

COURSE DESCRIPTION

COURSE DETAILS

Title (of the course): **MICROBIOLOGÍA DE LOS ALIMENTOS**

Code: 102233

Degree/Master: **GRADO DE CIENCIA Y TECNOLOGÍA DE LOS ALIMENTOS**

Year: 2

Name of the module to which it belongs: SEGURIDAD ALIMENTARIA

Field: SEGURIDAD ALIMENTARIA

Character: OBLIGATORIA

Duration: SECOND TERM

ECTS Credits: 6.0

Classroom hours: 60

Face-to-face classroom percentage: 40%

Study hours: 90

Online platform: <https://www.ucomoodle.es>

LECTURER INFORMATION

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PREREQUISITES AND RECOMMENDATIONS

Prerequisites established in the study plan

There are no previous requirements

Recommendations

It is advisable that students have at least a B-1 level in English and have previously done courses on Microbiology

INTENDED LEARNING OUTCOMES

- | | |
|------|--|
| CB4 | To make students able to share information, ideas, problems and solutions with an audience of specialists and non-specialists |
| CU2 | Improving user-level skills in ICT |
| CT1 | Ability to correctly express oneself in the Spanish language in its disciplinary field. |
| CT2 | Ability to resolve problems. |
| CT3 | Ability to work as a team. |
| CT7 | Analysis and synthesis skills. |
| CT11 | Organisational and planning skills. |
| CE3 | To understand the techniques and to carry out analysis of food in order to guarantee optimal conditions for human consumption. |
| CE7 | To analyse the biological physical and chemical dangers of the food chain in order to protect public health. |



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CE8 To apply the rules of food hygiene to industry design, as well as to alimentary processes and products in order to guarantee food security in accordance with the legal framework.

OBJECTIVES

- To think about the concept of this subject.
- To explain the factors that make possible food spoilage caused by microbiological associations.
- To relate different kind of food to food spoilage caused by microbiological associations.
- To know foodborne pathogens.
- To know how to raise a microbiological analysis of food.
- To valorate the importance of initial or common biota found in food commodities.
- To understand how microbial food contamination is caused.
- To recognize food spoilage caused by microorganisms.

CONTENT

1. Theory contents

THEORETICAL CONTENTS

Unit 1.- Microbial ecology of foods

Lesson 1.- Concept of food microbiology.

Lesson 2.- Microbial contamination of food.

Lesson 3.- Ecology of microorganisms in food.

Lesson 4.- Intrinsic factors influencing microbial activity of food.

Lesson 5.- Extrinsic factors influencing microbial activity of food.

Unit 2.- Fundamentals on microbiological analysis of foods.

Lesson 6.- Microbiological legislation for food.

Lesson 7.- Spanish and European legislation.

Lesson 8.- Microbiological quality of food: microbiological criteria

Lesson 9.- Foodborne illnesses caused by microorganisms

Lesson 10.- Foodborne illnesses caused by pathogenic organisms I.

Lesson 11.- Foodborne illnesses caused by toxins II.

Lesson 12.- Investigation of an epidemic food poisoning outbreak.

Lesson 13.- Microbiological analysis of food.

Lesson 14.- Traditional and conventional methods for microbiological analysis of food.

Lesson 15.- Alternative methods for microbiological analysis of food I: Conventional methods automation.

Lesson 16.- Alternative methods for microbiological analysis of food II: Rapid and very rapid methods.

Lesson 17.- Control of microbiological quality of food.

Unit 3.- Microbiology of Food commodities.

Lesson 18.- Microbiology of meat and meat products.

Lesson 19.- Microbiology of fish, molluscs and crustaceans.

Lesson 20.- Microbiology of raw and heat-treated milk.

Lesson 21.- Microbiology of fermented milk: yoghurt.

Lesson 22.- Microbiology of other fermented milk. Ice creams.

Lesson 23.- Microbiology of cream, butter and cheese.

Lesson 24.- Microbiology of eggs and eggs products.

Lesson 25.- Microbiology of fruit and vegetables.

Lesson 26.- Microbiology of heat-treated canned food.



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Lesson 27.- Microbiology of ready-to-eat food.

Lesson 28.- Microbiology of dehydrated food. Species.

Lesson 29.- Microbiology of cereals and its products. Sugars and its products.

Lesson 30.- Microbiology of drinkable water. Bottled water. Non-alcoholic beverages.

2. Practical contents

PRACTICAL CONTENTS

Laboratory

- Introduction: safety rules in the lab, materials, equipment, sterilisation, etc.,
- Homogenisation of samples and decimal dilutions preparation.
- Microbiological quality of food:

Counting of aerobic mesophilic bacteria on PCA. Counting of total enterobacteria as marker of microbiological quality of food. Counting of lactose-positive enterobacteria (coliforms) on liquid media (most probable number method - MPN)

- Biota control in industrially-fermented food commodities: Determination of Lactic Acid Bacteria.
- Hygienic-sanitary evaluation of equipment, handlers and environment:

Microbiological control of effective cleaning and disinfection of surfaces. Microbiological control of air quality: sedimentation technique. Control of food handlers. Nasal carriers. Handwashing

- Interpreting results
- Practical sessions report

Preparation of a presentation (Power Point) to be presented in class, based on a scientific paper written in English related to food microbiology.

METHODOLOGY

General clarifications on the methodology (optional)

GENERAL EXPLANATIONS ABOUT METHODOLOGY:

- 1) Theoretical contents shall be provided by lectures in which student participation or interaction shall be promoted.
- 2) Students shall carry out practical laboratory sessions (in-class activity) and afterwards, working in groups, they have to write a report about their practical classes (not in-class activity).
- 3) Students (group activity) shall prepare a presentation (Power Point) to be presented in class, based on a scientific paper written in English related to food microbiology.
- 4) During seminar-sessions European food safety problems shall be dealt.

Methodological adaptations for part-time students and students with disabilities and special educational needs

Students should communicate their part-time option in advance. Every particular case would be considered.

Face-to-face activities

Activity	Large group	Medium group	Total
<i>Assessment activities</i>	3	-	3
<i>Conference</i>	-	2	2
<i>Group presentation</i>	-	9	9
<i>Lab practice</i>	-	12	12

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Activity	Large group	Medium group	Total
Lectures	30	-	30
Seminar	-	2	2
Tutorials	-	2	2
Total hours:	33	27	60

Off-site activities

Activity	Total
Exercises	5
Group work	15
Reference search	10
Self-study	60
Total hours	90

WORK MATERIALS FOR STUDENTS

Dossier - <http://moodle.uco.es/moodlemap/>

Placement booklet - <http://moodle.uco.es/moodlemap/>

EVALUATION

Intended learnig	Exams	Oral Presentation	Placement reports
CB4	X	X	X
CE3	X	X	X
CE7	X	X	
CE8	X	X	X
CT1	X	X	X
CT11	X	X	X
CT2	X	X	X
CT3	X	X	X
CT7	X	X	X
CU2		X	X

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Intended learnig	Exams	Oral Presentation	Placement reports
Total (100%)	70%	15%	15%
Minimum grade	5	5	5

(*)Minimum grade necessary to pass the course

Method of assessment of attendance:

Attendance will add till 1 point to the final mark

General clarifications on instruments for evaluation:

GENERAL EXPLANATIONS ABOUT EVALUATION TOOLS:

- 1) Available materials: They are uploaded on the UCO Moodle Platform.
- 2) Minimum mark and validity period of the partial-examinations. Minimum mark to pass the subject is 5 and the validity period of the partial-examinations and other activities, practical sessions, is up to the extraordinary exams in September.
- 3) General explanations about the evaluation:
Theory examination shall be carried out in the form of written papers and it might include multiple choice questions, short answers and essays, as well as practical suggestion cases. Attendance to lessons shall be controlled by attendance sheet. Laboratory report and student-groups speeches shall be evaluated.

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

Adaptations of didactic methodology for partial-time students shall be carried out according to the Center legislation and studying every case in particular.

Qualifying criteria for obtaining honors:

Students with a numerical mark of 9 or over, taking into account his/her participation on academic activities.

BIBLIOGRAPHY

1. Basic Bibliography

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Basic bibliography

- Collins C., Lyne P.M. 2004. Microbiological methods. Arnold, London.
- Frazier W.C., Westhoff D.C. 1996. Food Microbiology. McGraw Hill Publ. Co. New Delhi.
- ICMSF. 2000. Microorganisms in Foods 6. Microbial Ecology of Food Commodities. Kluwer Academic & Plenum Publishers. New York.
- Jay J.M., Loessner M.J., Golden D.A. 2009.- Microbiología Moderna de los Alimentos. Acribia, Zaragoza.
- Juaneja V.K., Sofos J.N. 2010. Pathogens and Toxins in Foods. ASM Press, Washington, DC.
- Mossel D.D.A., Moreno B., Struijk C.B. 2003.- Microbiología de los Alimentos. Acribia, Zaragoza.
- Pascual M^aR., Calderón V. 2000.- Microbiología Alimentaria. Díaz de Santos, Madrid.
- COMMISSION REGULATION (EC) No 1441/2007 of 5 December 2007 amending Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs (07/12/07), L 322/12-28.
- Robinson R.K., Batt C.A., Patel P.D. 2000. Encyclopedia of Food Microbiology. Academic Press, Londres.

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Yousef A. E., Carlstrom C. 2006. Microbiología de los Alimentos: Manual de laboratorio. Acibia, Zaragoza.

2. Further reading

None

COORDINATION CRITERIA

Common evaluation criteria

Common learning outcomes

Joint activities: lectures, seminars, visits ...

SCHEDULE

Period	Assessment activities	Conference	Group presentation	Lab practice	Lectures	Seminar	Tutorials
1# Fortnight	0.0	0.0	0.0	0.0	4.0	0.0	2.0
2# Fortnight	0.0	0.0	0.0	12.0	4.0	0.0	0.0
3# Fortnight	0.0	0.0	3.0	0.0	4.0	0.0	0.0
4# Fortnight	0.0	2.0	3.0	0.0	4.0	0.0	0.0
5# Fortnight	0.0	0.0	3.0	0.0	4.0	2.0	0.0
6# Fortnight	0.0	0.0	0.0	0.0	4.0	0.0	0.0
7# Fortnight	0.0	0.0	0.0	0.0	4.0	0.0	0.0
8# Fortnight	3.0	0.0	0.0	0.0	2.0	0.0	0.0
Total hours:	3.0	2.0	9.0	12.0	30.0	2.0	2.0

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.