

COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED ECONOMIC AND SOCIAL SCIENCES		
ACADEMIC UNIT	AGRIBUSINESS AND SUPPLY CHAIN MANAGEMENT		
LEVEL OF STUDIES	<i>Undergraduate</i>		
COURSE CODE	5509	SEMESTER	5th
COURSE TITLE	AGRICULTURAL BUSINESS BY-PRODUCTS AND WASTE MANAGEMENT		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Lectures		4	5
COURSE TYPE	Special Background		
PREREQUISITE COURSES	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED for ERASMUS STUDENTS?	YES (in English)		
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/		

2. LEARNING OUTCOMES

Learning Outcomes
<p>The course is the basic introductory course in the concepts of agricultural by-products and waste management. Analyzes issues of planning, programming, operation and control of the management of by-products and waste of agricultural enterprises. In addition, it highlights the strategic role and current trends.</p> <p>Upon successful completion of the course the student will be able to:</p> <ul style="list-style-type: none"> • Identifies and classifies agricultural waste and by-products of primary production activities • Looks for data for each category of waste - by-product • Selects-distinguishes appropriate treatment method depending on the characteristics of the waste as well as the by-product as well as their expected legal disposal • Studies and designs the selected system on a case by case basis • The implemented system operates • Studies designs and implements waste reuse
General Competences
<ul style="list-style-type: none"> • Adaptation to new situations • Decision making • Autonomous work • Teamwork • Working in an international environment

- Project design and management
- Promotion of free, creative and inductive thought

3. SYLLABUS

Theoretical part

1. HISTORICAL BACKGROUND:

Hunter gatherer -Nomad, farmer-breeder-fisherman. The footprint of this trek.

2. CURRENT TIME

Modern forms of agriculture (conventional, organic, integrated). Human-environment interaction through these forms of agriculture.

3. WASTE

Definition of waste, classification of these (urban, agricultural, hazardous, etc.) species (liquid solids etc). Relevant European and National legal framework. List of waste.

By-products of agricultural holdings (Crop-animal-fishery production). Contrast with waste.

4. AGRICULTURAL WASTE

Definition of agricultural waste.

Categories of agricultural waste based on the production sector (agriculture, livestock, fisheries), based on the sector of economic activity (primary, secondary, tertiary sector).

By-products of agricultural-livestock and fishing holdings-units.

5. METHODS OF TREATMENT OF LIQUID AGRICULTURAL WASTE - BY-PRODUCTS

Location - Facilities - Produced Quantities of Waste.

Physical, Chemical, Microbial Characteristics of Waste - Legislative Framework.

Pre-treatment (grading, sand collection, fat collection, balancing).

Primary treatment (precipitation, flotation, chemical precipitation).

Secondary treatment (Organic in suspension or heterogeneous, aerobic).

Secondary treatment Biological anaerobic processes - biogas and energy production).

Tertiary treatment (phosphorus nitrogen removal).

Disinfection.

Natural Liquid Waste Treatment Systems.

6. METHODS FOR TREATMENT OF SOLID WASTE - BY-PRODUCTS

Location - Facilities - Produced Quantities of Waste.

Physical, Chemical, Microbial Characteristics of Waste - Legislative Framework

Fractionation.

Drying Beds.

Composting.

Combustion - energy production.

7. PRESENTATION OF METHODS AIMED AT REDUCTION OR CIRCULAR MANAGEMENT OR

NON-BURDENING THE ENVIRONMENT THROUGH BIODEGRADED MATERIALS.

8. DISPOSAL OF AGRICULTURAL WASTE TO THE ENVIRONMENT

Outflow of aerobic process.

Outflow of anaerobic process.

Composted material.

Three-phase olive mills.

Legislative framework.

TUTORIAL-LABORATORY SCHEME (2 hours per week)

STUDY ASSIGNMENT - STUDY STEPS

PROCEDURE FOR SELECTING A SUITABLE SYSTEM

STUDY DESIGN OF AGRICULTURAL WASTE - PRODUCTS (SOLID - LIQUIDS) TREATMENT SYSTEMS.

