Food Safety

Code: 107546
ECTS Credits: 6

2025/2026

Degree	Type	Year
Microbiology	OP	4

Contact

Name: Maria Manuela Hernandez Herrero

Email: manuela.hernandez@uab.cat

Teachers

Carolina Ripollés Àvila

Arnau Vilas Franquesa

Pere Puigbo Avalos

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Although there are no official prerequisites, it is convenient for the student to review the knowledge acquired in the subjects of first, second and third courses:

- Microbiology
- Microbe ecology
- Food Microbiology
- Epidemiology of infectious diseases

Objectives and Contextualisation

Food safety integrates different matters. The aim is that students can develop a quality system that allows the food industry to implement and manage rationally the measures and conditions necessary to ensure the suitability of a product for human consumption.

General objective:

To introduce students to risk analysis in food safety, used as a tool for public health protection, in order to control risks in the most effective way through the selection and implementation of appropriate measures by both authorities and food businesses. To identify and analyze the significant hazards that may arise at each

and every stage of food production and marketing. Additionally, to identify the various factors that can affect food safety in order to apply the appropriate control measures, while managing activities to ensure the suitability of a product for human consumption."

Specific objectives:

- Understand the foundations of risk analysis applied to food safety.
- Apply tools for the scientific assessment of risk.
- Understand risk management policies applied to food safety, both by regulatory authorities and food business operators.
- Understand risk communication strategies applied to food safety.
- Identify, analyze, and assess the most significant biological, chemical, and physical hazards.
- Identify the factors that influence the presence of hazards in food in order to establish critical limits and their monitoring systems, as well as the product's shelf life.
- Identify preventive measures to control the presence or development of hazards during food processing.
- Develop and manage the Hazard Analysis and Critical Control Point (HACCP) system.
- Develop and manage practices that provide the basic environment and operational conditions necessary for the production of safe food.

Learning Outcomes

1. CM13 (Competence) Plan diagnostic and control strategies for infectious diseases from a global perspective and integrating clinical and epidemiological data to provide innovative responses to the challenges, needs and demands of society.
2. CM14 (Competence) Integrate knowledge and skills in the field of microbiology applied to health, working individually and in groups, to prepare and present in writing or orally and publicly a scientific work either in English or in one's own language or others.
3. KM20 (Knowledge) Describe the most important groups of infectious agents, their biological cycles, the molecular mechanisms of pathogenesis and toxicity and the epidemiology of the diseases they cause.
4. KM21 (Knowledge) Indicate the main measures for the prevention and control of pathogenic microorganisms.
5. SM19 (Skill) Use bibliography or internet tools, both in English and in one's own language or others, for the study of pathogenic microorganisms and their control.
6. SM20 (Skill) Apply appropriate methods for the identification, diagnosis and control of microbial agents and their genetic or metabolic components in clinical samples or food.

Content

Unit 1.- Concepts: Food safety. Current trends in food safety.

Unit 2.-Risk analysis. Definition. Agencies involved at the municipal, regional, national, and European levels, and their relationship with other international organizations.

Unit 3.- Risk assessment: Identification of biological, chemical, and physical hazards and the factors affecting their presence. Hazard characterization, exposure assessment, and risk characterization. Tools for conducting risk assessment.

Unit 4. Food safety management: Food Safety Policy in Catalonia and Spain. Official control as a tool to protect public health: municipal, regional, European, and international levels. Food alert networks. Management within the agri-food company.

Unit 5.- Risk communication: perception, myths, and legends.

Unit 6.- The Hazard Analysis and Critical Point Control (HACCP) system. Technical barriers in its implementation. Key stages in the development of the HACCP system. Study and development of the HACCP system. Team training, product description. Elaboration of the flowchart and its verification. Analysis of hazards and selection of the most significant. Identification of preventive and / or control measures. Identification of the Critical Control Points, establishment of the critical limits, monitoring of PCC and corrective measures. Verification of HACCP. Documents, registries, and validation of the Plan.

Unit 7.- Program of control of suppliers. Definition Development of the program. Factors to consider: suppliers and product specifications. Description and registration of activities. Importance of supplier control. Documents and registers.

Unit 8.- Traceability program. Definition Legal Bases. Benefits and requirements for its implementation. Importance and aspects to be considered in the development of the traceability plan. Documents and registers.

Unit 9.- Design and maintenance of facilities and equipment. Location of the industries. General characteristics in the design of the installations. Characteristics of materials. Description, monitoring, and registration of maintenance activities.

Unit 10.- Clean and disinfecting program. Definition. Key aspects to be considered in the design of the plan: level of risk, evaluation of dirt, selection of detergents and disinfectants. Factors that affect the effectiveness of disinfectants. Monitoring, corrective measures and control of the plan. Documents and registers.

Unit 11.- Control Plan of pests and other undesirable animals. Definition. The integrated control Pest Plan. Devices used to control pests. Monitoring, corrective measures and control of the plan. Documents and registers.

Unit 12.- Water control plan. Definition of potability. Health criteria of water for human consumption. Characteristics of the facilities. Monitoring, corrective measures and control of the plan. Documents and registers.

Unit 13.- Control plan for allergens and substances that cause intolerance. Information required in the control of suppliers and the labeling of the elaborated product. Measures to avoid cross contamination: Warehouses, processing and cleaning. Monitoring, corrective measures and control of the plan. Documents and registers.

Unit 14.- Plan of control of by-products and waste. Definition of Hygienic aspects in the elimination of waste. Classification, separation, storage, and withdrawal. Characterization of by-products and waste. Monitoring, corrective measures and control of the plan. Documents and registers.

Unit 15.- Temperature control plan: Description of the equipment used. Monitoring and calibration activity. Food, equipment, and environment temperature records. Corrective measures and control of the plan.

Unit 16. Training plan for the Handling and Training Staff. Previous staffing skills. Purpose of the plan. Phases to consider in its development, implementation, and evaluation. General and specific knowledge. Monitoring, corrective measures and control of the plan.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom practice session	6	0.24	KM20, KM21, KM20
Classroom theoretical sessions	39	1.56	CM13, CM14, KM20, KM21, SM20, CM13

Type: Supervised			
Tutorials	4	0.16	CM13, CM14, CM13
Type: Autonomous			
Individual or group Self-learning activities	40	1.6	CM13, CM14, KM20, KM21, SM19, SM20, CM13
Shelf-study	57	2.28	CM14, KM20, KM21, SM19, SM20, CM14

The course development is based on the following activities:

1) Classroom theoretical sessions: consist of lectures supported by ICTs, in explaining the fundamental concepts of the basic themes of the subject.

2) Classroom practices for group self-learning activities: sessions will be held at the end of the semester. Each group will have to present, with visual support, the most important aspects of the work done.

3) Tutorials: tutorials will be done throughout the course to monitor self-learning work, and other aspects related to the subject. The tutorials will be directed primarily to guide and resolve the doubts of students. Tutorials can be done individually or in groups, depending on the objectives, in person or by TEAMS, by appointment.

Non-contact activities

1) Self-learning activities individual or groups: This is a task applied in which the student will have to do the search for information along with the one provided by the professor. The task will be presented in writing form.

2) Group Self-learning activities: students will have to do a task on a topic posed by the professor, following formal guidelines and contents common to all groups.

"In this course, the use of Artificial Intelligence (AI) technologies is allowed as an integral part of the development of the work, provided that the final result reflects a significant contribution from the student in terms of analysis and personal reflection. The student must clearly identify which parts were generated using such technology, specify the tools used, and include a critical reflection on how these tools influenced both the process and the final outcome of the activity. Lack of transparency in the use of AI will be considered a breach of academic honesty and may result in a penalty in the activity's grade or more serious sanctions in severe cases."

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
First control	25	2	0.08	CM13, CM14, KM20, KM21, SM19, SM20
Group-based self-learning activities	30	0	0	CM13, CM14, KM20, KM21, SM19
Individual or group-based self-learning activity	10	0	0	CM14, KM20, KM21, SM19

Second control	35	2	0.08	CM14, KM20, KM21, SM19

The skills of this subject will be evaluated by:

- First Control: from unit 1 to unit 5, and activities related to individual self-learning carried out in this period with a weight of 25% of the final mark
- Second Control: from unit 6 to unit 16, and activities related to individual self-learning carried out during this period, plus the material treated in the seminars, with a weight of 35% of the final mark
- Individual or group-based self-learning activity : It will have a 10% weight of the final mark.
- Group-based self-learning activities. Both written work and oral presentation will be valued. Group activity will have a weight in the final mark of 30% (document 25% and oral presentation 5%).

To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two-thirds of the final score of the course or module. Thus, the student will be graded as "Not Evaluable" if the weighting of all conducted evaluation activities is less than 67% of the final score.

To pass the course is required:

1. A minimum of 5 points (over 10) in each of the two controls; If this mark is not reached, the student must present to the recovery exam

2. A minimum of 5 points (out of 10) in the group self-learning activity. If this mark is not reached, the group will have one week for doing the appropriate modifications to improve this activity.

To average the marks of the self-learning activities, the mark of the controls must be at least 5 points (out of 10).

Single evaluation

1) A single examination in which the contents of the entire subject's program will be evaluated. The grade achieved in this synthesis test will correspond to 60% of the final grade for the course, as a 5 (out of 10) is required to pass the course.

2) A self-study individual activity with a weight of 10% of the final grade.

3) A self-learning activity related to a group case, weighing 25% written document and 5% oral presentation. A 5 out of 10 is necessary to pass the course. If this mark is not reached, the written document with the appropriate modifications will be delivered on the recovery day.

The single examination will take place on the same day, time, and place as the second control of the continuous evaluation. The delivery of the self-study activities and the oral presentation will be conducted on the same day as the synthesis test. The recovery examination for the single evaluation will take place on the same day, time, and location as the recovery examination for continuous evaluation.

Bibliography

Most relevant bibliography

- Batt, C. A., & Tortorello, M. L. 2014. Encyclopedia of food microbiology. Elsevier/Academic Press,. https://www.sciencedirect.com/science/referenceworks/9780123847331
- Bhunia, A. K. (2018). Foodborne Microbial Pathogens. Springer New York. https://doi.org/10.1007/978-1-4939-7349-1

- Blackburn, C. de W. 2006. Food spoilage microorganisms. CRC Press. http://app.knovel.com/web/toc.v/cid:kpFSM00001/viewerType:toc/root_slug:food-spoilage-microorganisms?
- Blackburn, C.D.W., McClure, P.J., 2009. Foodborne pathogens: Hazards, risk analysis and control: Second Edition. https://doi.org/10.1533/9781845696337
- Boye, J.I., Godefroy, S.B., 2010. Allergen Management in the Food Industry. John Wiley and Sons. https://doi.org/10.1002/9780470644584
- Caballero, Benjamin. 2003. Encyclopedia of Food Sciences and Nutrition. Academic Press. https://doi.org/10.1016/B0-12-227055-X/00031-6
- Demirci, A., Ngadi, M.O., 2012. Microbial decontamination in the food industry: Novel methods and applications, https://doi.org/10.1533/9780857095756
- Doyle, M. P., Diez-Gonzalez, F., & Hill, C. (Ed.). 2019. Food Microbiology. ASM Press. https://doi.org/10.1128/9781555819972
- Erkmen, O., & Bozoglu, T. F. (Ed.). 2016. Food Microbiology: Principles into Practice. Wiley. https://doi.org/10.1002/9781119237860
- Gajadhar, A., 2015. Foodborne Parasites in the Food Supply Web: Occurrence and Control. URL https://app.knovel.com/hotlink/toc/id:kpFPFSWOC1/foodborne-parasites-in/foodborne-parasites-in
- Holah, J., Lelieveld, H.L.M., 2011. Hygienic Design of Food Factories. https://doi.org/10.1533/9780857094933
- International Commission on Microbiological Specifications for Foods. (ICMSF) 2018. Microorganisms in foods 7: Microbiological testing in food safety management. https://link.springer.com/book/10.1007%2F978-3-319-68460-4
- International Commission on Microbiological Specifications for Foods (ICMSF). 2011. Microorganisms in Foods 8: Use of Data for Assessing Process Control and Product Acceptance. Springer US,. https://dx.doi.org/10.1007/978-1-4419-9374-8
- Kotzekidou, P., 2016. Food Hygiene and Toxicology in Ready-to-Eat Foods. https://doi.org/10.1016/c2014-0-01599-7
- Lelieveld, H.L.M., Mostert, M.A., White, B., Holah, J.T., 2003. Hygiene in food processing: Principles and practice. https://doi.org/10.1533/9781855737051
- Leveau,J., & Bouix, M. (2002). Manual técnico de higiene, limpieza y desinfección. Madrid: Antonio Madrid Vicente.
- Matthews, K.R., Kniel, K.E., Montvill, T.J. (2017). Food microbiology: An introduction. ASM Press. http://app.knovel.com/hotlink/toc/id:kpFMAIE017/food-microbiology-a
- Mortimore, S., & Wallace, C. (2001). HACCP: Enfoque práctico (2ª ed.). Zaragoza: Acribia.
- Mortimore, S.E., Wallace, C.A., 2015. HACCP: A food industry briefing: Second edition. Wiley Blackwell. https://doi.org/10.1002/9781118427224
- Motarjemi, Y., Moy, G., Todd, E., 2014. Encyclopedia of Food Safety | ScienceDirect FOSA URL https://www.sciencedirect.com/referencework/9780123786135/encyclopedia-of-food-safety
- Stanga, M., 2010. Sanitation: Cleaning and Disinfection in the Food Industry, Sanitation: Cleaning and Disinfection in the Food Industry. Wiley-VCH. https://doi.org/10.1002/9783527629459
- Tham, Danielsson-Tham. M.L. (2014). Food associated pathogens. CRC Press. https://dx.doi.org/10.1007/978-1-4419-9374-8
- Wallace, C.A., Sperber, W.H., Mortimore, S.E., 2010. Food safety for the 21st century: Managing HACCP and food safety throughout the global supply chain. https://doi.org/10.1002/9781444328653
- Wildbrett, G. (2000). Limpieza y desinfección en la industria alimentaria. Zaragoza: Acribia.

Other bibliographic resources

- Ahmed, J., Rahman, M.S., 2012. Handbook of Food Process Design. Wiley-Blackwell. https://doi.org/10.1002/9781444398274
- Clark, J.P., 2008. Practical Design, Construction and Operation of Food Facilities. https://doi.org/10.1016/B978-0-12-374204-9.X0001-8
- Griffiths, M.W., 2005. Understanding pathogen behaviour: Virulence, stress response and resistance, Understanding Pathogen Behaviour. https://doi.org/10.1533/9781845690229
- Grumezescu, A.M.,Holban, A.-M., 2018. Food Safety and Preservation: Modern Biological Approaches to Improving Consumer Health. Acad. Press. URL https://app.knovel.com/hotlink/toc/id:kpFSPMBAI2/food-safety-preservation/food-safety-preservation

- Institute of Food Science and Technology (UK), 2013. Food & Drink - Good Manufacturing Practice - A Guide to its Responsible Management (GMP6) (6th Edition) - Knovel [WWW Document]. URL https://app.knovel.com/hotlink/toc/id:kpFDGMPAG1/food-drink-good-manufacturing/food-drink-good-manu
- International Commission on Microbiological Specifications for Foods. 2001. Microorganismos de los alimentos. 6, Ecología microbiana de los productos alimentarios. Acribia. Zaragoza
- International Commission on Microbiological Specifications for Foods (ICMSF). 2004. Microorganismos de los alimentos 7: Análisis microbiológico en la gestión de la seguridad alimentaria. Editorial Acribia Zaragoza
- International Commission on Microbiological Specifications for Foods (ICMSF). 2016. Microorganismos de los alimentos 8: Uso de datos para evaluar el control del proceso y la aceptación del producto. Acribia, Zaragoza
- Kniel, K., 2013. Advances in Microbial Food Safety [WWW Document]. Adv. Microb. Food Saf. https://app.knovel.com/hotlink/toc/id:kpAMFSV002/advances-in-microbial/advances-in-microbial
- Meng, J., Doyle, M.P., Zhao, T., Zhao, S., 2007. Food Microbiology-Fundamentals and Frontiers (4th Edition) -K novel. ASM Press. https://app.knovel.com/hotlink/toc/id:kpFMFFE001/food-microbiology-fundamentals/food-microbiology-fun
- Wilhelm Tham, M.-L., Danielsson-Tham, 2014. Food associated pathogens. Editors: Wilhelm Tham, Maire-Louise Danielsson-Tham. CRC Press, Boca Raton [etc.]: https://ebookcentral.proquest.com/lib/uab/detail.action?docID=1375221
- Wróblewska, B., 2006. Food allergens,Fu, T.J., Jackson, L.S., Krishnamurthy, K., Bedale, W. (Ed.), Chemical and Functional Properties of Food Components, Third Edition. Springer International Publishing, Cham, p. 275-294. https://doi.org/10.3109/9781420061987-18

Websites

- Catalan Agency for Food Safey. http://acsa.gencat.cat/ca/inici/
- CDC, 2020. CDC and Food Safety. https://www.cdc.gov/foodsafety/cdc-and-food-safety.html
- Codex Alimentarius: http://www.fao.org/fao-who-codexalimentarius/home/en/
- ECDC-EFSA, 2021. EU One Health Zoonoses Reports. https://www.ecdc.europa.eu/en/all-topics-z/food-and-waterborne-diseases-and-zoonoses/surveillance-and
- EFSA. Chemical hazards data - OpenFoodTox. https://www.efsa.europa.eu/en/data/chemical-hazards-data
- ELIKA. Fundació Vasca para la seguridad alimentaria. https://www.elika.eus/es/
- European Centre for Disease Prevention and Control, 2021. Homepage | European Centre for Disease Prevention andControl. https://www.ecdc.europa.eu/en
- European Food Safety Authority: https://www.efsa.europa.eu/en
- FDA (Food and Drug Administration): https://www.fda.gov/food
- Food Safety Agency: http://www.food.gov.uk/
- Food Safety and Inspection Safety (USDA-FSIS): http://www.fsis.usda.gov/
- Spanish Agency for Food Safety and Nutrition https://www.aesan.gob.es/AECOSAN/web/home/aecosan_inicio.htm
- World Health Organization. Food Safety. https://www.who.int/health-topics/food-safety/

Software

- COMBASE. A Web Resource for Quantitative and Predictive Food Microbiology. University of Tasmania (Australia) and the USDA Agricultural Research Service (USDA-ARS). (Accés lliure). https://www.combase.cc/index.php/en/
- Mendeley. Reference manager. http://www.mendeley.com

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	741	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	74	Catalan/Spanish	second semester	morning-mixed