General information		
Academic subject	Advanced Microbiological Methods (I.C. Methodologies for Food Quality)	
Degree course	Master course Food Science and Technology (LM70)	
Academic Year	*First*	
European Credit Transfer and Accumulation System (ECTS)		3 ECTS
Language	*Italian*	
Academic calendar (starting and ending date)	*September 26th, 2022 – January 20th, 2023*	
Attendance	*No Compulsory*	

Professor/ Lecturer	
Name and Surname	Maria Calasso
E-mail	maria.calasso@uniba.it
Telephone	0805442948
Department and address	*DIP. DISSPA – Università degli Studi di Bari*
Virtual headquarters	*Microsoft teams*
Tutoring (time and day)	Lunedì-venerdì 9.00-17.00 previo appuntamento

---

Syllabus	
Learning Objectives	*The student will acquire knowledge and skills on the main molecular techniques for the identification, typing and ex-situ and in-situ monitoring of starter, deteriorating and pathogenic microorganisms in foods, to monitor the quality and safety during the transformation and storage phases.*
Course prerequisites	*Principles of Biochemistry, Food Microbiology and Genetics*
Contents	• *Microbial starters for main food fermentations; spoilage and pathogen microorganisms* *Culture-dependent techniques* • *Microbial identification by phenotypic methods* • *Microbial identification by genotypic methods* • *Nucleic Acid Extraction and Purification* • *Polymerase chain reaction* • *Electrophoresis* • *Polymerase chain reaction* • *Species Specific Identification* • *Sequencing* • *Amplified Ribosomal DNA Restriction Analysis* • *PCR Restriction Analysis* • *Southern Blot* • *Fluorescent In Situ Hybridization* • *Microbial Typing* • *PFGE (Pulsed Field Gel Electrophoresis)* • *RAPD (Random Amplified Polymorphic DNA)* • *repPCR (Repetitive Element Sequence Based PCR)* • *Polyphasic Approach* • *Culture-independent techniques* • *Microbial community dynamics* • *Real time PCR* • *Next generation sequencing* • *Metagenomics*

	• *Case studies*
Books and bibliography	*Persing et al. MOLECULAR MICROBIOLOGY Diagnostic Principles and Practice 2 nd Ed* *Cocolin, Gobbetti, Neviani. Microbiologia alimentare applicata. Zanichelli, 2022.* *Scientific reviews*
Additional materials	*Notes, slides and other bibliographic materials will be furnished during the course*

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/Self-study hours
Hours			
75	*16*	*14*	*45*
ECTS			
3	*2*	*1*	

Teaching strategy	*Lectures will be presented through PC assisted tools (PowerPoint, video). Field and laboratory classes will be experienced.* *Lecture notes and educational supplies will be provided by means of online platforms*
Expected learning outcomes	The expected learning outcomes, in terms of both knowledge and skills, are provided in Annex A of the Academic Regulations of the Degree in Food Science and Technology (expressed through the European Descriptors of the qualification)
Knowledge and understanding on:	Knowledge of the main advanced methods applied to monitor the main microbial groups involved in food production
Applying knowledge and understanding on:	Knowledge of the main microbiological methods for identification, typing and in situ/ ex situ monitoring of starter, spoilage, and pathogen microorganisms in the food, to guarantee quality and safety during processes of transformation and storage. Skill for management and control of traceability operations of food industries
Soft skills	*Making informed judgements and choices* Correctly advising solutions to assess microbiological properties and quality of foods *Communicating knowledge and understanding* Describing advanced microbiological methods and applications to monitor food quality *Capacities to continue learning* Updating theknowledge of advanced microbiological methods applied to monitor microbiological food quality
The expected learning outcomes, in terms of both knowledge and skills, are provided in Annex A of the Academic Regulations of the Degree in Food Science and Technology (expressed through the European Descriptors of the qualification).	

Assessment and feedback	
Methods of assessment	The exam consists of an oral dissertation on the topics developed during the theoretical and theoretical-practical lectures in the classroom and in the laboratory production plants, as reported in the Academic Regulations for the Bachelor Degree in Food Science and Technology (article 9) and in the study plan (Annex A).

	Students attending at the lectures may have a middle-term preliminary exam, consisting of a written test, relative to the first part of the program, which will concur to the final evaluation and will be considered valid for a year. The evaluation of the preparation of the student occurs on the basis of established criteria, as detailed in Annex B of the Academic Regulations for the Master's degree in food science and Technology. The foreign student's profit test can be done in English in the way described above.
Evaluation criteria	*Knowledge and understanding* • Describing the main advanced methods applied to monitor the main microbial groups involved in food production *Applying knowledge and understanding* • Describing the main microbiological methods for identification, typing and in situ/ ex situ monitoring of starter, spoilage, and pathogen microorganisms in the food, to guarantee quality and safety during processes of transformation and conservation. • Describing the management and control of traceability operations of food industries *Making informed judgements and choices* • Expressing reasonable hypotheses about solutions to assess microbiological properties and quality of foods *Communicating knowledge and understanding* • Describing advanced microbiological methods and applications to monitor food quality *Capacities to continue learning* • Expressing reasonable hypotheses about the application of advanced microbiological methods to monitor microbiological food quality
Criteria for assessment and attribution of the final mark	The evaluation criteria that contribute to the attribution of the final mark will be: knowledge and understanding, the ability to apply knowledge, autonomy of judgment, i.e. the ability to criticize and formulate judgments, communication skills
Additional information	