

<b>SCHOOL</b>	ENVIRONMENT		
<b>ACADEMIC UNIT</b>	FOOD SCIENCE & TECHNOLOGY		
<b>LEVEL OF STUDIES</b>	BACHELOR OF SCIENCE		
<b>COURSE CODE</b>	<b>FST204</b>	<b>SEMESTER</b>	2
<b>COURSE TITLE</b>	<b>GENERAL MICROBIOLOGY</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercise, 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>	
Lectures	2		
Laboratory practice	3		
<b>Total</b>	5	6	
<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>	Specialised general knowledge		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>			

## LEARNING OUTCOMES

### 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 aim of General Microbiology** course is for students to develop an understanding of the basic concepts of microorganisms and be familiar to the specific biochemical and physiological characteristics used to classify them.

**Upon successful completion of the course students will be able to:**

- Identify microorganisms and explain the biochemical and physiological activities through which microorganisms perform their work, beneficial or harmful.
- Carry out microbiological techniques and methodologies, with particular emphasis on microbiological analyses of foodstuffs.

- Select the most appropriate method of microbiological analysis and interpret its results.
- Evaluate and apply new and innovative proposed methods of microbiological analysis and compare them with classical methodology.
- Provide a knowledge base on which to build an understanding of topics related to microbiology, biotechnology and food hygiene.

### 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?

Search for, analysis and synthesis of data and information, with the use of the necessary technology  
 Adapting to new situations  
 Decision-making  
 Working independently  
 Team work  
 Working in an international environment  
 Working in an interdisciplinary environment  
 Production of new research ideas

Project planning and management  
 Respect for difference and multiculturalism  
 Respect for the natural environment  
 Showing social, professional and ethical responsibility and sensitivity to gender issues  
 Criticism and self-criticism  
 Production of free, creative and inductive thinking  
 .....  
 Others...  
 .....

- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Criticism and self-criticism
- Production of free, creative and inductive thinking

### SYLLABUS

#### Lectures

- Microorganisms as Cells
- Viruses and Prions
- The Impact of Microorganisms on Human Affairs
- Classification of Microorganisms
- Microbial Cell Biochemistry
- Factors affecting Microbial Growth in Foods
- Humidity, Water Activity
- Redox Potential
- pH
- Nutrients
- Microbial Contamination of Food Products - Physical and Chemical Changes Caused
- Food Preservation
- Industrial Microorganisms
- Food Spoilage
- Microbial Pathogens – Food Poisoning (physiology, disease – symptoms, prevention and control)

- Methods of Enumeration and Detection of Microbial Population in Foods

### Laboratory Practice

- Laboratory Safety: General Rules and Regulations
- Bacteria Morphology: Simple Stain, Negative Stain, Gram-Stain, Ziehl-Neelsen, Endospore Stain, Capsule stain
- Culture Media: Nutritional Requirements, Preparation, Usage, Inoculation
- Techniques for Isolation of Pure Cultures: Isolation of Discrete Colonies from a Mixed Culture (Streak or Spread Plate)
- Bacteria Identification: Physiological and Nutritional Requirements, Physical Requirements (Temperature, Oxygen), Biochemical Activities (Catalase test, Oxidase test, etc.)
- Sugar Utilization (Hugh-Liefson test, M.R.-V.P.)
- Protein Utilization: Casein and Zelin Hydrolysis, Hemolysis
- Aminoacid Utilization: Lysine Decarboxylation, Phenylalanine deamination, H<sub>2</sub>S Production
- Organic Acid Utilization
- Protozoa (environmental, parasitic)
- Fungi: Cultivation and Morphology, Identification
- Yeast: Cultivation and Morphology, Reproduction and Identification
- Bacteria: Isolation, Cultivation, Enrichment
- Biochemical and Immunological Tests for Bacteria Identification
- Identification of Bacteria Using Molecular Biology Tests
- Physical and Chemical Agents for the Control of Microbial Growth
- Bacterial Genetics

### TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	In teaching class	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Power point presentation, Whiteboard writing	
<b>TEACHING METHODS</b>  <i>The manner and methods of teaching are described in detail. 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. 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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	78
	Laboratory practice	39
	Total contact hours and training	<b>117</b>

<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><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></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p><b>Final written examination in theory and in laboratory that includes:</b></p> <p><b>Language of evaluation: Greek</b></p> <p>Midterm and final exams (fill-in the blanks questions, short answer questions, multiple choice questions)</p> <p>Students' access is to both the criteria and the examination results performed through the departmental site and/or the e-class platform.</p>
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#### 4. ATTACHED BIBLIOGRAPHY

1. Bibek Ray, Arun Bhunia (2013). Fundamental Food Microbiology, Fifth Edition. CRC Press
2. Martin R Adams, Maurice O Moss, Peter McClure (2016). Food Microbiology. Royal Society of Chemistry
3. James M. Jay, Martin J. Loessner, David A. Golden (2008). Modern Food Microbiology. Springer Science & Business Media
4. Brock: Biology of microorganisms. Madigan, Martinko Bender, Buckley και Stahl.
5. Microbiology: A human Perspective, 7th edition, by Nester, Anderson & Roberts. 2011. McGraw-Hill Publishing Company.
6. Microbiology: An Introduction, 11th edition, by G.J. Tortora, RB.R. Funke and C.L. Case.

Performance Statistics of the last 2years			
Grade (descending order)	absolute frequency	relative frequency %	sum of success rates per class
GENERAL MICROBIOLOGY			
10	14	9%	9%
9	29	18%	27%
8	44	27%	54%
7	47	29%	83%
6	28	17%	100%
	162	100%	