

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	AGRICULTURAL SCIENCES		
<b>DEPARTMENT</b>	FOOD SCIENCE AND TECHNOLOGY		
<b>LEVEL OF COURSE</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>FST_902</b>	<b>SEMESTER OF STUDIES</b>	9 <sup>th</sup>
<b>COURSE TITLE</b>	DESIGN AND MECHANICAL EQUIPMENT OF FOOD INDUSTRIES		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>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</i>		<b>WEEKLY TEACHING HOURS</b>	<b>ECTS CREDITS</b>
Lectures		3	
Exercises		2	
<b>Total</b>		<b>5</b>	<b>5</b>
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	<i>specialised general knowledge</i>		
<b>PREREQUISITE COURSES:</b>	No.		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek.		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No.		
<b>COURSE WEBPAGE (URL)</b>	<a href="https://eclass.upatras.gr/">https://eclass.upatras.gr/</a>		

### 2. LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul> <p>After completing this course students will be able to:</p> <ul style="list-style-type: none"> <li>• Prepare preliminary techno-economic studies on various industrial food production processes</li> <li>• Draw flow charts for various industrial food production processes</li> <li>• Know the principles of dimensioning of basic processing units used in the food industry</li> <li>• Calculate the total investment capital required to build production lines in the food industry</li> <li>• Calculate the total costs required for the industrial food production</li> <li>• Assess the viability of an investment</li> </ul>
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<b>General Competences</b>	
<i>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?</i>	
<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>
<i>Adapting to new situations</i>	<i>Adapting to new situations</i>
<i>Decision-making</i>	<i>Decision-making</i>
<i>Working independently</i>	<i>Working independently</i>
<i>Team work</i>	<i>Team work</i>
<i>Working in an international environment</i>	<i>Working in an international environment</i>
<i>Working in an interdisciplinary environment</i>	<i>Working in an interdisciplinary environment</i>
<i>Production of new research ideas</i>	<i>Production of new research ideas</i>
<ul style="list-style-type: none"> <li>• Search for, analysis and synthesis of data and information, with the use of the necessary technology</li> <li>• Decision-making</li> <li>• Working independently</li> <li>• Team work</li> <li>• Production of new research ideas</li> <li>• Project planning and management</li> <li>• Promotion of free, creative and inductive thinking</li> </ul>	

### 3. SYLLABUS

<ul style="list-style-type: none"> <li>- Introduction to the design of food industries.</li> <li>- Basic stages of preparation of preliminary techno-economic studies. Process Flow Charts. Tier charts and methodological flow charts.</li> <li>- Application of mass and energy balances in food production lines. Batch processes and continuous operation. Introduction to production line scheduling in the food industry.</li> <li>- Methodologies for estimating the total investment capital. Fixed investment capital. Methodologies for estimating the cost of installed mechanical equipment.</li> <li>- Sizing of bioreactors, heat exchangers, evaporators, dryers, sterilization and pasteurization processes</li> <li>- Estimation of the total investment capital using spreadsheets in Excel.</li> <li>- Methodologies for estimating the total cost of production.</li> <li>- Evaluation of techno-economic studies. Evaluation criteria for preliminary techno-economic studies.</li> <li>- Estimation of the total cost of production and evaluation of preliminary techno-economic studies using spreadsheets in Excel.</li> <li>- Solving exercises related to the design of food industries. Preparation of preliminary techno-economic studies using spreadsheets in MS Excel. Presentation of preliminary techno-economic studies using MS Powerpoint software.</li> </ul>
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### 4. TEACHING AND LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face						
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of Information and Communication Technologies (ICTs) (e.g. powerpoint) in teaching. Communication with students: through e-mail, department's website and platform e-class. The lectures content of the course for each chapter are uploaded on the internet, in the form of a series of .pdf files, where students can freely download them from the platform e-class.upatras.gr						
<b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i>	<table border="1"> <thead> <tr> <th><i>Activities</i></th> <th><i>Work Load per semester</i></th> </tr> </thead> <tbody> <tr> <td>Lectures (3 hours per week x 13 weeks)</td> <td>39</td> </tr> <tr> <td>Literature study and analysis</td> <td>25</td> </tr> </tbody> </table>	<i>Activities</i>	<i>Work Load per semester</i>	Lectures (3 hours per week x 13 weeks)	39	Literature study and analysis	25
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	Lectures (3 hours per week x 13 weeks)	39					
Literature study and analysis	25						

<p><i>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.</i></p> <p><i>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</i></p>	Exercises (2 hour per week x 13 weeks)	26
	Team work for the preparation of a techno-economic study	32
	Final examination (3 hours)	3
	<b>Total number of hours for the Course (25 hours of work-load per ECTS credit)</b>	<b>125</b>
<p><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>It is carried out based on the following criteria (combined or not) depending on the number of students who will participate in the course.</p> <ul style="list-style-type: none"> <li>• Written final exam (60%) which includes <ul style="list-style-type: none"> <li>- Multiple choice questions</li> <li>- Solving problems related to process planning and preparing techno-economic studies</li> <li>- Theory</li> </ul> </li> <li>• Team Work Presentation (40%)</li> </ul> <p>Grading scale: 1 to 10. Minimum passing grade: 5. Examination time: 3 hours.</p>	

## 5. ATTACHED BIBLIOGRAPHY

1. PETERS MS., TIMMERHAUS KD., WEST RE., ΣΧΕΔΙΑΣΜΟΣ ΚΑΙ ΟΙΚΟΝΟΜΙΚΗ ΜΕΛΕΤΗ ΕΓΚΑΤΑΣΤΑΣΕΩΝ ΓΙΑ ΜΗΧΑΝΙΚΟΥΣ (μετάφραση), ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., 2006, ISBN 960-418-058-4 (in Greek).
2. ΚΟΥΚΟΣ Ι., ΕΙΣΑΓΩΓΗ ΣΤΟ ΣΧΕΔΙΑΣΜΟ ΧΗΜΙΚΩΝ ΕΡΓΟΣΤΑΣΙΩΝ, ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., 2007, ISBN 978-960-418-173-5 (in Greek).