COURSE OF STUDY AGRICULTURAL SCIENCES AND TECHNOLOGIES

ACADEMIC YEAR *2023/2024*

ACADEMIC SUBJECT Agricultural microbiology, module of Technologies for Agri-food Manufacturing

General information	
Academic subject	Agricultural microbiology (Technologies for Agri-food Manufacturing I.C.)
Degree course	Agricultural science and technology
Academic Year	*3*
European Credit Transfer and Accumulation System (ECTS)	3
Language	Italian
Academic calendar (starting and ending date)	
Attendance	

Professor/ Lecturer	
Name and Surname	Erica PONTONIO
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Telephone	080-5442945
Department and address	*Department of Soil, Plant and Food Sciences*
Virtual headquarters	*TEAM 28x1dli*
Tutoring (time and day)	Lun – ven 8:30 – 17:30 (prior appointment to be agreed by e-mail.)

Syllabus	
Learning Objectives	
Course prerequisites	Knowledge on Chemistry and Biochemistry.
Contents	○ Lactic acid bacteria metabolisms ○ Concepts on dairy microbiology ○ Leavened baked goods microbiology. ○ Ecophysiology and metabolisms of yeast ○ Concepts on Oenological microbiology
Books and bibliography	○ Lectures notes ○ Microbiologia alimentare applicata di Luca Cocolin, Marco Gobbetti, Erasmo Neviani (ed. 2022)
Additional materials	

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			
	Topics will be discussed through: ○ lessons that discuss the teaching material and data presented with the help		

	of PowerPoint. o Practical lessons Guided tours at agri-food companies
Expected learning outcomes	
Knowledge and understanding on:	Knowledge of use of microorganisms in the main agri-food chains production.
Applying knowledge and understanding on:	o Ability to autonomously identify suitable biotechnologies for processing, hygiene, and food safety to be applied to production processes and agri-food products. o Ability to identify and carry out biotechnological interventions aimed at obtaining appropriate qualitative (organoleptic, technological, hygienic, and nutritional) standards of fermented food products.
Soft skills	• *Making informed judgments and choices* o Ability to interpret the results of analytical controls and to adjust the parameters of fermentation processes to the achievement of defined quality standards. • *Communicating knowledge and understanding* o Ability to communicate the importance and role of microorganisms and the purpose of biotechnological processes for the control and processing of raw materials in foods, to obtain specific quality standards. • *Capacities to continue learning* o The expected results of learning, in terms of knowledge and skills, are listed in the Annex A of the Teaching Regulations of the bachelor (expressed by means of the European Descriptors of the bachelor in Agricultural Science and Technology) and are summarized as follows: o Ability to update and deepen self-knowledge of food biotechnological processes through the study of scientific publications in the microbiological field, with particular focus to applications in oenology, dairy and leavened baked goods.

Assessment and feedback	
Methods of assessment	The final exam, unique, total, and collegial, for the Technologies of Agri-food Manufacturing I.C., consists of an oral test on the topics of both modules ("Agri-food Industries" and "Agricultural Microbiology"). Marks are out of 30, as defined in the Didactic regulations of the bachelor in Agricultural Science and Technology (article 9) and in the syllabus (Annex A). The evaluation of the student's preparation is based on established criteria, as detailed in Annex A of the Didactic regulations of the bachelor program. For the final exam, the oral test aims at evaluating the knowledge and skills obtained on the course of both modules. The positive outcome of the oral test will result in the final evaluation of the examination, which will be expressed as the arithmetic mean of the oral tests of the two modules. For students enrolled in the academic year of the course, there is an written exemption test related to the topics of lessons and exercises conducted in the period preceding the test (about half the program). Examination for Agricultural Microbiology module is overcome if the student shows at least sufficient preparation, a level of knowledge appropriate to the minimum level of requirements, sufficient mastery of acceptable subject matter and language, and ability to analyse problems and structure of the arguments and has also successfully passed the exemption test of Agri-food Industries. The positive

	outcomes of the exemption tests of both modules contribute to the evaluation of Technologies of Agri-food Manufacturing I.C. and have the validity of an academic year. For students eligible for exoneration, the final oral exam will only cover the topics of lessons and exercises carried out during the period following the exemption test. In this case, the assessment of the final exam is expressed as the mean between the mark of the exemption and the final tests. For foreign students the exam can be done in English.

Evaluation criteria	• *Knowledge and understanding*
	  ○ Knowledge of the growth and control parameters of microorganisms and the main biotechnological processes to produce fermented foods.
	• *Applying knowledge and understanding*
	  ○ Ability to autonomously identify suitable biotechnologies for processing, hygiene and food safety to be applied to production processes and agri-food products.
	  ○ Ability to identify and carry out biotechnological interventions aimed at obtaining appropriate qualitative (organoleptic, technological, hygienic and nutritional) standards of fermented food products.
	• *Autonomy of judgment*
	  ○ Ability to describe, select and manage the growth of microorganisms and the main biotechnological processes to produce fermented foods.
	• *Communicating knowledge and understanding*
	  ○ Describe the layout of biotechnological processes by identifying critical points and the most appropriate management strategies.
	  ○ Describe hypothetical biotechnological processes according to the compositional characteristics of the raw material and the desired characteristics for the finished product.
	• *Communication skills*
	  ○ Ability to explain with scientific rigour the knowledge of food microbiology and biotechnological processes, with particular focus to applications in oenology, dairy and leavened baked goods.
	• *Capacities to continue learning*
	The expected results of learning, in terms of knowledge and skills, are listed in the Annex A of the Teaching Regulations of the bachelor (expressed by means of the European Descriptors of the bachelor in Agricultural Science and Technology) and are summarized as follows:
	  ○ Ability to update and deepen self-knowledge of food biotechnological processes through the study of scientific publications in the microbiological field, with particular focus to applications in oenology, dairy and leavened baked goods.

Criteria for assessment and attribution of the final mark	Marks are out of 30, as defined in the Didactic regulations of the bachelor in Agricultural Science and Technology (article 9) and in the syllabus (Annex A). The evaluation of the student's preparation is based on established criteria, as detailed in Annex A of the Didactic regulations of the bachelor program.
Additional information	
	Office hours: Monday - Friday, after appointment, at the Department of Soil, Plant and Food Sciences, to be agreed by e-mail.