UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare		
ACADEMIC YEAR	2020/2021		
BACHELOR'S DEGREE (BSC)	NATURAL AND ENVIRONMENTAL SCIENCE		
INTEGRATED COURSE	BIOMONITORING AND ENVIRONMENTAL LAW - INTEGRATED COURSE		
CODE	19858		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/03, IUS/10		
HEAD PROFESSOR(S)	NASELLI FLORES LUIGI	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	GULLO NICOLA NASELLI FLORES LUIGI	Professore Ordinario Professore Associato	Univ. di PALERMO Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	3		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**GULLO NICOLA** Monday 15:00 17:00 Dipartimento di Giurisprudenza - piano II, stanza n. 11 - Via Maqueda n. 172 - 90134 Palermo (per il mese di luglio) **NASELLI FLORES LUIGI** Monday 10:30 11:30 Studio del docente, Via Archirafi, 28 - I piano Wednesday 10:30 11:30 Studio del docente, Via Archirafi, 28 - I piano Friday 10:30 11:30 Studio del docente, Via Archirafi, 28 - I piano		

DOCENTE: Prof. LUIGI NASELLI FLORES

PREREQUISITES	Environmental biomonitoring module: Good high-school mathematical skills, good abilities in English reading and listening, and basic knowledge of general Ecology are necessary to fruitfully attend the course. Environmental law module: Basic knowledge of Constitution, European Union Treaty and Environmental Code. The student can consult any updated environmental law code.
LEARNING OUTCOMES	Environmental biomonitoring module: Acquiring knowledge and comprehension abilities The goals of the class is to get critical and normative tools aimed at (i) identifying and selecting the most suitable bioindicators in the different ecosystems and in accordance to the purposes of biomonitoring, (ii) selecting most significant environmental parameters and (iii) to choice the most suitable sampling frequency. Setting of biomonitoring protocols sized both on the environmental characteristics of the ecosystems and on the biological traits of target organisms. Environmental law module: Acquiring knowledge and comprehension abilities Provide the student with the knowledge and skills necessary to: - Understanding urban planning law dealing with environment; - Understanding environmental law; Provide the student with the necessary knowledge and skills to: - Understanding the principles governing the relationship between environmental law and urban planning law; - Understanding the fundamental characteristics of the environmental protection system; - Understanding the sectoral regulations; - Understanding the model of liability for environmental damage Environmental biomonitoring module: Ability to apply knowledge and comprehension Ability to autonomously build a biomonitoring protocol sized on specific environmental features to be investigated. Ability to illustrate both graphically and orally the results achieved. Environmental law module: Ability to apply knowledge and comprehension Ability to apply knowledge and understanding of different urban law institutions; of different environmental law institutions; of environmental assessment; the reasons for the establishment and dissemination of the environmental protection guidelines Environmental biomonitoring module: Judgement autonomy The course is aimed at developing a basic knowledge, rooted on the actual European and Italian normative framework, to evaluate the implications deriving from the selection of variables and the general results achieved through a monitoring program. Ability to analyse the results coming from a biomonitoring assessment. Environmental law module: Judgement autonomy Critical awareness of the environmental discipline by moving from the planetary nature of the environmental issue and the different forms of pollution Environmental biomonitoring module: Communication skills The course will promote the ability to explain and sustain operative choices according to the legal context and to the environmental features. In addition, the ability to underline the importance and the necessity to monitor and control environmental characteristics even in (apparently) unimpacted ecosystems. Environmental law module: Communication skills Ability to explain in a clear and conscious way the acquired knowledge, also through written elaborations. Environmental biomonitoring module: Learning skills The course is aimed at developing the ability to critically analyse specialised scientific literature on the topics of the course. It is also aimed at facilitating the study required in a second-level degree or master course. Environmental law module: Learning skills Ability to reconstruct the evolution of the main institutions of environmental law and urban planning law, closely linked to each other, tracing the most significant doctrinal contributions and the main jurisprudential guidelines. Awareness of the evolution of environmental discipline due to the impact of environmental legislation.

