

COURSE OUTLINE

1. GENERAL

SCHOOL	FOOD AND NUTRITIONAL SCIENCES		
DEPARTMENT	FOOD SCIENCE AND HUMAN NUTRITION		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	1205	SEMESTER	4 th
COURSE TITLE	PRINCIPLES OF FOOD BIOTECHNOLOGY		
INDEPENDENT TEACHING ACTIVITIES <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>		WEEKLY TEACHING HOURS	CREDITS
Lectures and Practical courses		3 h (Theoretical course)	5
		2 h (Practical training)	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Field of Science		
PREREQUISITE COURSES:	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)			
TEACHERS	S. Papanikolaou. G. Bekiaris, O. Kalantzi		

2. LEARNING OUTCOMES

<p>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</p> <ul style="list-style-type: none"> ● 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 <p>The course aims at:</p> <ul style="list-style-type: none"> ➤ providing knowledge of the Principles of the Microbial Biotechnology, the Fermentation Technology and the Bioprocesses. ➤ providing knowledge and expertise in microbial (principally) and enzymatic (to lesser extent) processes implicated with White Biotechnology and Food Technology. ➤ the acquisition of competencies concerning how microbial cells, enzymes and bioreactors are functioning and how biotechnological products are recovered. ➤ finally, the development of the ability of the person to successfully perform calculations concerning
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the various studied bioprocesses related with the Food Technology and the White Biotechnology.

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
Teamwork	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...

- Work autonomously
- Work in teams

3. SYLLABUS

- From the antiquity to Manouil Sarris Tenedios and from Antonie van Leeuwenhoek to systems biology – Definition and colors of Biotechnology.
- Microorganisms of Industrial Fermentations: fungi, yeasts, bacteria and their physiological features.
- How microbial cells grow: Factors influencing microbial growth.
- Basic metabolic pathways utilized and basic metabolic products synthesized by the microorganisms of Industrial Fermentations.
- Basic mathematical models simulating microbial growth.
- The kinetics of microbial growth: Batch culture. Mass balances and calculations.
- The kinetics of microbial growth: Fed-batch culture. Mass balances and calculations.
- The kinetics of microbial growth: Continuous culture. Mass balances and calculations.
- Technology of bioreactors – Scale up of processes – Enzyme technology – The enzymatic catalysis – Influence of pH and temperature upon the enzymatic catalysis.
- Biotechnological products.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc</i>	Direct distant learning	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Power point presentations (Theoretical course). Experimental training (exercises, demonstration) (Practical course).	
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,	Activity	Semester workload
	Theory lectures	13 weeks
	Laboratory training	10 sessions
	Theory lectures	75 h
	Laboratory training	50 h

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	TOTAL	125	
<p align="center">STUDENT PERFORMANCE EVALUATION <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>Theoretical course: written examination, that comprises questions of knowledge, comprehension and problems resolutions (100%).</p> <p>Laboratory course: Questions of knowledge and comprehension concerning the practical aspects of the course (100%).</p>		

5. LITERATURE

1. ΜΙΚΡΟΒΙΟΛΟΓΙΑ ΚΑΙ ΜΙΚΡΟΒΙΑΚΗ ΤΕΧΝΟΛΟΓΙΑ 2^η ΕΚΔΟΣΗ, Συγγραφέας: Γ. ΑΓΓΕΛΗΣ, Εκδόσεις ΣΤΑΜΟΥΛΗΣ ΑΕ, 2^η έκδοση, 2017
2. ΜΗΧΑΝΙΚΗ ΒΙΟΔΙΕΡΓΑΣΙΩΝ - ΒΑΣΙΚΕΣ ΕΝΝΟΙΕΣ, Συγγραφέας: Μ. SHULER – F. KARGI, ΠΑΝ/ΚΕΣ ΕΚΔΟΣΕΙΣ ΕΜΠ, 2005