

SCHOOL	ENVIRONMENT		
ACADEMIC UNIT	FOOD SCIENCE & TECHNOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	FST403	SEMESTER	4
COURSE TITLE	FOOD BIOTECHNOLOGY		
INDEPENDENT TEACHING ACTIVITIES <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>	WEEKLY TEACHING HOURS	CREDITS	
Lectures	2		
Laboratory practice	2		
Total	4	6	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>General background, special background, specialised general knowledge, skills development</i>	Specialised general knowledge		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes, in Greek and English		
COURSE WEBSITE (URL)			

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

Food Biotechnology is an interdisciplinary subject combining the sciences of microbial biotechnology, fermentation technology and the development of bioprocesses.

The aim of Food Biotechnology course is to introduce concepts related to microbial and enzymatic processes and the role of microorganisms in food production. Students will be educated on issues related to microbial cultures, production and recovery of metabolic products and their application in food.

Upon successful completion of the course students will have knowledge to:

- Describe the role of microorganisms and enzymes in Fermentation Technology

- Describe the different types of fermentations
- Outline the various applications of enzymes and other biotechnology-derived products in the food industry
- Explain the basic metabolic pathways of microorganisms
- Select microorganisms for the targeted production of biotechnological products and/or food additives
- Describe the recovery methods of biotechnological products
- describe different methods of recovery of biotechnological products
- use scientific equipment to apply techniques for the recovery of biotechnological products
- Calculate the results of the fermentation process (concentration of metabolic products produced, consumption of the substrate, etc.)
- Evaluate and assess the results of fermentation, considering the metabolism of the micro-organisms, the growth conditions

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...

- Working independently
- Team work
- Decision-making
- Working in an interdisciplinary environment

SYLLABUS

- Introduction and importance of biotechnology in food production
- Microbial metabolism. Metabolic pathways involved in the microbial production of compounds
- Microorganisms used in Food Biotechnology
- Biotechnological production of enzymes
- Biotechnological production of single cell protein
- Biotechnological production of organic acids
- Biotechnological production of microbial oil
- Biotechnological production of carotenoids
- Biotechnological production of biopolymers
- Recovery of biotechnological products
- Food Biotechnology in bread, malting and brewing process
- Food Biotechnology in the production of table olives and vinegar
- Food Biotechnology in mushroom cultivation

TEACHING and LEARNING METHODS - EVALUATION

<p>DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	<p>In class</p>	
<p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Power point presentation, Whiteboard writing Laboratory education, Problem solving</p>	
<p>TEACHING METHODS <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></p>	<p>Activity</p>	<p>Semester workload</p>
	<p>Lectures</p>	<p>78</p>
	<p>Laboratory practice</p>	<p>26</p>
	<p></p>	<p></p>
	<p></p>	<p></p>
	<p></p>	<p></p>
	<p></p>	<p></p>
<p>Total contact hours and training</p>	<p>104</p>	
<p>STUDENT PERFORMANCE EVALUATION <i>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.</i></p>	<p>Final written examination (in theory and in laboratory) that includes:</p> <ul style="list-style-type: none"> -multiple choice questions -short answer questions -judgment questions -problem solving 	

ATTACHED BIBLIOGRAPHY

1. Microbiology and Microbial Technology (2007). Aggelis G. Stamoulis Press
2. Bioprocess Engineering – Basic Concepts (2005). Shuler M. –Kargi F. NTUA Press.

Performance Statistics of the last 2years			
Grade (descending order)	absolute frequency	relative frequency %	sum of success rates per class
FOOD BIOTECHNOLOGY			
10	16	10%	10%
9	36	23%	33%
8	35	22%	55%
7	41	26%	81%
6	31	19%	100%
	159	100%	