COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED BIOLOGY AND BIOTECHNOLOGY		
ACADEMIC UNIT	BIOTECHNOLOGY		
LEVEL OF STUDIES	BACHELOR OF SCIENCE		
COURSE CODE	**3190**	**SEMESTER**	6st (spring semester)
COURSE TITLE	CELL AND TISSUE CULTURE TECHNOLOGY		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	0,12
Laboratory Courses	2	0,08
Tutorials/essays/practice actions	2	0,08
TOTAL ECTS (Table 4)		**5,00**
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Biotechnology Specialization
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (in English)
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/courses/BIOTECH145/

2. 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 course is the basic introduction in the scientific field of the concepts of plant and animal cell culture.

The course aims to introduce students to the basic concepts of plant propagation and in vitro systems using animal cells.

It also deals with introductory concepts in plant and animal cell culture methods under laboratory aseptic conditions, in the management of different types of propagation materials (meristem, body embryos, protoplasts, etc.) and basic problem-solving techniques.

Finally, the course aims to provide students with an understanding of the importance of plant micropropagation and in vitro systems for the production and evaluation of bioactive compound from plants, using biotechnological methods, in the modern economy and particularly in the management and utilization of natural resources, while at the same time contributes to the prospect of distinctive employment in the field.

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

- Understand the key and critical features of plant cell culture and its importance for the development of healthy plant material and its application on a mass scale.
- Know the tools and techniques of animal cell culture and their importance as in vitro

evaluation systems.

- Distinguish the basic problems of plant and cell culture micro-propagation and how to deal with them.
- Use basic methodologies for successful micropropagation as well as mass production of plant and propagating material.
- Analyze and calculate the key costs for setting up a commercial micropropagation unit.
- Collaborate with his classmate to create and present a plant or animal tissue culture protocol of his choice, while possessing written and oral results communication skills.

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment Production of new research ideas	*Others…..*

- Autonomous study
- Group study
- Interdisciplinary study
- Generation of new research ideas
- Promotion of the free, creative and deductive reasoning

3. SYLLABUS

1. Processes of cell division and differentiation or dedifferentiation in vitro.
2. Nutritional culture media and growth factors.
3. Creating aseptic conditions and handling under them.
4. Micropropagation. Problems associated with the process of plant tissue culture.
5. Induction of random organogenesis or somatic embryogenesis, development and maturation of somatic embryos. Creation of synthetic seeds.
6. Protoplast isolation, culture and fusion. Anther culture and production of diploid plants. Cultivation of ruminants, buds and embryos.
7. In vitro tissue preservation, in vitro fertilization, in vitro selection, micro inoculation, in vitro flowering.
8. Bioreactors.
9. Bioactive Compounds production from cell/tissue cultures. Immobilization of cells and culture of immobilized cell systems. Production and cultivation of alder roots.
10. Design and operation of a micro propagation laboratory.
11. Types of mammalian cells.
12. Mammalian Cell Tissue Culture Applications.
13. Organization of a basic unit of animal cell cultures.
14. International Cell and Tissue Culture Collections.
15. 3D culture.
16. Mammalian cell culture systems. Primary cultures. Cell lines. Doubling time. Infections.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Class courses (amphitheater/lab courses room)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Presentation software (PowerPoint) Distant educational support through the e-class electronic platform.

<table>
<tr><td></td><td>Communication of assessment of student tests and group studies through e-mail</td></tr>
<tr><td>TEACHING METHODS
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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39 h</td></tr>
<tr><td>Practical courses focusing on method application and case studies by smaller student groups</td><td>10 h</td></tr>
<tr><td>Group and/or individual work: bibliography search and protocols of selected tissue culture of plant and animal organisms.</td><td>26 h</td></tr>
<tr><td>Autonomous study</td><td>50 h</td></tr>
<tr><td>Total
(25hours of working input per credit unit)</td><td>125h
(5 ECTS)</td></tr>
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</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

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

Specifically-defined evaluation criteria are given, and if and where they are accessible to students</td><td>I. Written final exam in theory (50%) including:
- Multiple choice questions
- Critical analysis questions
- Comparative review of theorical educational elements

II. Examination in laboratory courses (50%) including:
1. Group/individual assignments or/and
2. Written examination in laboratory courses including:
- Multiple choice questions
- Critical analysis questions

The final grade for the course is determined by the total results for the different parts of the examination.</td></tr>
<tr><td></td><td></td></tr>
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5. ATTACHED BIBLIOGRAPHY

Suggested textbooks:

- Σπύρος Κίντζιος, Εισαγωγή στον Μικροπολλαπλασιασμό των Φυτών, Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα (http://repository.kallipos.gr/handle/11419/241), 2015, ISBN 978-960-603-033-8
- Landecker Hannah, Η καλλιέργεια της ζωής στο εργαστήριο. Πώς τα κύτταρα έγιναν τεχνολογία, Εκδόσεις Πατάκη, 2017, ISBN: 9786188323841