- Pre-treatment
- Sand collection
- Fat collection
- Balancing
- Floating
- Aerobic processes (activated sludge system)
- Aerobic processes (system of heterogeneous processes)
- Disinfection
- Anaerobic Processes - Biogas Production
- Natural wastewater treatment systems
- Composting
- Disposal of treated wastewater into the soil
- Examples of applications other than those already mentioned (eg sprays and pesticide containers, olive mills, dairies, etc.).

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face -to-face, Distance learning	
USE OF INFORMATION and COMMUNICATIONS TECHNOLOGY	<ul style="list-style-type: none"> • Support of the learning process through the University's AUA Open eClass platform (integrated e-Course Management System) • Support of lectures using presentation software • Use of audiovisual material • Use of web applications <p>Communication with students: face-to-face at office hours, email, eclass platform</p>	
TEACHING METHODS	<i>Activity</i>	<i>Workload</i>

	Lectures (direct)	65
	Laboratory Practice	--
	Essay Writing	18
	Autonomous study	42
	Advisory Support	--
	Examination	--
	Laboratory Examination	--
	<i>Total</i> <i>(About 25 hours of study</i> <i>per ECTS)</i>	125

STUDENT PERFORMANCE EVALUATION

The evaluation process is in the language that the course is taught (Greek or English) and consists of:

- i. Compulsory written final examination at the end of the semester (weighting factor **70%** at least) which may includes:

- Multiple choice questionnaires
- Open-ended questions
- Problem solving
- Oral examination

Evaluation criteria: correctness, completeness, clarity

- ii. Optional written exam or essay during the semester (weighting factor 25%) which may includes:

- Multiple choice questionnaires
- Open-ended questions
- Problem solving
- Essay/report
- Oral examination

Evaluation criteria: correctness, completeness, clarity

Special learning difficulties:

Students with **special learning difficulties** in writing and reading (as they are certified and characterized by a competent body) are examined based on the procedure provided by the Department.

Specifically-Defined Criteria:

The evaluation criteria are made known during the first lesson and are clearly stated on the course website and the AUA Open e-class platform. The answers to the exam questions are posted on the AUA Open e-Class platform after the exam. The students are allowed to see their exam paper after its grading (during the announced office hours) and receive

explanations about the grade they received.

5. ATTACHED BIBLIOGRAPHY

Suggested Bibliography in Greek Language:

