

General Information	
Academic subject	Advanced Microbiological Methods (I.C. Methodologies for Food Quality)
Degree course	Master programme: Food Science and Technology
ECTS credits	3
Compulsory attendance	No
Teaching language	Italiano

Subject teacher	Name Surname	Mail address	SSD
	<b>Maria Calasso</b>	<a href="mailto:maria.calasso@uniba.it">maria.calasso@uniba.it</a>	AGR/16

ECTS credits details		
Basic teaching activities	2 ECTS Lectures	1 ECTS Laboratory or field class

Class schedule	
Period	I semester
Course year	first
Type of class	Lecture- workshops

Time management	
Hours	75
In-class study hours	30
Out-of-class study hours	45

Academic calendar	
Class begins	September 28 <sup>h</sup> , 2020
Class ends	January 22 <sup>th</sup> , 2021

Syllabus	
Prerequisites/requirements	Principles of biochemistry, food microbiology and genetics
Expected learning outcomes	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>o Knowledge of the main advanced methods applied to monitor the main microbial groups involved in food production</li> </ul> <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>o 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 conservation.</li> <li>o Skill for management and control of traceability operations of food industries</li> </ul> <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> <li>o Correctly advising solutions to assess microbiological properties and quality of foods</li> </ul> <p><i>Communicating knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>o Describing advanced microbiological methods and applications to monitor food quality</li> </ul> <p><i>Capacities to continue learning</i></p> <ul style="list-style-type: none"> <li>o Updating the knowledge of advanced microbiological methods applied to monitor microbiological food quality</li> </ul> <p>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)</p>

<p>Contents</p>	<ul style="list-style-type: none"> <li>• Microbial starters for main food fermentations; spoilage and pathogen microorganisms</li> <li>• Culture-dependent techniques</li> <li>• Microbial identification by phenotypic methods</li> <li>• Microbial identification by genotypic methods</li> <li>• Nucleic Acid Extraction and Purification</li> <li>• Polymerase chain reaction</li> <li>• Electrophoresis</li> <li>• Genic amplification</li> <li>• Species Specific Identification</li> <li>• Sequencing of 16S rRNA Gene</li> <li>• Amplified Ribosomal DNA Restriction Analysis</li> <li>• PCR Restriction Analysis</li> <li>• Southern Blot</li> <li>• Fluorescent In Situ Hybridization</li> <li>• Microbial Typing</li> <li>• PFGE (Pulsed Field Gel Electrophoresis)</li> <li>• RAPD (Random Amplified Polymorphic DNA)</li> <li>• <del>repPCR (Repetitive Element Sequence Based PCR)</del></li> <li>• Polyphasic Approach</li> <li>• Culture-independent techniques</li> <li>• Microbial community dynamics</li> <li>• <del>PCR-DGGE (Polymerase Chain Reaction-Denaturing Gradient Gel Electrophoresis)</del></li> <li>• Real time PCR</li> <li>• Next generation sequencing</li> <li>• Metagenomics</li> <li>• Case studies</li> </ul>
<p>Course program</p>	
<p>Reference books</p>	<ul style="list-style-type: none"> <li>• Lecture notes and educational supplies provided during the course</li> <li>• Lecture notes and educational supplies will be provided by means of online platforms (i.e.: Edmodo)</li> <li>• Scientific reviews.</li> <li>• Persing et Al. MOLECULAR MICROBIOLOGY Diagnostic Principles and Practice 2 nd Ed</li> <li>• Introduction to Bioinformatics in Microbiology; Editors: Christensen, Henrik, 2018, Springer</li> <li>• Brock; Madigan; Martinko. Brock BiologiadeiMicroorganismi 1, 2. Casa Editrice Ambrosiana (2007).</li> <li>• Gobbetti M. e Corsetti A. Biotecnologiedeiprodottilevitati da forno. Casa Editrice Ambrosiana (2010).</li> <li>• Simonetti, Simonetti e D’Auria. Elementi di Tecniche Microbiologiche, Edizioni Mediche Scientifiche Internazionali (2001).</li> </ul>
<p>Notes</p>	
<p>Teaching methods</p>	<p>Lectures will be presented through PC assisted tools (PowerPoint, video). Field and laboratory classes, reading of regulations, case studies will be experienced.</p> <p>Lecture notes and educational supplies will be provided by means of online platforms (i.e.: Edmodo, Google Drive etc.)</p>
<p>Evaluation methods</p>	<p>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 Master Degree in Food Science and Technology (article 9) and in the study plan (Annex A).</p>

	<p>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.</p> <p>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 Degree in Food Science and Technology.</p> <p>Non-Italian students may be examined in English language, according to the aforesaid procedures.</p>
Evaluation criteria	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ Describing the main advanced methods applied to monitor the main microbial groups involved in food production</li> </ul> <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ 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.</li> <li>○ Describing the management and control of traceability operations of food industries</li> </ul> <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> <li>○ Expressing reasonable hypotheses about solutions to assess microbiological properties and quality of foods</li> </ul> <p><i>Communicating knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ Describing advanced microbiological methods and applications to monitor food quality</li> </ul> <p><i>Capacities to continue learning</i></p> <ul style="list-style-type: none"> <li>○ Expressing reasonable hypotheses about the application of advanced microbiological methods to monitor microbiological food quality</li> </ul>
Receiving times	Visiting hours: from Monday to Thursday 9.00 a.m. – 17.30 p.m. by appointment only