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# Testi del Syllabus

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Resp. Did.	<b>TRETIACH MAURO</b>	<b>Matricola: 005263</b>
Docenti	<b>CANDOTTO CARNIEL FABIO, 3 CFU</b> <b>TRETIACH MAURO, 3 CFU</b>	
Anno offerta:	<b>2023/2024</b>	
Insegnamento:	<b>942SV - BIOMONITORING FOR ENVIRONMENTAL CHANGE DETECTION</b>	
Corso di studio:	<b>SM58 - ECOLOGIA E SOSTENIBILITÀ DEI CAMBIAMENTI GLOBALI</b>	
Anno regolamento:	<b>2022</b>	
CFU:	<b>6</b>	
Settore:	<b>BIO/01</b>	
Tipo Attività:	<b>B - Caratterizzante</b>	
Anno corso:	<b>2</b>	
Periodo:	<b>Primo Semestre</b>	
Sede:	<b>TRIESTE</b>	

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## Testi in italiano

<b>Lingua insegnamento</b>	English
<b>Contenuti (Dipl.Sup.)</b>	<p>A world that changes and that has always changed?</p> <p>The factors of change: (a) physical factors: temperatures, precipitation, extreme phenomena; (b) land use change: urbanization, desertification, habitat fragmentation, de- and reforestation; (c) pollution of water, air and soil matrices; (d) invasions of alien species: the plant world. Monitoring of change on a scientific basis: from basic data to predictive models.</p> <p>The “basic” of Biomonitoring: why use organisms? Identification of groups of sensitive organisms such as environmental sentinels. The qualitative and quantitative monitoring of biodiversity. Examples from the animal world (hymenoptera; amphibians; birds) and plants (algae; vascular plants; lichenized fungi). Phenological changes in populations and plant communities at a geographical level and the extent of the alteration of population dynamics.</p> <p>The evaluation of the functioning at the level of plant communities and ecosystems: what to measure, how and why. Analysis of the dynamics of carbon and nutrient exchanges in the soil-ecosystems-atmosphere system and monitoring methods at different scales.</p> <p>Monitoring the conservation status of species, communities and ecosystems: from theory to practice.</p>

<b>Testi di riferimento</b>	Selection of scientific papers and reviews put at disposal in moodle
<b>Obiettivi formativi</b>	<p>The course aims to provide the methodological basis for the interpretation of biological data in the study of global changes. Knowledge and understanding:</p> <ul style="list-style-type: none"> <li>- Acquire solid knowledge on issues related to the characterization of environmental changes and the pros and cons of different approaches, with particular emphasis on biomonitoring techniques, in particular on the use of organisms as environmental sentinels.</li> </ul> <p>Acquisition of a critical mood for the interpretation of complex phenomena. Capability to critically read and understand scientific papers. To be able to plan a biomonitoring survey of air pollution, knowing the pros and cons that might be encountered in the realisation phase.</p> <p>Ability to apply knowledge and understanding Students, also through group activities, will be able to choose, apply and interpret the results of experimental protocols, consult databases and web-sites dedicated to environmental control.</p> <p>Judgment Autonomy This is developed through participation in the discussions during the lessons and through the preparation for the exam, which requires the individual re-elaboration and assimilation of the material illustrated by the teacher, as well as the writing of a short document (generally 6-8 pages) on specific topics for which in-depth studies were agreed in the students' cohort.</p> <p>Communication skills The discussion at lesson and specific corrections to the written documents will be used to improve the scientific vocabulary and learn to give reasons in support of each student's thesis.</p> <p>Learning ability This is stimulated by the intersection between the knowledge deriving from the lectures, as well as by the critical reading of the applied experimental protocols and from the requests to propose solutions to the scientific problems presented from time to time by the teacher, which illustrates numerous case studies by detailing them on the basis of scientific articles.</p>
<b>Prerequisiti</b>	Basic knowledge of ecology, botany, zoology, environmental chemistry.
<b>Metodi didattici</b>	<p>Lectures with the aid of Power Point slides; seminars on specific topics; open discussions on single scientific papers.</p> <p>Any changes to the methods described here, necessary to ensure the application of the security protocols related to the COVID-19 emergency, will be communicated on the websites of department, degree course and teaching course.</p>
<b>Altre informazioni</b>	<p>On the Moodle course website the following items will be available: detailed program of the course; ppt slides; a selection of short papers on specific topics and further unpublished, original texts; useful or recommended websites links. Access is reserved for those enrolled in the course. All the materials to be discussed at lesson, and the presentations in ppt format are updated progressively and made available immediately within a few hours preceding the single lesson.</p>
<b>Modalità di verifica dell'apprendimento</b>	<p>Oral exam on the entire program of about one hour, with the first question by drawing lots for one of the 48 lessons of the course, followed by others at fixed intervals (+6, 12 or 18) decided by the student himself at the beginning of the exam.</p> <p>The following items will be evaluated:</p> <ul style="list-style-type: none"> <li>- Knowledge of relevant content;</li> </ul>

- Ability to analyze data and information;
- Ability to develop connections, also with other disciplines;
- Contribution of individual critical insights;
- Expository clarity;
- Use of correct terminology.

