

Projekt: „Zintegrowany Program Rozwoju Uniwersytetu Śląskiego w Katowicach”

## Program and timetables

Class conducted by visiting professor Dr.ssa **Erica Lumini** from IPSP-CNR, Turin, Italy to full-time students of the Faculty of Natural Sciences

### LIFE SCIENCE: Environmental Microbiology/Plant-microbe interactions

**Lecture's place** – Zajęcia odbywać się będą w budynku Instytutu Biologii, Biotechnologii i Ochrony Środowiska UŚ Katowice ul. Jagiellońska 28 pokój B-110 oraz B-101.

Date and Time	Argument	Type	Hours
Monday, 12/09/2022 9.30-11.00	Microbial ecology and principles of microbial taxonomy and phylogenesis.	Lecture (L)	2h_L
Tuesday, 13/09/2022 9.30-11.00 14.00-16.15	Methods to study microbial communities: culture dependent and culture independent methods (molecular techniques).	Lecture and practical exercises in the laboratory (LAB)	5h 2h_L3h_LAB
Wednesday, 14/09/2022 9.00-12.00	Methods of sampling, collection and store of samples (Site and organization to be agreed e.g. Coal post mining sites)	Field excursion (FE)	4h_FE
Thursday, 15/09/2022 9.30-11.00	Microorganisms and their roles in fundamental biogeochemical cycles	Lecture (L)	2h_L
Friday, 16/09/2022 9.30-11.00	Plant microbe interaction (nitrogen fixing microorganisms, PGPR, plant pathogenic bacteria, microbial symbiont) Ecological significance and applications of the most important N-fixing symbioses	Lecture (L)	2h_L
Monday, 19/09/2022 9.30-11.00	Fungi and Plant-Fungus interactions. Description of the most important associations between fungi and photosynthetic organisms.	Lecture (L)	2h_L
Tuesday, 20/09/2022 9.30-11.00	The mycorrhizal symbiosis. General characteristics and mycorrhizal types: ectomycorrhiza and endomycorrhiza (arbuscular, orchid, ericoid) and ectoendomicorrhiza	Lecture (L)	2h_L
Wednesday, 21/09/2022 9.00-12.00	Collection and store of samples (Site and organization to be agreed )	Field excursion (FE)	4h_FE
Thursday, 22/09/2022 9.30-11.00 14.00-16.15	Soil microbiota, Ecological aspects of the wood-wide-web, and the contribution of sequencing projects , Modern methods to study the taxonomic and functional diversity of bacterial and fungal communities that interact with plants.	Lecture and practical exercises in the laboratory (LAB)	5h 2h_L 3h_LAB
Friday, 23/09/2022 9.30-11.00	The plant microbiota. Microbiota and microbiome. Importance of interactions with microbial communities: from human health to plant ecology.	Lecture (L)	2h
Total			<b>30h</b>

**Duration:** The course includes 30 hours of in-class lectures and seminars, including laboratory experiences and field excursions. Students will also present a review of scientific papers and a seminar dealing with “Microorganism in art”.

### **Learning outcomes**

The main training goal of the teaching period is focused on the fundamental concepts concerning the interactions between microorganisms (Bacteria, Archaea, Fungi) and their environment and the relationship between microorganisms and plants. The main microbiological and molecular techniques used in applied and environmental microbiology will be studied in detail. Specific objectives of the theoretical part will take in account the phylogenetic characterization of microbial ecosystems, the analysis of the main biogeochemical cycles and the diversity of plant-microbe interactions in natural and altered conditions. The laboratory module will provide technical skills to study the microorganisms and their relationships in the environment.

### **Laboratory**

Through laboratory practicals, the student will have the opportunity to observe and directly manipulate some experimental systems and learn the principal methods for studying soil microorganisms and their relationship with plants.

### **Judgment**

Evaluation, interpretation and revision of literature data.

### **Communication skills**

Reading, presentation and discussion of literature data