



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze Agrarie, Alimentari e Forestali		
<b>ACADEMIC YEAR</b>	2022/2023		
<b>MASTER'S DEGREE (MSC)</b>	AGROENGINEERING AND FORESTRY SCIENCES AND TECHNOLOGIES		
<b>SUBJECT</b>	AGRI-ENVIRONMENTAL MICROBIOLOGY		
<b>TYPE OF EDUCATIONAL ACTIVITY</b>	B		
<b>AMBIT</b>	50564-Discipline forestali ed ambientali		
<b>CODE</b>	22482		
<b>SCIENTIFIC SECTOR(S)</b>	AGR/16		
<b>HEAD PROFESSOR(S)</b>	SETTANNI LUCA	Professore Ordinario	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>			
<b>CREDITS</b>	6		
<b>INDIVIDUAL STUDY (Hrs)</b>	88		
<b>COURSE ACTIVITY (Hrs)</b>	62		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	1		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<b>SETTANNI LUCA</b> Wednesday 11:00 - 13:00 Dipartimento Scienze Agrarie, Alimentari e Forestali, Edificio 5, Ingresso A. I giorni e gli orari indicati per il ricevimento sono relativi al periodo in cui sono svolte le lezioni. Gli incontri si possono concordare via email o telefonica negli altri periodi.		

DOCENTE: Prof. LUCA SETTANNI

<b>PREREQUISITES</b>	General knowledge of biology
<b>LEARNING OUTCOMES</b>	<ul style="list-style-type: none"> <li>- Knowledge and ability to understand. Acquisition of advanced tools for Microbiological understanding and evaluation. Ability to use the specific technical language.</li> <li>- Ability to apply knowledge and understanding. Ability to assess the needs of the microbial communities of the natural environments.</li> <li>- Making judgements. To be able to evaluate the implications and results of the microbiological studies performed. In the light of the knowledge acquired, to interpret the determining factors in the microbial ecosystems. To be able to act specifically to prevent or limit the imbalances or the irreversible changes in the relationships between the microbial populations of a given environment.</li> <li>- Communication abilities. Ability to expose the mechanisms of microbial interactions to laboratory technicians, and the results of the analysis also to a non-expert public. To be able to apply a suitable synthetic and technical language to communicate problems and to suggest useful solutions.</li> <li>- Learning skills. To acquire the ability to identify the biological aspects relevant for the forest sector and to suggest intervention solutions with modern techniques and methodologies through continuous updates and scientific consultations.</li> </ul>
<b>ASSESSMENT METHODS</b>	The oral exam is finalised to verify the disciplinary skills and knowledge included in the syllabus; the assessment is expressed into thirty out of thirty. The minimum number of questions is three and aims to verify the gained knowledge, the elaboration abilities, as well as the possess of an adequate speaking ability. The threshold for sufficiency (18/30) will be gained when the student shows knowledge and understanding of topics, at least in their guidelines, and has minimum levels of applied skills concerning the solution of specific case studies; he should be in possess of talking abilities and of a correct use of language for the specificity of the course. Below this threshold the exam will be assessed as insufficient. The more the student shows argumentative and talking capacities, besides knowledge going into details of the discipline, the more his assessment will be positive till the grade of excellence (30/30 cum laude). With regard to intermediate scores, the higher the level of critical evaluation skills (21/30), of approach to solving a problem (24/30), of formulating proposals and to create useful connections between the topics covered (27/30).
<b>EDUCATIONAL OBJECTIVES</b>	The course aims to provide the basis of general microbiology, aimed at environmental and forestry sector, through the study of the morphology, physiology, genetics and microbial taxonomy and understanding of biogeochemical cycles and functional microbial groups involved in the main degradation processes of organic matter. The course, through laboratory sessions, aims to provide the student manual skills necessary to start working in a microbiology laboratory and to perform quantitative and qualitative analyses of environmental and forest samples.
<b>TEACHING METHODS</b>	The course includes 40 hours of lecture and 22 hours of laboratory sessions
<b>SUGGESTED BIBLIOGRAPHY</b>	Madigan MT, Martinko, JM, Bender, KS, Buckley, DH, Stahl, DA (2016) Biologia dei Microrganismi, Micriobiologia Generale, Ambientale e Industriale 14th edition, Pearson Italia. ISBN-10 : 889190094X

## SYLLABUS

Hrs	Frontal teaching
3	Principles on life in soil
2	Microhabitat
5	Interactions soil-plant-microorganisms
4	Cell growth - Development of microbial populations
2	Trophic interactions
3	Rhizosphere
2	Electron transport in anaerobiosis
2	Chemolithoautotrophic bacteria
1	Phototrophy
3	Gram negative non proteobacteria
3	Gram negative proteobacteria
2	Gram positive bacteria
2	Microbial identification and monitoring
4	Biogeochemical cycles
2	Bioremediation

<b>Hrs</b>	<b>Practice</b>
22	Analyses of environmental samples (soil, water, plant material), plate counts, isolation of microorganisms, morphological analysis and grouping of isolates, physiological and biochemical characterization of the main microorganisms, genotypic identification