COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Free Elective]		
COURSE CODE	131	**SEMESTER**	5th
COURSE TITLE	TREATMENT OF FOOD PROCESSING WASTES		

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 (ECTS)**
Lectures and Practical courses	3 (theory)+2 (lab)	4
Total	**5**	**4**
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Area
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	No
COURSE WEBSITE (URL):	

(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 aims at:
a) providing knowledge concerning the various traditional and advanced methods related with the treatment and the valorization of agro-industrial wastes and residues.
b) also, at initiating the students to the several types of chemical, enzymatic and microbial methods related to the treatment and valorization of agro-industrial wastes and residues.
c) the acquisition of competencies concerning the knowledge of “Green” and “Sustainable” methods implicated in the valorization of food and agro-industrial waste streams and residues.
d) finally developing the person’s ability to successfully understand the several processes related with the conversions of wastes and residues into added-value compounds with the aid of chemical and biotechnological methods.

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...* *.....*

- Work autonomously
- Work in teams

(3) SYLLABUS

1. Definitions, concepts, basic presentations, economical significance of the waste treatment and valorization “philosophy”.
2. Types of wastes and residues: Solid, semi-solid and liquid wastes; residues containing sugars, proteins, fats, glycerol and phenolic compounds.
3. Growth of microorganisms on natural ecosystems (like wastes). Modeling of the bioprocesses.
4. Traditional methods of the waste-waters treatment; primary treatment (centrifugation, filtration, sedimentation, etc).
5. Traditional methods of the waste-waters treatment; secondary (biotechnological) treatment. Trickling filters and activated sludge.
6. Models, calculations and equations in the biological treatment plants.
7. Treatment of solid wastes and residues. Composting process.
8. Anaerobic treatment. Biogas production. Biochemistry and technology.
9. Biotechnology of edible mushrooms production during growth on wastes and residues.
10. Advanced processes of waste and residue treatment: Implication of chemical and enzymatic methods in the synthesis of added-value products through waste valorization.
11. Advanced processes of waste and residue treatment: Implication of microbiological methods in the synthesis of added-value products through waste valorization. Synthesis of single-cell protein, lipid, organic acids, etc.
12. Case studies: Conversions of Greek-type wastes: Olive-mill waste-waters and cheese-whey.

(4) TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc.*	• In class
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	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, 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*	

Activity	***Semester workload***
Theory lectures	75
Laboratory training	25
Course total (25 h of workload per ECTS)	***100***

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.*	Theoretical course: written examination, that comprises questions of knowledge, comprehension and problems resolutions (100%). Laboratory course: Questions of knowledge and comprehension concerning the practical aspects of the course (100%).

(5) ATTACHED BIBLIOGRAPHY

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