

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	FOOD AND NUTRITIONAL SCIENCES		
<b>ACADEMIC UNIT</b>	FOOD SCIENCE AND HUMAN NUTRITION		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	3560	<b>SEMESTER</b>	6 <sup>th</sup>
<b>COURSE TITLE</b>	QUANTITATIVE FOOD MICROBIOLOGY		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
	5	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
<b>PREREQUISITE COURSES:</b>	Food Microbiology, Food Biochemistry		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERACSMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://oeclass.aua.gr/eclass/courses/449/">https://oeclass.aua.gr/eclass/courses/449/</a>		

### 2. LEARNING OUTCOME

#### Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

The course is a fundamental introductory module on the concept of the quantitative assessment of microbiological spoilage of foods. Its content aims to familiarize students with the basic principles of food microbiology, with emphasis on the qualitative and quantitative expression of food spoilage, alternative methods of food preservation, foodborne infections, and indicators of food safety and quality.

The course also aims to provide knowledge in the field of microbial ecology within food ecosystems, microbial cell-to-cell communication (quorum sensing), and the formation and function of biofilms, with particular emphasis on food safety and quality. It further introduces fundamental concepts and methodologies related to the application of rapid and non-invasive techniques (Fourier-transform

infrared spectroscopy, image analysis) for the rapid and non-invasive assessment of the microbiological quality of foods.

Upon successful completion of the course, the student will be able to:

- Understand the fundamental and critical characteristics of spoilage microorganisms, the types of food spoilage, the concept of ephemeral spoilage microorganisms, and the chemical spoilage indicators in major food categories (meat, fish, fruits, and vegetables).
- Demonstrate knowledge of tools and techniques for the rapid and non-invasive assessment of the microbiological quality of foods.
- Distinguish the primary roles of pathogenic microorganisms in food safety.
- Evaluate strategies for controlling pathogenic microorganisms in foods during their distribution and storage.
- Comprehend the significance of microbial cell-to-cell communication and biofilm formation in relation to food quality and safety.

### **General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Teamwork</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>... ..</i>
<i>Production of new research ideas</i>	<i>Others...</i>

- Decision-making
- Working independently
- Production of new research ideas
- Production of free, creative and inductive thinking
- Criticism and self-criticism

### **3. SYLLABUS**

- Ephemeral spoilage microorganisms-Chemical Indices of spoilage.
- Microbiological quality and safety indices.
- Quantitative assessment of food spoilage, quality, and safety – General principles.
- Quantitative assessment of spoilage of fresh meat and meat products.
- Quantitative assessment of spoilage of fresh fish.
- Quantitative assessment of spoilage of fresh fruits and vegetables.
- Principles of cell-to-cell communication (Quorum sensing).
- Foodborne bacteria. Principles of foodborne infections, responsible microorganisms, characteristics, causative factors, clinical symptoms.
- Biofilms; development quantification of Formation and control, mode of action, implications on food safety.
- Implementation of rapid and non-invasive techniques in quantitative assessment of the microbiological quality of foods.

- Quantitative determination of kinetic parameters of microbial growth/survival.

#### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face										
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Power point presentations. Communication with students via e-mail. Support of the learning process through access to the E-class electronic platform, as well as to online microbiology databases (www.combase.com).										
<b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i>  <i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Activity</th> <th style="text-align: center;">Semester workload</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">70</td> </tr> <tr> <td>Laboratory practice</td> <td style="text-align: center;">30</td> </tr> <tr> <td>Individual study</td> <td style="text-align: center;">25</td> </tr> <tr> <td>Course total</td> <td style="text-align: center;">125</td> </tr> </tbody> </table>	Activity	Semester workload	Lectures	70	Laboratory practice	30	Individual study	25	Course total	125
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Lectures	70										
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<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i>  <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple-choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i>  <i>Specifically defined evaluation criteria are given, and if and where they are accessible to students.</i>	Language of evaluation: Greek  Written final exam. Compilation of short-answer questions, problem solving, and multiple-choice questions  Examination criteria are publicly available and accessible to students on E-class										

#### 5. ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

- Montville, T.J., Matthews, K.R. (2005) Food Microbiology. ASM Press, Washington DC, USA
- Adams, M.R., Moss, M.O. (2008) Food Microbiology. Royal Society of Chemistry, Cambridge, UK
- Jay, M.J., Loessner, M.J., Golden, D.A. (2005) Modern Food Microbiology, 7<sup>th</sup> Edition, Springer Publishers, USA

*- Related academic journals:*

- International Journal of Food Microbiology, Food Microbiology, Journal of Food Protection, Journal of Food Safety, Food Research International, Foods, Microorganisms.