



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze Agrarie, Alimentari e Forestali		
<b>ACADEMIC YEAR</b>	2019/2020		
<b>BACHELOR'S DEGREE (BSC)</b>	AGRICULTURAL SCIENCES AND TECHNOLOGIES		
<b>SUBJECT</b>	AGRI-FOOD MICROBIOLOGY		
<b>TYPE OF EDUCATIONAL ACTIVITY</b>	C		
<b>AMBIT</b>	10689-Attività formative affini o integrative		
<b>CODE</b>	18710		
<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>	7		
<b>INDIVIDUAL STUDY (Hrs)</b>	115		
<b>COURSE ACTIVITY (Hrs)</b>	60		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	3		
<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 agricultural and food 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 agricultural environment and to limit the development of spoilage and/or pathogenic microorganisms in foods.</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 agrifood 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).
<b>EDUCATIONAL OBJECTIVES</b>	The course aims to provide the basis of general microbiology, aimed at agrifood sector, through the study of the morphology, physiology, genetics and microbial taxonomy and understanding of the main functions of the microbial groups of agricultural and food environments. 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 agricultural and food samples.
<b>TEACHING METHODS</b>	The course includes 40 hours of lecture and 20 hours of laboratory sessions
<b>SUGGESTED BIBLIOGRAPHY</b>	Madigan M.T., Martinko J.M., Bender K.S., Buckley D.H., Stahl D.A. (14a edizione), Brock, Biologia dei Microorganismi Farris G.A., Gobbetti M., Neviani E., Vincenzini M. (2012) Microbiologia dei prodotti alimentari, Casa Editrice Ambrosiana

## SYLLABUS

Hrs	Frontal teaching
1	History of microbiology
1	Staining of microorganisms
1	Bacterial morphologies
6	Structure and functions of prokaryotic cell: plasma membrane; cytoplasm; cellular inclusions; ribosomes; nucleoid; plasmids; cell wall; bacterial toxins; protein secretion; structures external to the cell wall; microbial biofilms; pili, fimbriae and flagella and cell mobility; endospore
1	Chemotaxis and phototaxis
4	Microbial nutrition; nutrient requirements; transport systems; culture media
1	Pure culture technique and colony morphologies
4	Prokaryotic cell cycle; microbial growth kinetics; growth curve; estimation of growth by direct and indirect methods
1	Continuous cultures
4	Environmental factors affecting the growth of microorganisms: activity water; pH; temperature; oxygen; pressure; radiations
1	Microbial growth in natural environments
3	Methods for the control of microorganisms; the rate of microbial death; measurements of antimicrobial activity
4	Microbial metabolism: aerobic respiration; anaerobic respiration; fermentation
3	Introduction to the microbial ecology of soil

## SYLLABUS

<b>Hrs</b>	<b>Frontal teaching</b>
5	Microbial communities of foods

  

<b>Hrs</b>	<b>Practice</b>
20	Analyses of agricultural (soil, rizosphere, compost) and food (fermented products) samples, plate counts, isolation of microorganisms, morphological analysis and grouping of isolates, physiological and biochemical characterization of the main microorganisms