- Αγγελάκης Ν., Tchobanoglous G. (1995) Υγρά απόβλητα, Πανεπιστημιακές Εκδόσεις Κρήτης, Ηράκλειο
- Αλμπάνης Τ., 2009, Ρύπανση και τεχνολογίες προστασίας περιβάλλοντος, Εκδόσεις Τζιόλα, Θεσσαλονίκη
- Βαβίζος Γ., Μερτζάνης Α., (2003): *Περιβάλλον - Μελέτες Περιβαλλοντικών Επιπτώσεων. 2η Έκδοση.* Βιβλίο 345 σελ. Εκδόσεις Παπασωτηρίου, Αθήνα, ISBN 960-7530-03-9
- Γεωργακάκης Δημήτριος (2003) Διαχείριση Στερεών Αποβλήτων Τόμος Γ' Στερεά
- Γεωργικά Απόβλητα Ελληνικό Ανοικτό Πανεπιστήμιο, Πάτρα
- Γεωργακάκης Δημήτριος (2003) Διαχείριση υγρών Αποβλήτων Τόμος Γ' Υγρά γεωργικά Απόβλητα Ελληνικό Ανοικτό Πανεπιστήμιο, Πάτρα
- Γεωργακάκης, Δ. (2009). Διεργασίες Πρωτοβάθμιας επεξεργασίας γεωργοβιομηχανικών αποβλήτων και νερού. In Γ. Δ., Διαχείριση Γεωργοβιομηχανικών Αποβλήτων. Αθήνα: Γεωπονικό Πανεπιστήμιο Αθηνών
- Καλδέλης, Ι. Κ., & Κονδύλη, Α. Μ. (2005). Περιβαλλοντική και Βιομηχανική Ανάπτυξη. Μείζονα Περιβαλλοντικά Προβλήματα, Διαχείριση Αποβλήτων (Τόμ. 2ος). Αθήνα: Εκδόσεις Σταμούλη.
- ΚΥΑ 145116/11(ΦΕΚ.354/Β' /8-3-2011). Καθορισμός μέτρων, όρων και διαδικασιών για την επαναχρησιμοποίηση επεξεργασμένων υγρών αποβλήτων και άλλες διατάξεις.
- Λυμπεράτος Γεράσιμος (2003) Διαχείριση Υγρών Αποβλήτων Τόμος Α' Αστικά Λύματα Ελληνικό Ανοικτό Πανεπιστήμιο, Πάτρα
- Λυμπεράτος, Γ., & Βαγενάς, Δ. (2012). Διαχείριση Υγρών Αποβλήτων. Αθήνα: Τζιόλα
- Λυμπεράτος Γεράσιμος Κωνσταντίνος Γιαπιτζάκης και Κωνσταντίνος Κομνίτσας (2004) Διαχείριση Υγρών Αποβλήτων Τόμος Β' Βιομηχανικά Υγρά Απόβλητα Ελληνικό Ανοικτό Πανεπιστήμιο, Πάτρα
- Νταρακάς, Ε. (2006). Επεξεργασία βιομηχανικών αποβλήτων . Θεσσαλονίκη: Εκδόσεις ΑΠΘ
- Μαρία Κ. Ντούλα, Federico Tinivella, Lose Luis Moreno Orteg, Βίκτωρ Α. Καββαδίας, Απόστολος Σαρρής, Σιδέρης Θεοχαρόπουλος, Miguel A. Sanchez-Monedero (2012) Ορθές Πρακτικές Διαχείρισης Αποβλήτων Ελαιοτριβείων Οδηγός Εφαρμογής LIFE07/ENV/GR/000280
- Παναγιωτακόπουλος Δ., 2007. Βιώσιμη διαχείριση αστικών στερεών απορριμμάτων. Εκδόσεις Ζυγός, Θεσσαλονίκη, 174 σελ
- Πανώρας, Α., & Ηλίας, Α. (1999). Άρδευση με Επεξεργασμένα Υγρά Αστικά Απόβλητα. Θεσσαλονίκη
- Παυλοστάθης, Σ., & Κυρίτσης, Σ. (1980). Ζωικά Απορρίμματα, Διαχείριση, Χρησιμοποίηση, Προστασία Περιβάλλοντος . Αθήνα: Υπουργείο Γεωργίας, Υπηρεσία Ζωικής Παραγωγής και Ανωτάτη Γεωπονική Σχολή Αθηνών, Εργαστήριο Γεωργικών Κατασκευών.
- Σκορδίλης Αδαμάντιος, Κωνσταντίνος Κομνίτσας (2004) Διαχείριση Στερεών
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- Πανεπιστήμιο, Πάτρα
- ΥΠΑΑΤ (2008) Εγχειρίδιο Ορθής γεωργικής πρακτικής για την ενδεδειγμένη αξιοποίηση της Ιλύος των αστικών Λυμάτων.

Suggested Bibliography in English Language:

- Crites, R. W., Reed, S. C., & Bastian, R. K. (2000). Land Treatment Systems for Municipal and Industrial Wastes. New York: Mc Graw-Hill.
- Crites, R., & Tchobanoglous, G. (1998). Small and Decentralized Wastewater Management Systems. McGraw-Hill.
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- Rynk, J. R., van de Kamp, M., Willson, G. B., Singley, M. E., Richard, T. L., Kolega, J. J., Brinton, W. F. (1992). On-Farm Composting Handbook. NY: Northeast Regional Agricultural Engineering Service.
- Tchobanoglous, G., Theisen, H., & Samuel, V. A. (1993). Integrated Solid Waste Management. Engineering Principles and Management Issues. New York: McGraw Hill.
- W. A. Dick, (2000) Land Application of Agricultural Industrial and Municipal By Products (σ. 387-408). Wisconsin, USA: Soil Science Society of America Inc. Book Series 6
- WHO, 1982, Rapid assessment of sources of air, water, and land pollution, WHO, Geneva.

Related academic Journals:

Instructor's Notes