	Ability to continue their training in master’s degree, in doctoral research courses and in specialization courses.
ASSESSMENT METHODS	Environmental biomonitoring module A written exam is scheduled at the end of the course, eventually integrated by 2-3 specific questions. The exam is addressed toward evaluating the ability to determine the ecological status of a given ecosystem through the choice and the analyses of selected biondicators. The test allows to demonstrate i) a basic knowledge on the selection of bioindicators (which grants a score ranging from 18 to 23), ii) a deeper knowledge on how to use autoecological (populations, including their phenotypic plasticity) and sinecological (community) knowledge to perform an environmental assessment (which grants a score ranging between 24 and 27), and iii) a capacity to make projection on future ecological scenarios (which grants a score ranging between 28 and 30 with honours). Environmental law module 1) Oral final exam - Grades on a scale between 18 and 30 cum laude. The exam consists of an interview aimed to check the level of knowledge of the topics in the syllabus, the level of familiarity with the specialized language and the ability to develop a reasoning aimed to the application of theoretical knowledge to specific cases . The interview consists of a minimum of two/three questions. The evaluation will follow the grid below: - Excellent (30 - 30 cum laude): great knowledge of the topics, excellent language skills, excellent capacity of analysis; the student is able to brilliantly apply theoretical knowledge to real cases. He/she is also able to properly argue possible solution, including multiple alternatives. - Very good (27-29): good knowledge of the topics, very good language skills, good capacity of analysis; the student is able to properly apply theoretical knowledge to real cases. - Good (24-26): good knowledge of the main topics, good language skills, the student shows adequate ability to apply theoretical knowledge to real cases. - Satisfactory (21-23): the student does not show a complete command of the main topics, although showing the knowledge of the basic ones; he/she shows satisfactory language skills and a quite satisfactory ability to apply theoretical knowledge to real cases. - Sufficient (18-20): minimal knowledge of the main teaching and technical language issues, limited capacity to adequately apply theoretical knowledge to real cases. - Insufficient outcome: the student does not have an acceptable knowledge of the contents of the various topics on the syllabus. 2) One written test in progress, on voluntary basis, is scheduled. The test, consisting in two open questions, is aimed to check students' overall understanding of the yet addressed topics and to test the ability to apply theoretical knowledge to the solution of concrete cases. The evaluation will follow the evaluation grid sub "1)". The final score will be computed as the average of the scores the student has obtained in each module
TEACHING METHODS	Environmental biomonitoring module: Frontal lectures (40 h) and practice exercise in the classroom and in the field (16 h). Environmental law module: Frontal lectures (48h).

MODULE
ENVIRONMENTAL BIOMONITORING

Prof. LUIGI NASELLI FLORES

SUGGESTED BIBLIOGRAPHY

Articoli su riviste internazionali selezionati dal docente saranno forniti all'inizio del corso. Gli articoli consentiranno agli studenti di approfondire tutte le conoscenze acquisite in aula. La lista degli articoli e' modificata/aggiornata anno per anno in relazione alle nuove conoscenze acquisite.
Libro suggerito: Reynolds, C.S., 2006. The Ecology of Phytoplankton. Cambridge University Press (https://www.cambridge.org/core/books/ecology-of-phytoplankton/7E14FD43792ECC717C9E90E3519A1803#fndtn-information)

Papers from the international scientific literature selected by the teacher will be given to students at the beginning of the course. The papers will allow the students to deepen all the knowledge received in the classroom. According to the new knowledge achieved internationally on the different subjects of the course, the list of papers is updated year by year.
Suggested Textbook: Reynolds, C.S., 2006. The Ecology of Phytoplankton. Cambridge University Press (https://www.cambridge.org/core/books/ecology-of-phytoplankton/7E14FD43792ECC717C9E90E3519A1803#fndtn-information)

AMBIT	50171-Discipline ecologiche
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

According to the "manifesto" of the degree course "Scienze della Natura e dell'ambiente" the final target of the course "Biomonitoraggio ambientale" is to give to students a good knowledge on contents and methods pertaining environmental control through a biological assessment. The goal is to reach the basic knowledge to program and develop biomonitoring tools sized on the different ecosystem typologies.

