



## Information about the subject

**Degree:** Bachelor of Science Degree in Veterinary Medicine

**Faculty:** Faculty of Veterinary Medicine and Experimental Sciences

**Code:** 1262511 **Name:** Microbiology in Food

**Credits:** 6,00 **ECTS** **Year:** The course is not offered this academic year **Semester:** 1

**Module:** Module of elective courses

**Subject Matter:** Feeding **Type:** Elective

**Department:** Animal Production and Public Health

**Type of learning:** Classroom-based learning

**Languages in which it is taught:**

**Lecturer/-s:**



## Module organization

### Module of elective courses

Subject Matter	ECTS	Subject	ECTS	Year/semester
Intensifications per animal group	24,00	Specialisation in Clinic of Wild and Exotic Animals	6,00	5/1
		Specialisation in the Equine Clinic	6,00	This elective is not offered in the academic year 23/24
		Specialisation in treatment of small animals	6,00	5/1
		Surgical pathology of the musculoskeletal system of small animals	6,00	5/1
Animal Reproduction and Production	30,00	Fighting bull	6,00	This elective is not offered in the academic year 23/24
		Reproductive Technology	6,00	This elective is not offered in the academic year 23/24
		Specialisation in animal production	6,00	5/1
		Specialisation in animal research	6,00	This elective is not offered in the academic year 23/24
		Specialisation in aquaculture	6,00	This elective is not offered in the academic year 23/24



Feeding	12,00	Microbiology in Food	6,00	This elective is not offered in the academic year 23/24
		Quality management in the agri-food industry	6,00	This elective is not offered in the academic year 23/24

## Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 The student has understood and assimilated the contents of the module.
- R2 The student is able to solve problems or practical cases related to these contents, using different resources (bibliographic, computer, etc).
- R3 The student is able to work in a laboratory, correctly performing the basic operations and taking into account the corresponding safety standards. The student understands the planning, development and purpose of the experience and is able to compare and validate the obtained results.
- R4 The student is able to write a comprehensible and organized text on various aspects of the subject.
- R5 The student is able to present and defend his or her work correctly.
- R6 The student searches bibliographic information from different sources and knows how to analyse it with a critical and constructive spirit.
- R7 The student collaborates with the teacher and classmates throughout the learning process: works in groups, is respectful in his/her treatment towards others, is proactive and complies with the organizational rules of the module.



## Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB3	Capacity to gather and interpret relevant data usually within their specific field of study and capacity to make judgments that include reflection on relevant social, scientific or ethical issues.			X	
CB4	Capacity to communicate information, ideas, problems and solutions at specialist and non-specialist levels.			X	
CB5	Capacity to develop those learning skills needed to undertake further studies with a high degree of autonomy.			X	
GENERAL		Weighting			
		1	2	3	4
CG0	Capacity to speak well in public.		X		
SPECIFIC		Weighting			
		1	2	3	4
E55	Knowing and applying food components and characteristics.				X
E56	Knowing and applying food collection, storage and processing.				X
E57	Knowing and applying food changes, alterations and adulterations.				X
E58	Knowing and applying health inspection criteria and regulations.				X
E59	Knowing and applying ante- and post-mortem veterinary inspection.				X
E60	Knowing and applying establishment and product inspection.				X



E61	Knowing and applying good hygienic practices and the hazard analysis critical control point system.				X
E62	Knowing and applying handling and treatment control.				X
E63	Knowing and applying food safety and public health rules.				X
E64	Knowing and applying food risk analysis: risk identification, management and communication.				X
E65	Knowing and applying research methods on outbreaks of food toxi-infections.				X
E66	Knowing and applying dynamics and demographics of infections and food poisonings.				X

TRANSVERSAL		Weighting			
		1	2	3	4
T1	Capacity of analysis, synthesis, implementation of knowledge for problem-solving and decision-making.			X	
T2	Understanding and applying the scientific method to professional practice including evidence-based medicine.		X		
T3	Basic knowledge of the veterinary profession: legal, economic, administrative, planning and time management issues and the veterinarians' society together with the importance of monitoring quality, standardization and protocols of veterinary practice.		X		
T4	Mastering fluency in oral and written mother tongue communication, listening and responding effectively using a language appropriate to audience and context.			X	
T5	Knowledge of a second language, preferably English, especially technical vocabulary of veterinary science.	X			
T6	Using information technology to communicate, share, search for, collect, analyze and manage information, especially related to the veterinarian practice.			X	
T7	Ability to adapt to new situations, self-critical ability, being aware of personal limitations and understanding when and where seeking and obtaining advice and professional help.			X	



