

## COURSE LAYOUT

### 1. GENERAL

SCHOOL	Environment and Agricultural Engineering		
DEPARTMENT	Department of Natural Resources Development & Agricultural Engineering		
STUDY LEVEL	Undergraduate		
COURSE CODE		SEMESTER	10 <sup>th</sup>
COURSE TITLE	Bachelor's Thesis		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	ECTS
<i>Total</i>			30
COURSE TYPE	Compulsory specialization course and skills development		
PREREQUISITES	NO		
LANGUAGE:	Greek (or optional in English upon approval)		
IS THE COURSE OFFERED For ERASMUS STUDENTS?	NO		
COURSE WEB PAGE			

### 2. LEARNING OUTCOMES

Learning Outcomes
<p>The Bachelor's Thesis represents an independent scientific and systematic approach to analyzing a topic and synthesizing a solution while relying on existing literature and research. It may consist of:</p> <ul style="list-style-type: none"> <li>• A research paper, i.e., it may involve laboratory or field experiments that fall within the research activities of the Department's laboratories.</li> <li>• A technical or agro-economic study of problems faced by different regions of the country.</li> <li>• An in-depth literature review on topics that fall within the scope of the department's undergraduate program or topics of general agricultural interest.</li> </ul> <p>One or more students, always in consultation with the thesis supervisor, can undertake the same topic. Under the guidance of the faculty supervisor, students have the opportunity to develop essential laboratory skills and gain experience through an in-depth study and thorough investigation of a specialized subject. This process helps them build critical and integrative thinking skills, as well as the ability to organize and analyze information with a rigorous, systematic, and scientific approach.</p> <p>Upon successful completion of the thesis, students will be able to:</p> <p>Knowledge Level:</p> <ul style="list-style-type: none"> <li>• Deepen their research skills in a specific thematic area by applying the knowledge acquired during their studies.</li> <li>• Clearly identify the research questions of a problem, focusing on the key aspects necessary for its solution.</li> <li>• Describe and substantiate the essential knowledge relevant to and required for the research topic.</li> <li>• Summarize existing scientific knowledge and expertise on the subject with clarity.</li> </ul>

#### Skills Level:

- Critically utilize the available literature for a specific thematic area.
- Design a research plan and develop an appropriate methodology for approaching and investigating the study subject.
- Design experiments, adopt internationally accepted protocols and methodologies, and compose well-documented scientific texts with proper citations.
- Synthesize existing knowledge and produce a comprehensive scientific document.
- Communicate their findings clearly and effectively by delivering a well-structured presentation before the three-member examination committee.
- Present the results of their thesis at national or international conferences and, with the guidance of their supervisor, publish them in internationally recognized scientific journals.

#### Abilities Level:

- Integrate into research teams within experimental settings and adapt to the team's requirements.
- Combine knowledge and leverage expertise to solve complex problems in interdisciplinary applications within the Department of Natural Resources Management and Agricultural Engineering.
- Select appropriate techniques/technologies and adapt them to their research questions using original thinking.
- Generate and analyze data, drawing meaningful research conclusions.
- Evaluate and compare their research findings with relevant studies in Greek and international literature, providing well-supported interpretations and arguments.

#### General Competencies

- Searching, analyzing, and synthesizing data and information, utilizing appropriate technologies
- Adapting to new situations
- Decision-making
- Independent work
- Working in an interdisciplinary environment
- Generating new research ideas
- Project design and management
- Demonstrating social, professional, and ethical responsibility
- Engaging in critical thinking and self-reflection
- Promoting free, creative, and inductive thinking

### 3. COURSE CONTENT

The thesis project fully occupies the 10th semester of the academic program.

Its objective is to tackle key issues by addressing one or more problems at a research, theoretical, and applied (implementation) level within the fields of science and technology related to the department's disciplines. This process provides students with the opportunity to synthesize and apply the knowledge acquired during their studies.

The thesis must encompass a comprehensive set of activities covering all research stages to ensure a successful outcome. The results of these activities are summarized in the thesis document, which must include:

## Introduction

The introduction provides a description and analysis of the thesis topic, ensuring that the reader clearly understands the subject matter and the research questions the students aim to address.

## Literature Review

This section documents and synthesizes sources related to the scientific domain of the thesis, presenting key concepts and problem requirements. It outlines the research or other relevant findings on which the study is based and defines the thesis objectives in relation to state-of-the-art practices. The review draws from published articles, books, and other scientifically recognized and reliable sources.

## Methodology (Materials, Equipment, Laboratory Tests/Standards, Software)

This section describes the assumptions of the research approach and the methodology used to conduct the study. It provides a detailed account of the experimental methods followed, strictly presenting the procedures without any discussion of the results. Additionally, it includes a thorough explanation of the data analysis process, outlining how the collected data/information was organized and analyzed—whether through statistical or other methods—along with any limitations and potential errors in the methodology, etc.

## Results

This section presents the findings from the data analysis (quantitative and/or qualitative) obtained through the applied methodology. The results are displayed using tables and diagrams, without interpretation, commentary, or comparison with other research findings.

## Discussion

The findings are interpreted in relation to relevant published studies, drawing comparisons to provide deeper insight. The results are juxtaposed and crosschecked to highlight the study's contribution to scientific research. Additionally, it outlines potential directions for future research.

## Conclusions

A concise summary of the key findings of the thesis is presented.