SYLLABUS

Hrs	Frontal teaching
4	Introduction to the course. Definitions and protocols. How to analyse different matrices: soil, water, air. Analysis of the general features of the different ecosystems
4	Identification of factors determining spatial and temporal heterogeneity in an ecosystem. Development of a sampling protocol
4	Collecting and analysing data: number transformation and normalization. How to show data on a graph. Temporal series and XY graphs. Correlation coefficients and the significance. Analysis of data variability
4	Defining trophic state of an aquatic ecosystem. Main descriptors of trophic state. Introducing phytoplankton. Italian laws: 152/99. European Directive 2000/60: Water Framework Directive. Methods and measurements of the main trophic state parameters: total phosphorus, chlorophyll a concentration, Secchi depth.
4	Spatial zonation of an ecosystem. Introducing spatial heterogeneity in an aquatic ecosystem: effect of light extinction and temperature gradients. Effets of Light and Temperature on the biological structure of an aquatic ecosystem. Peculiarities of Mediterranean aquatic ecosystems.
4	Growth strategies of natural populations. C-S-R strategies. Morphological traits of phytoplankton. Measuring the main size and morphological descriptors of phytoplankton. Morpho-functional approach. Relationships between morphological features and environmental characteristics.
4	Relationships between resource availability (light and nutrients9 and dominant phytoplankton shapes. Synthetic environmental descriptors: zmix/zeu ratio. Relationships between phytoplankton morphology and environmental parameters.
4	Introducing biodiversity and its use in the environmental biomonitoring. Intermediate Disturbance Hypothesis. How to measure biological diversity: alpha, beta and gamma diversity. Similarity indices. Diversity indices for finite and infinite populations. Shannon Index computation and its ecological meaning.
4	Harmful Algal Blooms (HAB). Main algal toxins. Ecological conditions favouring HAB. Early warning procedures. Case studies on Sicilian ecosystems.
4	River ecology. River Continuum Concept. Autotrophy and Heterotrophy in lotic ecosystems. Ecological classification of rivers and use of macroinvertebrate as bioindicators. Benthic diatoms as biological indicators. IBE and its suitability to monitor rivers. Other indices.

Hrs	Practice
8	Data manipulation and their graphic rendering.Graphic methods to identify growth strategies. Use of bioindicators to identify the ecological state of an aquatic ecosystem.
8	Sampling methods. Development of a sampling protocol. Data acquisition in biomonitoring programs. Counting phytoplankton and assessing biomasses. How to use morpho-functional descriptors in ecological state assessments.

MODULE
ENVIRONMENT LAW

Prof. NICOLA GULLO

SUGGESTED BIBLIOGRAPHY

Gianpaolo Rossi, Diritto dell'ambiente, Giappichelli, Ultima edizione
oppure
Paolo dell'Anno, Diritto dell'ambiente, Cedam, Ultima edizione
Beniamino Caravita, Luisa Cassetti, Andrea Morrone, Diritto dell'ambiente, Bologna, il Mulino
Nicola Lugaresi, Diritto dell'ambiente, Padova, Cedam, 2020
e Filippo Salvia, Cristian Bevilacqua, Manuale di diritto urbanistico, Cedam, 2018

AMBIT	50172-Discipline agrarie, chimiche, fisiche, giuridiche, economiche e di contesto
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48

EDUCATIONAL OBJECTIVES OF THE MODULE

Basic knowledge of the source of law system, of the constitutional framework relating to local authorities, of the administrative law, of the real rights law, general obligations and contracts law

SYLLABUS

Hrs	Frontal teaching
4	Allocation of function between state and regions on planning law
8	Urban planning
6	Building permits
6	Principles of international environmental law
6	Division of the powers between the EU and states in environmental policies
2	Principles of European law
2	Environmental protection in the Italian Constitution
2	Division of powers between state and regions on the environment
4	Environmental law
6	Environmental assessments
2	Environmental Liability