COURSE OUTLINE

"LABORATORY COURSE III: MICROBIOLOGY & CELL BIOLOGY"

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
STUDY LEVEL	ISCED LEVEL 6		
COURSE CODE	**MBG208**	**SEMESTER**	3rd
COURSE TITLE	LABORATORY COURSE III: MICROBIOLOGY & CELL BIOLOGY		
TEACHING ACTIVITIES *In case credits are awarded to individual components of the course eg. Lectures, laboratory practicals, etc. If credit units are awarded for the whole course, indicate the weekly teaching hours and total credits*		**HOURS/WEEK**	**ECTS CREDITS**
		4	5
COURSE TYPE *General, Background, Scientific field course, Expertise Course, Skills Development etc*	SCIENTIFIC FIELD, SKILLS DEVELOPMENT		
PREREQUISITE COURSES:	NO		
LANGUAGE OF TEACHING AND EXAMINATIONS:	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	https://eclass.duth.gr/courses/ALEX01218/		

2. LEARNING OUTCOMES

Learning outcomes

Describe the learning outcomes of the course, the specific knowledge, skills and competencies that students will acquire after successfully completing the course. Refer to Appendix A.

• Description of learning outcomes for the course according to the level of study - refer to the European Higher Education Area Qualifications Framework

• Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B Curriculum Vitae Summary Guide

The objectives of the course:

- understand the basic principles of Cell Biology and Molecular Microbiology as well as gaining practical experience in basic laboratory methods.
- familiarize the students with the laboratory space, the use of specific instruments, the preparation of solutions and buffers to be used during the experimental process, followed by the laboratory exercises.

Learning outcomes:

Upon successful completion of the course the student acquires the following skills and knowledge to:

- Understand the basic principles in the field of Cell Biology, and Molecular Microbiology
- Prepare solutions, buffers and media commonly used for the laboratory exercises
- Understand the experimental approaches of basic Cell Biology techniques
- Prepare microbial cultures and determine the number of live cells in biological samples
- Determine the susceptibility of microbes to antimicrobial agents (antibiograms)
- Understand the experimental approaches in Microbiology and related basic and emerging technologies
- Analyze and interpret experimental results in Cell Biology and Microbiology
- Suggest solutions to problems / questions in Cell Biology and Microbiology, formulate hypothesis and design appropriate methodological approaches
- Improve critical thinking, problem-solving abilities and communication

General Skills

Which of the general competencies that the student will have acquired on the completion of the studies (see also the Diploma Supplement and below) are relevant to this course?

Research, analysis and synthesize of data and information, using the necessary technologies
Adaptation to new situations
Decision making
Autonomous work
Team work
Work in an international environment
Work in an interdisciplinary environment
Production of new research ideas
Project design and management
Respect for diversity and multiculturalism
Respect for the natural environment
Development of social, professional and moral responsibility and gender sensitivity

Promotion of free, creative and inductive thinking

- Research, analysis and synthesis of data and information, using the necessary technologies
- Team work
- Autonomous work
- Exercising criticism and self-criticism
- Production of new research ideas
- Promotion of critical, problem-solving thinking
- Adaptation to new situations
- Production of new research ideas

3. COURSE CONTENT

• Introduction to the laboratory, preparation of solutions
• Aseptic methods in microbiology, medium preparation, sterilization
• Sterile culture preparation: Preparation of liquid and solid microbial cultures.
• Determination of bacterial number by serial dilutions. Isolation of lactic acid bacteria from dairy products.
• Microbial susceptibility to antimicrobial agents. Antimicrobial activity of essential oils. Antibiograms.
• Fixation and Gram staining. Microscopy observation. Observation of mouth microbial flora.
• Fixation of specimens for observation of mitosis under a microscope.
• Cell culture of attached and cells in suspension. Cell count.
• Tissue homogenization. Proteins extraction from tissue. Cell fractionation.
• Preparation of SDS polyacrylamide gel. Protein electrophoresis.
• Transfer of proteins to a nitrocellulose membrane. Non-specific blocking.
• Western blotting: Incubation with primary and secondary antibody. Visualization using the Chemidoc system. Analysis of the results with the corresponding software (Image Lab).

4. TEACHING and LEARNING METHODS - EVALUATION

TYPE OF TRAINING
Face-to-face, Distance learning, etc..

Face to face

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, and in communication with the students

Use of ICT in teaching
Use of ICT in Laboratory Education
Use of ICT in communication with the students

MODES OF DELIVERY
Describe the teaching methods in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, practicum, 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

The interactive teaching method is used to assist the development of the student's scientific thinking in the class. This way, the student not only acquires knowledge, but also develops the skills of experimental design and results interpretation, while at the same time learns to work together with both his/her colleagues and the lecturer.

Activity	***Workload/semester***
Lectures	20
Laboratory practise/work	50
Student's study	50
Project writing	50
Course Total	**150**

STUDENT PERFORMANCE EVALUATION
Describe of the methods of evaluation language, methods of evaluation, types of exams, 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
Are evaluation criteria known to the students?

Student evaluation languages
Greek

Method (Formative or Concluding)
Formative

Student evaluation methods
Written exam with multiple choice test (10%)
Essay / Report (10%)
Laboratory Report (80%)

	Evaluation criteria are known to the students at the beginning of the semester

5. SUGGESTED BIBLIOGRAPHY

Title: Microbiology Laboratory Handbook
Authors: J.M. Miller.
Publisher: Parisianou Publications S.A.
Publication year: 2011.
ISBN: 978-960-394-782-0.
Eudoxos code: 12632043.

Course Notes:
Scientific articles and reviews, related websites, articles and videos are posted on the course's e-class website:

1. Title: Notes on Molecular Microbiology Laboratory Exercises.
Author: I. Kourkoutas.
Date & Place of Publication: Department of Molecular Biology & Genetics-DUTH, Alexandroupolis, 2010.
2. Title: Cell Biology Laboratory Exercise Notes.
Author: M. Koffa.
Date & Place of Publication: Department of Molecular Biology & Genetics-DUTH, Alexandroupolis, 2015.