COURSE OUTLINE

1. GENERAL INFORMATION

FACULTY/SCHOOL	PLANT SCIENCES/FOOD AND NUTRITIONAL SCIENCES/APPLIED BIOLOGY AND BIOTECHNOLOGY/ENVIRONMENT AND AGRICULTURAL ENGINEERING		
DEPARTMENT	CROP SCIENCE/FOOD SCIENCE AND HUMAN NUTRITION/BIOTECHNOLOGY/NATURAL RESOURCES MANAGEMENT AND AGRICULTURAL ENGINEERING		
LEVEL OF STUDY	*Undergraduate*		
COURSE UNIT CODE	1280	**Semester:**	2nd/3rd (NRMAE)
COURSE TITLE	GENERAL MICROBIOLOGY		
INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHNG HOURS**	**ECTS**
	Lectures	3	5
	Laboratory Exersices	2	
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4			
COURSE TYPE *Background knowledge, Scientific expertise, General Knowledge, Skills Development*	Background knowledge		
PREREQUISITE COURSES:	None		
LANGUAGE OF INSTRUCTION:	Greek		
LANGUAGE OF EXAMINATION/ASSESSMENT:			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/courses/EFP140/		

2. LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

General Microbiology is a basic course for understanding the diversity, cellular structure, function and phylogeny of microorganisms. It is the foundation for taking higher level microbiology-related courses in various Departments of the AUA, such as Plant Pathology, Food Safety and Technology, Food Microbiology, Soil Microbiology, Microbial Biotechnology, various courses on agricultural and non-agricultural waste treatment and bioremediation.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Environmental awareness*
Individual/Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Group/Team work	*Critical thinking*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Introduction of innovative research	*(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)*
	…….

- Data research, analysis and synthesis
- Decision making
- Individual work
- Environmental awareness
- Basic understanding of living organisms
- Offer constructive criticism and self-criticism
- Development of free, creative and inductive thinking
- Development of scientific thinking

3. COURSE CONTENT

LECTURES

Microbes and Microbiology
History of microbiological discoveries
Overview of microbial life
Cell structure and function
- Structure of the cytoplasmic membrane in bacteria and archaea
- Cell walls of bacteria and Archaea
- Flagella and other cellular parts and organelles

Microbial nutrition and laboratory culture
Microbial growth
- The process of microbial cell division
- Temperature and microbial growth

Principles of microbial metabolism
Introduction to virology
- Viruses
- Classification of viruses
- Viruses of bacteria, plants and animals

Microbial evolution and systematics
- Microbial fossils
- RNA-based life
- The ecumenical tree of life

Microbial diversity: Bacteria
- Overview of bacteria
- Proteobacteria
- Gram-positive bacteria
- Cyanobacteria and prochlorophytes
- Chlamydia
- Stalked bacteria
- Flavobacteria

- Spirochetes
- Deinococci
- Green sulfur bacteria
- Hyperthermophilic bacteria

Microbial diversity: Archaea

- Phylogeny and metabolism
- Euryarhaeota
- Crenarchaeota

Biology of the eukaryotic cell and eukaryotic microorganisms
Introduction to mycology

- Introduction to fungi, economic significance
- Classification and phylogeny of fungi
- Fungal morphology and physiology (I) and (II)
- Reproduction and life cycles of fungi
- Chytridiomycetes, Zygomycetes, Glomeromycetes
- Ascomycetes
- Lichens, Basidiomycetes (I), Basidiomycetes (II)

Mitosporic fungi and parasexual cycle

LABORATORY EXERCISES

- Basic laboratory techniques in Microbiology: Isolation, culture and microscopic observation of microorganisms
- Bacteria (Gram stain and morphology)
- Photosynthetic microorganisms (prokaryotic and eukaryotic), Mucoromycota (asexual and sexual fruiting bodies)
- Ascomycota (asexual fruiting bodies) and Yeasts
- Ascomycota (sexual fruiting bodies), Basidiomycota

4. TEACHING METHODS--ASSESSMENT

MODES OF DELIVERY *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	In-class lecturing
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, Laboratory Education, Communication with students*	Use of slide presentation and blackboard. Communication with students. Learning process support by access to e-class asynchronous distance learning platform.
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of self-*	

Activity/ Method	Semester workload
Lectures	39 hours
Laboratory practice	26 hours
Individual laboratory project (data processing and commenting)	
Personal study	60 hours
Total of Course (25 hours of workload per ECTS)	***125 hours***

directed study are given following the principles of the ECTS.	

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work,* *other……etc.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*	I. One or two midterm tests during the course of the semester. They are optional for the students. The midterm test grade counts as a bonus on the final exam's grade. II. A final exam which includes questions requiring a short analysis. The questions are designed to evaluate basic knowledge of Microbiology and familiarization with the biology and applications of microorganisms related to Agriculture. III. A written exam on the laboratory exercises. Students are required to identify microorganisms presented during the laboratory exercises and justify their identification.

5. SUGGESTED BIBLIOGRAPHY:

Brock, Biology of Microorganisms (2nd edition), Crete University Press (2018).
Introduction to Mycology. Class notes by Professor Georgios Zervakis (2019)
Laboratory exercise material available at the e-class website of the course

6. TEACHERS:

-Lectures:
Professor Dimitrios Georgakopoulos
Professor Georgios Zervakis
Assistant Professor Maria Dimou

-Laboratory exercises:
Professor Dimitrios Georgakopoulos
Professor Georgios Zervakis
Professor Iordanis Chatzipavlidis
Assistant Professor Maria Dimou
Assistant Professor Anthi Karnaouri
Dr Io Kefalogianni
Mrs Kalliopi Papameletiou (laboratory technician)