



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Promozione della Salute, Materno-Infantile, di Medicina Interna e Specialistica di Eccellenza "G. D'Alessandro"		
<b>ACADEMIC YEAR</b>	2016/2017		
<b>BACHELOR'S DEGREE (BSC)</b>	PREVENTION TECHNIQUES FOR THE ENVIRONMENT AND WORKPLACE		
<b>INTEGRATED COURSE</b>	ENVIRONMENTAL SAMPLING TECHNIQUES - INTEGRATED COURSE		
<b>CODE</b>	15175		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	2		
<b>SCIENTIFIC SECTOR(S)</b>	ICAR/03, MED/50		
<b>HEAD PROFESSOR(S)</b>			
<b>OTHER PROFESSOR(S)</b>	VAGLIASINDI CARLO	Professore a contratto	Univ. di PALERMO
	MANNINA GIORGIO	Professore Ordinario	Univ. di PALERMO
<b>CREDITS</b>	8		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<b>MANNINA GIORGIO</b> Tuesday 09:00 11:00 Dipartimento di Ingegneria - Area Idraulica e Ambientale piano 2° ed. 8 Wednesday 9:00 11:00 Dipartimento di Ingegneria - Area Idraulica e Ambientale piano 2° ed. 8 - Ufficio no. SO8P2130		

**DOCENTE:**

<b>PREREQUISITES</b>	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.
<b>LEARNING OUTCOMES</b>	<p>Knowledge and understanding: by the end of the course student know the characteristics of the supply water and waste, the sampling techniques from environmental matrices, can read and interpret the results, know the laws regulating the issues of environmental pollution (air, water, soil), have acquired knowledge about the use of water systems, waste, air.</p> <p>Ability to apply knowledge and understanding: students should be able to apply how to perform the main controls for the environmental assessment of pollution (air, water, soil); how to detect the risk factors present in the living environment, should be able to apply the expected administrative measures.</p> <p>Autonomous judgement: students should be able to prepare the monitoring plans for the verification of environmental pollutants, to evaluate the quality of water bodies, can cope with the problems related to the disposal of solid waste.</p> <p>Communication skills: students should be able to clearly present works they have carried out individually or in groups.</p> <p>Learning skills: students should be able to find pertinent data for professional update and training and be prepared for subsequent study levels.</p> <p>Communication skills : student</p>
<b>ASSESSMENT METHODS</b>	<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:  Excellent (30-30 Honours) - Excellent knowledge of the topics, excellent properties of language, good capacity analytic, students and able to apply knowledge to solve problems proposed.  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.  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.  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.  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.  Insufficient - It does not have an acceptable knowledge of the contents of the topics covered in the teaching.</p>
<b>TEACHING METHODS</b>	Frontal lectures and discussions on real cases, group work and guided tours.

**MODULE**  
**APPLIED TECHNICAL AND MEDICAL SCIENCES 1**

*Prof. CARLO VAGLIASINDI*

**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.

L. Bono: "Trattamenti delle acque reflue", ed. McGraw-Hill, Milano, 2008.

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

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

M. Gorla: "Siti contaminati". Ed. Flaccovio, 2012.

<b>AMBIT</b>	10360-Scienze della prevenzione nell' ambiente e nei luoghi di lavoro
<b>INDIVIDUAL STUDY (Hrs)</b>	75
<b>COURSE ACTIVITY (Hrs)</b>	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**

<b>Hrs</b>	<b>Frontal teaching</b>
3	The water cycle. Review of basic knowledge about water supply, wastewater collection and transportation.
9	Wastewater. Definitions. Sampling activities. Wastewater features. Setting-up of a treatment scheme. Mechanical treatments. Biological treatments: activated sludge, lagoons, trickling filters, RBC, MBBR. Sludge treatment: aerobic and anaerobic digestion. Final sludge disposal. Sludge composting and agronomic reuse. Nutrients (nitrogen and phosphorus) removal. Wastewater disinfection. Tertiary treatments. Wastewater re-use. Imhoff tanks. Facilities of plants managements and operation.
3	Drinking water. Characteristics of natural waters. Water requirements depending on the different uses. Setting-up of the treatment scheme. Coagulation-flocculation. Filtration. Disinfection. Sludge treatment.
6	Municipal waste. MW classification. Composition, sampling and analysis. MW production. Collection. Separate collection. Waste Transportation. Transfer stations. Sanitary landfills. Thermal treatment. Plants for waste selection and recovery. Composting plants. Secondary solid fuel (SSF). Hospital 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.
3	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 ENVIRONMENTAL SANITARY ENGINEERING

*Prof. GIORGIO MANNINA*

### 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.

L. Bonomo: "Trattamenti delle acque reflue", ed. McGraw-Hill, Milano, 2008.

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

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

M. Gorla: "Siti contaminati". Ed. Flaccovio, 2012.

<b>AMBIT</b>	10367-Scienze interdisciplinari
<b>INDIVIDUAL STUDY (Hrs)</b>	45
<b>COURSE ACTIVITY (Hrs)</b>	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	Wastewater. Definitions. Sampling activities. Wastewater features. Setting-up of a treatment scheme. Mechanical treatments. Biological treatments: activated sludge, lagoons, trickling filters, RBC, MBBR. Sludge treatment: aerobic and anaerobic digestion. Final sludge disposal. Sludge composting and agronomic reuse. Nutrients (nitrogen and phosphorus) removal. Wastewater disinfection. Tertiary treatments. Wastewater re-use. Imhoff tanks. Facilities of plants managements and operation.
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