

## COURSE OUTLINE

### GENERAL

SCHOOL	Environment and Agricultural Engineering		
ACADEMIC UNIT	Natural Resources Management and Agricultural Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	1820	SEMESTER	8 <sup>th</sup>
COURSE TITLE	Environmental Control of Agricultural Buildings		
INDEPENDENT TEACHING ACTIVITIES <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>		WEEKLY TEACHING HOURS	CREDITS
Lectures		5	5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:	<ul style="list-style-type: none"> <li>• Heat and Mass Transfer</li> <li>• Design and Planning of Livestock Units</li> <li>• Storage Facilities of Fresh Agricultural Products</li> <li>• Thermal-Cooling Machines</li> <li>• Math III</li> </ul>		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	ELECTRONIC NOTES AND PRESENTATIONS OF THE COURSE ARE AVAILABLE FOR THE STUDENTS OF THE SEMESTER AT THE ADDRESS, <a href="https://oeclasse.aua.gr/eclasse/">https://oeclasse.aua.gr/eclasse/</a>		

### LEARNING OUTCOMES

<p>Learning outcomes</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>																			
<ul style="list-style-type: none"> <li>✓ Specialized knowledge on environmental control of (1) animal facilities, (2) aerated storage and (3) cold storage</li> <li>✓ Specialized competences in issues such as energy and mass balance, calculation of required ventilation rates and selection of fans, synergy between ventilation-heating-cooling systems, selection of appropriate equipment controlling temperature and relative humidity in animal facilities, cold storage and aerated storage.</li> </ul>																			
<p>General Competences</p> <p><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></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Search for, analysis and synthesis of data and use of the necessary technology</i></td> <td style="width: 50%; border: none;"><i>Project planning and management information, with the Respect for difference and multiculturalism</i></td> </tr> <tr> <td style="border: none;"><i>Adapting to new situations</i></td> <td style="border: none;"><i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i></td> </tr> <tr> <td style="border: none;"><i>Respect for the natural environment</i></td> <td style="border: none;"><i>Criticism and self-criticism</i></td> </tr> <tr> <td style="border: none;"><i>Decision-making</i></td> <td style="border: none;"><i>Production of free, creative and inductive thinking</i></td> </tr> <tr> <td style="border: none;"><i>Team work</i></td> <td style="border: none;"><i>Others...</i></td> </tr> <tr> <td style="border: none;"><i>Working independently</i></td> <td></td> </tr> <tr> <td style="border: none;"><i>Working in an international environment</i></td> <td></td> </tr> <tr> <td style="border: none;"><i>Working in an interdisciplinary environment</i></td> <td></td> </tr> <tr> <td style="border: none;"><i>Production of new research ideas</i></td> <td></td> </tr> </table>		<i>Search for, analysis and synthesis of data and use of the necessary technology</i>	<i>Project planning and management information, with the Respect for difference and multiculturalism</i>	<i>Adapting to new situations</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>	<i>Respect for the natural environment</i>	<i>Criticism and self-criticism</i>	<i>Decision-making</i>	<i>Production of free, creative and inductive thinking</i>	<i>Team work</i>	<i>Others...</i>	<i>Working independently</i>		<i>Working in an international environment</i>		<i>Working in an interdisciplinary environment</i>		<i>Production of new research ideas</i>	
<i>Search for, analysis and synthesis of data and use of the necessary technology</i>	<i>Project planning and management information, with the Respect for difference and multiculturalism</i>																		
<i>Adapting to new situations</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>																		
<i>Respect for the natural environment</i>	<i>Criticism and self-criticism</i>																		
<i>Decision-making</i>	<i>Production of free, creative and inductive thinking</i>																		
<i>Team work</i>	<i>Others...</i>																		
<i>Working independently</i>																			
<i>Working in an international environment</i>																			
<i>Working in an interdisciplinary environment</i>																			
<i>Production of new research ideas</i>																			

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Project planning and management
- Respect for the natural environment
- Production of free, creative and inductive thinking

#### SYLLABUS

- Introduction to Agricultural Buildings
- Energy and mass balances
- Thermal insulation and moisture protection
- Building materials
- Psychrometrics
- Heating and cooling equipment
- Ventilation systems design
- Fans and air circulation fields
- Heat loads in animal barns, warehouses and freeze units
- Interconnection of heating / cooling / ventilation systems
- Appropriate mechanical equipment

#### TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning,</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of ICT in teaching and communication with students	
TEACHING METHODS <i>The manner and methods of teaching are described in detail. 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.  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>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	125
	Course total	125
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure  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 Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	<ul style="list-style-type: none"> <li>✓ Problem solving</li> <li>✓ Open-ended questions</li> <li>✓ Course assignments followed by oral examination</li> </ul>	

#### ATTACHED BIBLIOGRAPHY

- The Mechanics and Physics of Modern Grain Aeration Management. Ed. Shlomo Navarro and Ronald Noyes, CRC Press 2001, ISBN: 978-1-4200-4033-3.*
- Engineering for Storage of Fruits and Vegetables, 1st Ed. Cold Storage, Controlled Atmosphere Storage, Modified Atmosphere Storage. Chandra Gopala Rao, Elsevier 2015, ISBN: 978-0-12-803365-4.*
- Environment Control for Animals and Plants. Albright, L. D. St. Joseph, Mich.: ASAE, 1990.*

---

*Environment Control for Animals and Plants.* Albright, L. D. St. Joseph, Mich.: AS4E, 1990.  
*Engineering for Storage of Fruits and Vegetables.* Ed. Chandra Gopala Rao, Elsevier Science & Technology Books, 2015,  
ISBN 978-0-1280-3365-4.

---