

Course Title	Agricultural Waste Management				
Course Code	ABF 454				
Course Type	Theory and Labs				
Level	Undergraduate				
Year / Semester	Spring Semester/8th Semester/4rd year				
Teacher’s Name	Dr. Vlasios Goulas				
ECTS	5	Lectures / week	2 x 1.5hr	Laboratories / week	1 x 1 h
Course Purpose and Objectives	<p>The purpose of the course is to introduce students to the environmental aspects of agricultural and food production. The course also aims to familiarize students with the technologies for management and treatment of agricultural wastes. More specific, the students will become acquainted with biotechnological and chemical technologies to treat agricultural wastes and/or to valorization agricultural wastes for production energy and high-added-value compounds.</p> <p>Furthermore, the aim of the course is to introduce students to the Super Pro Designer, a valuable tool for professionals dealing with environmental issues (e.g., wastewater treatment, air pollution control, waste minimization, pollution prevention).</p>				
Learning Outcomes	<p>After successfully completing this course, students will be able to:</p> <ul style="list-style-type: none"><li>• Understand the characteristics and types of agricultural wastes and the importance of waste management to improve food safety and security for health advancement</li><li>• Apply the environmental management systems as ISO 14000</li><li>• Calculate wastewater organic (BOD, COD, TOD)</li><li>• understand the basic principles for the management of agricultural wastes and the common and promising technologies for the valorization of food industry wastes</li><li>• Design and evaluate preliminary treatment processes and practice waste minimization</li></ul>				
Prerequisites	No	Required	No		
Course Content	<p><b>Theory</b></p> <ul style="list-style-type: none"><li>• Agricultural wastes: social, economic and environmental issues</li><li>• Environmental management systems</li></ul>				

	<ul style="list-style-type: none"> <li>• Physico-chemical properties of agricultural wastes</li> <li>• Measurement of organic compounds in liquid wastes</li> <li>• Water pollution by agricultural waste</li> <li>• Primary treatment of liquid agricultural wastes</li> <li>• Secondary treatment of liquid agricultural wastes</li> <li>• Tertiary treatment of liquid agricultural wastes</li> <li>• Solid wastes treatment technologies</li> <li>• Generating energy from waste: biogas, bioethanol, biodiesel</li> <li>• Recovery of high-added-value compounds from agricultural waste: proteins, pharmaceuticals, antioxidants, polysaccharides, enzymes, organic acids etc</li> <li>• Agricultural wastes management: Cases studies of winery, olive mill, dairy industry, meat and poultry industry, fruit and vegetable processing Industry</li> <li>• Air pollution from agricultural industry</li> <li>• Accounting for the impact of agricultural waste on water resources and climate change</li> </ul> <p><b>Labs</b></p> <ul style="list-style-type: none"> <li>• Introduction to Super Pro Designer for batch processing modelling</li> <li>• Overview of Unit Operation Models</li> <li>• Flowsheet development and initialization</li> <li>• Material Balances calculations</li> <li>• Super Pro Designer: Batch process tutorial</li> <li>• Reducing BOD level in meat-processing industry wastes</li> <li>• Recovery lactose and proteins from whey</li> <li>• Recovery polyphenols from olive mill wastes</li> <li>• Recovery bromelain from pineapple residues</li> <li>• Winery wastes management</li> <li>• Production of biodiesel from vegetable oil wastes</li> <li>• Review of lab exercises, discussion of results and preparation for the evaluation</li> </ul>
Teaching Methodology	<p>Lectures</p> <p>Laboratory courses using Super Pro designer software</p> <p>Group class presentations (selected topics/ scientific papers)</p> <p>Autonomous study</p>
Bibliography	<p>(1) Power point presentations</p> <p>(2) Ρύπανση και τεχνολογίες προστασίας περιβάλλοντος. 2009. Αλμπανης Τριαντάφυλλος, Εκδόσεις Τζιόλα. ISBN: 9789604182060.</p> <p>(3) Βιομηχανία τροφίμων και περιβάλλον. 2002. Γκέκας Βασίλης. Εκδόσεις Τζιόλα. ISBN: 9604180576.</p>

	<p>(4) Περιβάλλον: ρύπανση και τεχνικές αντιρρύπανσης. Μαλλιάρης Χρήστος. Εκδόσεις Μεταίχμιο. ISBN: 9603750573.</p> <p>(5) Handbook of enology. 2006. Ribereau-Gayon, P., Glories, Y., Maujean, A., Dubourdieu. John Wiley &amp; Sons Ltd. ISBN: 9780470010341.</p>
Assessment	<p>Final examination: 55%</p> <p>Intermediate examination: 25%</p> <p>Laboratory examination: 10%</p> <p>Presentation of coursework (group of 2 students): 10%</p> <p>Written exams of increasing difficulty, which may include multiple choice test, questions of brief answer, questions to develop a topic, judgment questions and solving problems.</p>
Language	