



**Valorization of Agro-  
industrial By-products and  
Waste  
Syllabus**

**GENERAL**

<b>SCHOOL</b>	AGRICULTURAL SCIENCES		
<b>DEPARTMENT</b>	FOOD SCIENCE & NUTRITION		
<b>PROGRAMME</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>ME914</b>	<b>SEMESTER</b>	<b>I</b>
<b>COURSE</b>	Valorization of Agro-industrial By-products and Waste RESPONSIBLE: D. MAKRIS		
<b>TEACHING ACTIVITIES</b>		<b>TEACHING HOURS PER WEEK</b>	<b>CREDIT UNITS</b>
		LECTURES	3
		LABORATORY	3
<b>COURSE TYPE</b>	SCIENTIFIC AREA/SPECIFIC BACKGROUND/ SKILL DEVELOPMENT		
<b>PREREQUISITES:</b>	NO		
<b>TEACHING AND EXAM LANGUAGE:</b>	GREEK		
<b>COURSE OFFERED TO ERASMUS STUDENTS</b>	NO		
<b>COURSE SITE (URL)</b>			

**LEARNING OUTCOME**

Learning outcome



The objective of the course is the provision of knowledge pertaining to policies and scientific methods of management and valorisation of agri-food industry by-products and wastes. Particular emphasis is given in the avoidance of by-product/waste dumping generated during food processing and consumption, with the aim of reducing environmental aggravation. Furthermore, strategies and valorisation methodologies are also dealt with, to present routes of producing mainly high value-added products. Laboratory exercises intent to accustom students with practices related with agri-food by-product/waste valorisation as a strategy to produce high value-added products.

Upon successful completion of the course, students will be able to:

- *Have basic knowledge related with circular economy and associated domestic and international strategies*
- *Have knowledge on of the nature of agri-food wastes*
- *Have knowledge on avoidance/recycling/reuse of agri-food wastes.*
- *Have spherical knowledge on agri-food waste processing.*
- *Have spherical knowledge on on agri-food waste valorisation methods*

#### General skills

Upon completion of the course, the students will acquire the following skills:

- *Critical thinking and the link between theory and practical applications*
- *Search, analysis and combination of data and information with the use of cutting edge technologies*
- *Decision making*
- *Self-sufficient working*
- *Team working*
- *Advancement of free, creative and inferential thinking*
- *Development of connotative and divergent thinking*

#### Syllabus

1<sup>st</sup> week: Waste management and sustainability in the food industry  
2<sup>nd</sup> week: Biorefining – basic principles  
3<sup>rd</sup> week: Valorisation of food processing wastes  
4<sup>th</sup> week: Enzymes, proteins and peptides  
5<sup>th</sup> week: Polysaccharides  
6<sup>th</sup> week: Lipid-soluble pigments and antioxidants  
7<sup>th</sup> week: Water-soluble pigments and antioxidants  
8<sup>th</sup> week: Fermentation technology  
9<sup>th</sup> week: Production of alcohols and organic acids  
10<sup>th</sup> week: Production of microbial lipids  
11<sup>th</sup> week: Citrus processing wastes  
12<sup>th</sup> week: Winemaking wastes  
13<sup>th</sup> week: Olive oil production and cereal processing wastes

Laboratory course: 1. Introduction 2. Determination of sugar content in grape must residues with the phenol-sulfuric acid method. Calculation of potential alcoholic strength 3. Determination of total polyphenols in olive leaves (Folin-Ciocalteu) – Effect of solvent extraction. 4. Estimation of the reducing power of extracts (FRAP method) 5. Anthocyanin determination in fruit processing by-products. 6. Determination of total carotenoids in tomato processing by-products 7. Determination of total proteins in whey (Bradford method). 8. Overview – summary



**TEACHING AND LEARNING METHODS - EVALUATION**

<b>TEACHING MODE</b>	On campus. In laboratory courses, following a short demonstration by the teaching staff, students carry out the experiment. Furthermore, students get accustomed to writing of scientific reports, in which the experimental data are appropriately given and discussed.		
<b>USE OF COMPUTER SERVICES</b>	Lectures are delivered by power point presentations and other audio media		
<b>TEACHING ORGANISATION</b>	<b>Activity</b>	<b>Semester workload</b>	
	Lecture course	39	
	Laboratory course	39	
	Study	47	
	Sum	<b>125</b>	
<b>STUDENT EVALUATION</b>	The language of evaluation is Greek. The final grade is 50% the grade of the lecture course and 50% of the laboratory course. The exams of the lecture course include multiple choice questions. The exams of the laboratory course include exercises (50%) and reports (50%).		

**RECOMMENDED BIBLIOGRAPHY**

Gekas B., Balta-Brouma K.P. (2005). Food Industry & Environment. Tziola Eds. [ISBN: 960-418-057-6]