## References

All sources cited in the text must be included in the reference list.

## Appendices

This section contains all tools used in the study, along with any additional material that is not part of the main body but needs to be documented. Appendices should be numbered using uppercase Greek letters within the text (e.g., Appendix A, Appendix B, etc.).

## TEACHING and LEARNING METHODS - Evaluation

TEACHING METHOD	<ul style="list-style-type: none"><li>• In-person communication between students and the supervising faculty member.</li><li>• On-site implementation in research laboratories.</li><li>• Field data collection and sampling, when applicable.</li><li>• Remote study and implementation.</li><li>• Online meetings</li></ul>
USE OF INFORMATICS and COMMUNICATION TECHNOLOGIES	<ul style="list-style-type: none"><li>• Use of computers and PowerPoint slides for presenting research studies related to the thesis topic.</li><li>• Access to international bibliographic databases (Scopus, Web of Science, Google Scholar).</li><li>• Use of specialized software for simulation, design, programming, statistical analysis, digital processing of</li></ul>

	<p>geospatial data, and thematic mapping development, depending on the requirements of the thesis topic.</p> <ul style="list-style-type: none"> <li>• Use of the e-class platform for posting relevant materials.</li> <li>• Use of online meeting platforms.</li> </ul>	
TEACHING ORGANISATION	<i>Activity</i>	<i>Work Load</i>
	<i>Study and Analysis of Literature</i>	100
	<i>Thesis Development: Design, experimentation, laboratory analyses, programming, simulation, evaluation, etc.</i>	440
	<i>Thesis Writing</i>	200
	<i>Presentation Preparation and Delivery</i>	10
	<i>Total contact hours and training (About 25 hours of study per ECTS)</i>	750 (30 ECTS)
STUDENTS EVALUATION	<p>Thesis Presentation</p> <p>Students must present their thesis publicly at an official event announced by the Department's Secretariat upon the supervisor's request.</p> <p><u>Presentation Guidelines</u></p> <ul style="list-style-type: none"> <li>• Each thesis presentation is allotted 15–20 minutes, followed by ample time for questions from the Three-Member Examination Committee.</li> <li>• A thesis can only be presented if at least two members of the examination committee, including the supervising professor, are present either physically or online.</li> </ul> <p><u>Post-Presentation Revisions</u></p> <ul style="list-style-type: none"> <li>• After the examination, students receive feedback, corrections, or required modifications suggested by all committee members.</li> <li>• Upon incorporating the recommended changes, the student must submit the final version of the thesis to the supervising professor, who ensures that all required revisions have been implemented.</li> </ul> <p>Thesis Evaluation</p> <p>The thesis is evaluated by a three-member examination committee composed of faculty members from the department whose expertise is relevant to the thesis topic. In addition to department faculty members, the committee may also include:</p> <ul style="list-style-type: none"> <li>• One member from the university's Laboratory Teaching Staff (EDIP), with or without a doctoral degree.</li> <li>• Faculty members from other universities or researchers (Grade A, B, or C) from research</li> </ul>	

	<p>centers, provided they hold a doctoral degree.</p> <p><b>Evaluation Criteria</b></p> <p>The assessment of the thesis is based on the student's progress during its development, the quality of the written scientific report, and the effectiveness of the presentation and defense. The key evaluation aspects include:</p> <p><u>Research and Learning Process:</u> The student's competence and effectiveness in conducting research and completing the thesis.</p> <p><u>Academic Diligence:</u> Adherence to literature review standards, execution of laboratory analyses and experiments, timelines, and deliverables.</p> <p><u>Quality of the Written Thesis:</u></p> <ul style="list-style-type: none"> <li>• The clarity and scientific rigor of the investigation and analysis.</li> <li>• The structure, coherence, and organization of the thesis.</li> <li>• Proper use of terminology, language, and concept articulation.</li> <li>• Scientifically sound justification of findings and conclusions.</li> </ul> <p><u>Presentation and Defense:</u></p> <ul style="list-style-type: none"> <li>• The coherence and clarity of the oral presentation.</li> <li>• The student's ability to demonstrate knowledge of the thesis topic and its broader scientific field.</li> <li>• The quality of responses to questions posed during the defense.</li> </ul> <p><b>Grading System</b></p> <p>Each committee member assigns a score from 0 to 10 (with accuracy to one decimal place). The final grade is determined as the average of the three scores, with a minimum passing grade of 5.0</p>
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#### 4. SUGGESTED BIBLIOGRAPHY

<ul style="list-style-type: none"> <li>• Bell, Judith (2007). How to Write a Scientific Paper: A Guide to Research Methodology. Metaichmio. In Greek</li> <li>• Dimitropoulos, Efstathios (2009). Introduction to the Methodology of Scientific Research: Towards a Systemic Dynamic Model of Research Methodology. Hellin Publications. In Greek</li> <li>• Zafeiropoulos, Kostas (2005). How to Conduct a Scientific Study. Kritiki Publications. In Greek</li> <li>• Mantzaris, Ioannis (2012). Scientific Research. Self-published. In Greek</li> <li>• Mason, J. (2003). Conducting Qualitative Research. Hellenic Letters. In Greek</li> <li>• Bourliaskos, V. (2010). How to Write a Scientific Paper. In Greek</li> </ul> <p>Relevant Scientific Journals Suggested by the supervising faculty member, depending on the thesis topic.</p>
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