

## COURSE OUTLINE

### 1. GENERAL

SCHOOL	AGRICULTURAL AND FORESTRY SCIENCES		
DEPARTMENT	AGRICULTURAL DEVELOPMENT		
LEVEL OF STUDIES	7		
COURSE CODE	ECO1007	SEMESTER	7 <sup>th</sup> & 9 <sup>th</sup>
COURSE TITLE	Optimization Theory with applications in the agricultural sector		
<b>TEACHING ACTIVITIES</b> <i>If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.</i>		<b>TEACHING HOURS PER WEEK</b>	<b>ECTS CREDITS</b>
Lectures and laboratory courses		5	5
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.			
<b>COURSE TYPE</b> <i>Background, General Knowledge, Scientific Area, Skill Development</i>	Specialization		
<b>PREREQUISITES:</b>			
<b>TEACHING &amp; EXAMINATION LANGUAGE:</b>	Greek		
<b>COURSE OFFERED TO ERASMUS STUDENTS:</b>	Yes		
<b>COURSE URL:</b>	<a href="https://eclass.duth.gr/courses/OPE01116/">https://eclass.duth.gr/courses/OPE01116/</a>		

### 2. LEARNING OUTCOMES

<b>Learning Outcomes</b> <i>Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.</i>	
<ul style="list-style-type: none"> <li>To recognize the basic concepts of the theory of production and the principles of optimization.</li> <li>To become familiar with the theory of linear programming in operational research.</li> <li>Practice training in DEA modelling and solving them using pcs</li> <li>Develop computational skills using specialized, free mathematical software (DEAP).</li> <li>To practice the analysis and interpretation of optimization problems in farms / businesses.</li> </ul>	
<b>General Skills</b> <i>Name the desirable general skills upon successful completion of the module</i>	
<i>Search, analysis and synthesis of data and information, ICT Use</i> <i>Adaptation to new situations</i> <i>Decision making</i> <i>Autonomous work</i> <i>Teamwork</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project design and management</i> <i>Equity and Inclusion</i> <i>Respect for the natural environment</i> <i>Sustainability</i> <i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i> <i>Critical thinking</i> <i>Promoting free, creative and inductive reasoning</i>
<ul style="list-style-type: none"> <li>Independent Work</li> <li>Search, analysis and synthesis of data and information, using the necessary technologies</li> <li>Promoting free, creative and inductive reasoning</li> </ul>	

### 3. COURSE CONTENT

1. Introduction.
2. Inputs and production function.
3. Production function in the short term.
4. Production in the long run
5. Iso-production curves, curves of equal cost.
6. Productivity and efficiency. Technical efficacy, distributive efficacy, economic efficiency.
7. Efficiency measurement: Parametric and non-parametric methods.
8. DEA (Data Envelopment Analysis). The CRS Constant Returns to Scale) model.
9. The VRS (Variable Returns to Scale) model.
10. Computer software: Parametric methods (Cobb-Douglas).
11. Non-parametric methods (DEAP, On- Front, EMS).
12. Application of the analysis to data of previous scientific papers
13. Presentations of student assignments

### 4. LEARNING & TEACHING METHODS - EVALUATION

<b>TEACHING METHOD</b> <i>Face to face, Distance learning, etc.</i>	In the classroom	
<b>USE OF INFORMATION &amp; COMMUNICATIONS TECHNOLOGY (ICT)</b> <i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i>	<ul style="list-style-type: none"> <li>• Use of information technologies (power point, video)</li> <li>• Support of the learning process through the e-class online platform</li> <li>• Mathematic &amp; econometric software</li> </ul>	
<b>TEACHING ORGANIZATION</b> <i>The ways and methods of teaching are described in detail.</i> <i>Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research &amp; analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.</i>  <i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i>	<b>Activity</b>	<b>Workload/semester</b>
	Lectures	39
	Practice Exercises that focus on the application of methodologies and analysis of case studies in smaller groups of students	15
	Tutorial	26
	Independent Study	45
	<b>Total Course (25 hours of workload per credit unit)</b>	<b>125</b>
<b>STUDENT EVALUATION</b> <i>Description of the evaluation process</i>  <i>Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others</i>  <i>Please indicate all relevant information about the course assessment and how students are informed</i>	I. Written final exam (90%) which includes: - Multiple-choice questions - Solve an exercise related to quantitative data of a project of time, cost - Comparative evaluation of theory elements	
	II. Individual Projects (10%)	

## 5. SUGGESTED BIBLIOGRAPHY

Hand-outs and notes and scientific papers.

COELLI, RAO, BATTESE. AN INTRODUCTION TO EFFICIENCY AND PRODUCTIVITY ANALYSIS.  
KLUWER ACADEMIC PUBLISHERS, NY 2006,

## ANNEX OF THE COURSE OUTLINE

### Alternative ways of examining a course in emergency situations

<b>Teacher (full name):</b>	Konstantinos Galanopoulos
<b>Contact details:</b>	<a href="mailto:kgalanop@agro.duth.gr">kgalanop@agro.duth.gr</a>
<b>Supervisors: (1)</b>	YES
<b>Evaluation methods: (2)</b>	<ul style="list-style-type: none"> <li>➤ <i>written assignment</i> or/and exercises</li> <li>➤ written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.</li> </ul>
<b>Implementation Instructions: (3)</b>	<p>The exam will be conducted via e-class and MS Teams:</p> <p>A. MS TEAMS Students should log in to the TEAMS room of the course through their institutional account. Their identification will be done using their institutional account. They will also participate in the camera examination which they will have open during the examination. Before the start of the examination, students will show their identity card to the camera, so that they can be identified.</p> <p>B. e-Class At the same time, they should log in to the e-class using their institutional account and go to the course page (a prerequisite must have registered for the course) (<a href="https://eclass.duth.gr/courses/OPE01116/">https://eclass.duth.gr/courses/OPE01116/</a>) and in the section "PROJECTS" where they will be given the exam form which they will download to their computer, they will answer the questions on a sheet of paper (or electronically in a word file) and then they will submit the file or photo of the sheet within the prescribed deadline. The duration of the examinations will be 20 minutes.</p> <p>C. Beneficiaries of participation in examinations</p> <ul style="list-style-type: none"> <li>• A list of the AEM of the beneficiaries to participate in the examination is attached. This list will be updated by the day on which the examination period starts.</li> </ul> <p>In order for the student to participate in the exams, he/she must read and accept the terms of his/her participation in the examination process. This can be done through the page <a href="https://students.duth.gr">https://students.duth.gr</a> and from the menu "Service", by going to the option "Participation in the next exam period".</p> <ul style="list-style-type: none"> <li>• In addition, he/she must have registered for the course on the e-class page.</li> </ul>

(1) Please write YES or NO

(2) Note down the evaluation methods used by the teacher, e.g.

- *written assignment* or/and exercises
- written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.

(3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:

a) in case of **written assignment and / or exercises**: the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and **any other necessary information**.

b) in case of **oral examination with distance learning methods**: the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.

c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.

There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.