Any changes to the methods described here, necessary to ensure the application of safety protocols related to any health emergencies, will be communicated on the Department, Degree Program and teaching website.

### Programma esteso

not yet available

### Obiettivi Agenda 2030 per lo sviluppo sostenibile

11, 12, 13, 14, 15

## Obiettivi per lo sviluppo sostenibile

Codice	Descrizione
11	Città e comunità sostenibili
12	Consumo e produzione responsabili
13	Agire per il clima
14	La vita sott'acqua
15	La vita sulla terra



## Testi in inglese

English

A world that changes and that has always changed?

The factors of change: (a) physical factors: temperatures, precipitation, extreme phenomena; (b) land use change: urbanization, desertification, habitat fragmentation, de- and reforestation; (c) pollution of water, air and soil matrices; (d) invasions of alien species: the plant world. Monitoring of change on a scientific basis: from basic data to predictive models.

The “basic” of Biomonitoring: why use organisms? Identification of groups of sensitive organisms such as environmental sentinels. The qualitative and quantitative monitoring of biodiversity. Examples from the animal world (hymenoptera; amphibians; birds) and plants (algae; vascular plants; lichenized fungi). Phenological changes in populations and plant communities at a geographical level and the extent of the alteration of population dynamics.

The evaluation of the functioning at the level of plant communities and ecosystems: what to measure, how and why. Analysis of the dynamics of carbon and nutrient exchanges in the soil-ecosystems-atmosphere system and monitoring methods at different scales.

Monitoring the conservation status of species, communities and ecosystems: from theory to practice.

Selection of scientific papers and reviews put at disposal in moodle

The course aims to provide the methodological basis for the interpretation of biological data in the study of global changes. Knowledge and understanding:

- Acquire solid knowledge on issues related to the characterization of environmental changes and the pros and cons of different approaches, with particular emphasis on biomonitoring techniques, in particular on the use of organisms as environmental sentinels.

Acquisition of a critical mood for the interpretation of complex phenomena. Capability to critically read and understand scientific papers. To be able to plan a biomonitoring survey of air pollution, knowing the pros and cons that might be encountered in the realisation phase.

Ability to apply knowledge and understanding

Students, also through group activities, will be able to choose, apply and interpret the results of experimental protocols, consult databases and web-sites dedicated to environmental control.

Judgment Autonomy

This is developed through participation in the discussions during the lessons and through the preparation for the exam, which requires the individual re-elaboration and assimilation of the material illustrated by the teacher, as well as the writing of a short document (generally 6-8 pages) on specific topics for which in-depth studies were agreed in the students' cohort.

Communication skills

The discussion at lesson and specific corrections to the written documents will be used to improve the scientific vocabulary and learn to give reasons in support of each student's thesis.

Learning ability

This is stimulated by the intersection between the knowledge deriving from the lectures, as well as by the critical reading of the applied experimental protocols and from the requests to propose solutions to the scientific problems presented from time to time by the teacher, which illustrates numerous case studies by detailing them on the basis of scientific articles.

Basic knowledge of ecology, botany, zoology, environmental chemistry.

Lectures with the aid of Power Point slides; seminars on specific topics; open discussions on single scientific papers.

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websites links. Access is reserved for those enrolled in the course. All the materials to be discussed at lesson, and the presentations in ppt format are updated progressively and made available immediately within a few hours preceding the single lesson.

Oral exam on the entire program of about one hour, with the first question by drawing lots for one of the 48 lessons of the course, followed by others at fixed intervals (+6, 12 or 18) decided by the student himself at the beginning of the exam.

The following items will be evaluated:

- Knowledge of relevant content;

- Ability to analyze data and information;
- Ability to develop connections, also with other disciplines;
- Contribution of individual critical insights;
- Expository clarity;
- Use of correct terminology.

Any changes to the methods described here, necessary to ensure the application of safety protocols related to any health emergencies, will be communicated on the Department, Degree Program and teaching website.

	not yet available
	11, 12, 13, 14, 15

## **Obiettivi per lo sviluppo sostenibile**

<b>Codice</b>	<b>Descrizione</b>
11	Sustainable cities and communities
12	Responsible consumption and production
13	Climate action
14	Life below water
15	Life and land