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T8	Efficient and effective work, both independently and as a member of a multidisciplinary team or unit, showing respect, appreciation and sensitivity to the work of others.		x	
T9	Keeping an ethical behaviour in the exercise of given responsibilities toward the profession and society.		x	
T10	Ability to learn, to research, and to be aware of the need to keep knowledge updated, and attending training programs.		x	
T11	Ability to work in an international context, appreciating diversity and multiculturalism, through the knowledge of foreign cultures and customs.	x		



## Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R7	20,00%	Evaluation of the use of the practical lessons in the classroom, of problems or computer science, seminars and tutorials, by means of participation, computer-supported problem solving and the elaboration of the corresponding reports.
R3, R7	30,00%	Evaluation of the practical laboratory work, which must demonstrate the competences acquired by the student and his or her ability to use them to solve the different situations and problems that arise in a laboratory; this assessment may consist of one of the following methods, or a combination of several of them: an individual written test, the individual or group performance of a laboratory experience, the delivery of an individual or group report on the work carried out in the laboratory.
R3, R7	20,00%	Evaluation of practical work in a clinic through which the student must demonstrate the competences acquired and the ability to use them to solve the different situations and problems that arise in a clinic; this assessment may involve one of the following methods, or a combination of several of them: a written individual test, the individual or group performance of a clinical experience, the delivery of an individual or group report on the work carried out in the laboratory.
R4, R5, R6	10,00%	Evaluation of group work through a system of continuous assessment throughout the course based on the delivery of assignments the objectives and content of which will be proposed by the teacher.



R4, R5, R6	20,00%	Evaluation of activities in which the student must do some research individually and structure information related to each of the topics through a system of continuous assessment throughout the course based on the delivery of papers, the objectives and contents of which will be proposed by the teacher.
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## Observations

### MENTION OF DISTINCTION:

According to Article 22 of the Regulations governing the Evaluation and Qualification of UCV Courses, the mention of "Distinction of Honor" may be awarded by the professor responsible for the course to students who have obtained, at least, the qualification of 9 over 10 ("Sobresaliente"). The number of "Distinction of Honor" mentions that may be awarded may not exceed five percent of the number of students included in the same official record, unless this number is lower than 20, in which case only one "Distinction of Honor" may be awarded.

## Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 On-site training activity aimed primarily at acquiring knowledge acquisition skills. It is characterised by the fact that students are spoken to. Also called master class or exposition, it refers to the oral presentation made by the teacher, (with the support of blackboard, a computer and a projector for the display of texts, graphs, etc.), in front of a group of students. They are expository, explanatory or demonstrative sessions of contents. The size of the group is determined by the limit or physical capacity of the classroom; therefore, it is a single group.
- M2 On-site training activity aimed primarily at obtaining knowledge application and research skills. Knowledge is built through interaction and activities. The activity consists of supervised monographic sessions with shared participation (teachers, students, experts). The size of the group is variable, from one large group to various small groups, with a minimum of 6 students to ensure interaction. The evaluation will be based on follow-up records kept by the teacher. Participation and the development of the capacity to problematize should be taken into account.





- M6 On-site training activity in groups carried out in the laboratory. It includes the sessions where the students develop laboratory experiments, make dissections or use the microscopes for the study of histological or histopathological samples actively and autonomously, under the supervision of the professor. It also includes work with healthy animals, objects, products, corpses (e.g., animal handling, bacteriological practices, physiology or biochemistry, meat inspection, etc.). It would correspond to the "Supervised practical non-clinical animal work" type e2 of the European evaluation of EAEVE. The size of the group is variable, in a range of 10 to 20 students.
- M8 A set of on-site training activities carried out by the teacher to provide personalised attention to the student or in small groups with the aim of reviewing and discussing the materials and topics presented in classes, seminars, readings, carrying out projects, etc. The aim is to ensure a truly comprehensive education of the student rather than a mere transfer of information. It is, therefore, a personalized assistance relationship in which the tutor assists, facilitates and guides one or more students in the learning process.
- M11 Autonomous training activities related to personal study, or the preparation of individual course assignments. The individual preparation of readings, essays, problem solving, papers, reports, etc. will be evaluated through presentations or submissions during theoretical classes, practical classes, seminars and/or tutorials. The evaluation of the submitted papers will consider the structure of the paper, the quality of the documentation, originality, spelling and presentation.



## IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons (TL) M1	R1, R2, R4, R7	60,00	2,40
Seminars (S) M2	R1, R2, R4	20,00	0,80
Laboratory Practice (LP) M6	R3, R7	28,50	1,14
Tutorial M8	R1, R2, R3, R4, R5, R6, R7	18,50	0,74
Evaluation (Ev) M6	R1, R2, R3, R4, R5, R6, R7	8,00	0,32
<b>TOTAL</b>		<b>135,00</b>	<b>5,40</b>

## LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Group work	R4, R5, R6	7,50	0,30
Individual work M11	R4, R5, R6	7,50	0,30
<b>TOTAL</b>		<b>15,00</b>	<b>0,60</b>



## Description of the contents

Description of the necessary contents to acquire the learning outcomes.

### Theoretical contents:

Content block	Contents
UNIT 1: Food Microbiology	1. History and development of food microbiology.2. Characteristics of the microorganisms that predominate in food3. Sources of microorganisms in food4. Microbiological quality of food
DIDACTIC UNIT 2: Uses of microorganisms in food	5. Microorganisms used in food fermentation6. Indicator cultures and bacteriophages7. Production of fermented foods8. Favorable intestinal bacteria: probiotics9. Bioconservatives of foods of microbial origin
DIDACTIC UNIT 3: Microbial Decomposition of Foods	10. Indicators of microbial food breakdown
DIDACTIC UNIT 4: Control of microorganisms in food	11. Physical elimination12. Washing and sterilization13. Heat removal.14. Elimination by reduction of the percentage of water activity.15. Control by combination of methods16. Control by antimicrobial conservatives
DIDACTIC UNIT 5: Detection of microbes and safe food	17. Conventional detection methods18. Quick detection methods19. Automated detection methods
DIDACTIC UNIT 6: Practical content	Practice 1. Preparation and handling of laboratory equipment.Practice 2. Detection of Salmonella in foodPractice 3. Detection of Listeria monocytogenes in foodPractice 4. Identification of Salmonella by slide agglutinationPractice 5. Identification of Campylobacter yeyuni according to ISO standardPractice 6. Microbiological analysis of airs and surfaces



## DIDACTIC UNIT 7: Technical outputs

Visit 1. Biotecme (microorganisms for agricultural products). Visit 2. Intertek Ibérica Spain, S.L.U. (Laboratory microbiological analysis of food). Alboraya Visit 3. Cleanity. Cheste Visit 4. Ainia (Technology Center). Paterna Visit 5. Quesos Calero S.I. Rod Quart

## Organization of the practical activities:

	Content	Place	Hours
PR1.	Preparation and handling of laboratory equipment	Laboratory	5,00
PR2.	Detection of Salmonella in food	Laboratory	5,00
PR3.	Detection of Listeria monocytogenes in food	Laboratory	5,00
PR4.	Identification of Salmonella by slide agglutination	Laboratory	5,00
PR5.	Identification of Campylobacter yeyuni according to ISO standard	Laboratory	5,00
PR6.	Microbiological analysis of airs and surfaces	Laboratory	5,00



## Temporary organization of learning:

Block of content	Number of sessions	Hours
UNIT 1: Food Microbiology	8,50	17,00
DIDACTIC UNIT 2: Uses of microorganisms in food	9,00	18,00
DIDACTIC UNIT 3: Microbial Decomposition of Foods	6,00	12,00
DIDACTIC UNIT 4: Control of microorganisms in food	8,00	16,00
DIDACTIC UNIT 5: Detection of microbes and safe food	5,00	10,00
DIDACTIC UNIT 6: Practical content	16,00	32,00
DIDACTIC UNIT 7: Technical outputs	15,00	30,00

## References

- Bibek Ray, arun bhuma. (2010) Fundamentos de Microbiología de los alimentos
- Fratamico, Pina M. Foodborne pathogens : microbiology and molecular biology
- Madigan, M.T. (2009). Brock Biología de los microorganismos. Madrid: Pearson Addison Wesley.
- Willey, J.M. (2009). Prescott, Harley y Klein. Microbiología. Madrid: McGrawHill.



## Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

**Situation 1: Teaching without limited capacity** (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

**Situation 2: Teaching with limited capacity** (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

### 1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

☒ Microsoft Teams

☐ Kaltura



## **Situation 3: Confinement due to a new State of Alarm.**

In this case, the following changes are made:

### **1. Educational Activities of Onsite Work:**

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

☒ Microsoft Teams

☐ Kaltura

Explanation about the practical sessions:



## 2. System for Assessing the Acquisition of the competences and Assessment System

### ONSITE WORK

#### Regarding the Assessment Tools:

☒ The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

☐ The following changes will be made to adapt the subject's assessment to the online teaching.

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

#### Comments to the Assessment System: