# .- Food Microbiology II

## Prof. Pier Sandro Cocconcelli

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The aim of the course is to provide the in-depth knowledge of food microbiology necessary for the management of food safety and food manufacturing processes. In the first phase of the course, the general aspects of the interaction between the food environment, technological processes and microorganisms will be explored, using the latest scientific information derived from the application of omics sciences to microbiology. Subsequently, the following will be covered: 1) measures to mitigate microbiological risks in food, with particular attention to pathogenic bacteria and viruses, 2) the food spoilage microbiota and meaures to limit it, and 3) the role of microorganisms in food fermentation processes. In the course, the case studies related to food safety and microbiological quality management will be presented and discussed.

At the end of the course, the student is expected to have a sound scientific basis in food microbiology and to be able to:

* perform a critical analysis of microbiological safety and quality management processes in the food chain
* apply procedures for microbiological risk assessment, management and mitigation in the food industry
* promote food qualities through the management of microbial communities

***COURSE CONTENT***

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|  | ECTS |
| Food as an ecosystem: factors influencing the survival and growth of microbial communities in food. Analysis of the molecular mechanisms underlying adaptation to the food environment. | 1 |
| The microbiological safety of food. New insights into pathogenic bacteria and viruses in: information from genomic studies. Emerging pathogens. Quantitative analysis of microbiological risk in food (Risk Assessment). Microbiological risk management in food production chains. | 1.5 |
| Microorganisms as agents of food spoilage. Key factors for controlling microbial spoilage. Microbiological aspects in the determination of date marking | 1 |
| The microbiota of fermented foods, biological diversity and technological properties. Adventitious, back-slopping and selected cultures for food fermentations. The fermentations of meat, dairy and plant products. | 1.5 |
| Laboratory and Practical activities  In the practical activities the students will simulate a challenge test to determin the growth kinetics of pathogens in foods | 1.0 |

***READING LIST***

M.P. Doyle, F.Diez-Gonzales, C. Hill *Food microbiology: fundamentals and frontiers,* 5th ed. American Society for Microbiology, 2019

S.J. Forsythe *The Microbiology of Safe Food* 3rd ed. Wiley, 2019

Reading lists on specific topics, websites of interest in food safety and emerging risks , E-books and \*.pdf documents will be indicated during the course and uploaded on Blackboard.

***TEACHING METHOD***

The course consists of:

* frontal lessons in the classroom. In order to maximise the effectiveness of the course, in some phases, experts of the food system may participate alongside the lecturer;
* case studies and simulations of the application of risk analysis and mitigation strategies will be addressed by the students individually and in study groups
* experimental activities in the laboratory

***ASSESSMENT METHOD AND CRITERIA***

Course assessment will be based on the report of the laboratory activities, discussion of case studies and oral examination. In the laboratory test, students will be required to write the laboratory notebook relating to the activities performed and to demonstrate that they have acquired the basics of applying microbiological procedures to the food sector. In the case studies, carried out in groups, the individual student's ability to present and critically analyse the subject matter will be assessed. The oral examination is aimed at assessing theoretical competence and reasoning skills. The final grade is derived from the weighted evaluation of the marks obtained in the laboratory activities, the classroom discussion of the case studies and the questions in the oral examination.

***NOTES AND PREREQUISITES***

Lesson frequency is not mandatory, but highly recommended. The attendance to practical classes is mandatory. Students must register via Blackboard to the course and check it regularly for further information or updates. The teaching material will be provided only via Blackboard (just before classes).

Professor Pier Sandro Cocconcelli is available to meet with students after class at DiSTAS -Microbiology or by mail at pier.cocconcelli@unicatt.it.