVITY (Hrs)	50

EDUCATIONAL OBJECTIVES OF THE MODULE

Provide students with the tools that will enable them to properly handle sampling activities, for the assessment of the optimal operation of the systems for water, waste and air treatment. He/she will know the main regulations regarding environmental pollution.

SYLLABUS

Hrs	Frontal teaching
4	Drinking water samplig techniques.
4	Surface and Marine Waters samplig techniques.
4	Wastewater samplig techniques.
8	Waste Management and Disposal Techniques–Sistri System D.lgs. 152/06 and code C.E.R – documentation.
4	Air sampling techniques for the assessment of pollutants.
4	Sampling techniques of Asbestos-containing Substances. Reclamation and remediation techniques.
10	Environmental legislation - Water: water resources (L. 36/94, D.P.C.M. 4/3/96); drinking water (D.P.R. 236/88, Legislative Decree 31 / 2001D.M. 443/90); water pollution (Legislative Decree 152/06 and subsequent amendments); soil (Law 183/89); hydrogeological risk (Law 267/98); EC framework directive (n.60 / 2000). The waste: D.lgs. 152/06 and smi, the codes C.E.R., D.lgs. 36/2003. Reclamation of contaminated sites: D. Lgs 152/06. Legislative Decree 68/2015 Air: D.P.R. 203/88, Legislative Decree. 315/99 Legislative Decree 152/06. Industrial activities at risk of a major accident: Legislative Decree no. 334/99.
10	Group work on environmental issues: presentation and discussion of real cases
2	Sampling report compilation