COURSE OUTLINE

1. GENERAL

SCHOOL	School of Environment and Agricultural Engineering		
ACADEMIC UNIT	Development of Natural Resources and Agricultural Engineering		
LEVEL OF STUDIES			
COURSE CODE	0281	**SEMESTER**	1st
COURSE TITLE	AGRICULTURAL MICROMETEOROLOGY AND CROP WATER RELATIONS		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	4
Laboratory exercises	1	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (In English)
COURSE WEBSITE (URL)	

2. LEARNING OUTCOMES

Learning outcomes

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.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The subject of the course is the analysis and explanation of the fundamental physics and the factors involved in the micro-meteorological observation of changes within defined time limits in the lower atmosphere. In addition to the introductory concepts and their units, the equations of the energy and water balance of a surface and the processes of mass transfer fluxes are discussed. Agricultural Micrometeorology is concerned with observations and processes that take place on time scales of less than a day and at distances of less than a kilometre. Micrometeorological processes confined to the lower layers of the atmosphere near the surface under the influence of frictional flow represent an important subject of agricultural micro-meteorology. Energy and gas exchanges between the atmosphere and the underlying land surface (water, soil, vegetation) are important issues.

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General Competences

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?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

3. SYLLABUS

Purpose of Agricultural Micrometeorology
Introductory concepts
Geometric characteristics of the position of the Sun and the Earth
Equation of Time and its importance in observation
Climate, Microclimate and Atmospheric environment
Daily and Seasonal Microclimate Variations
Microclimate characteristics
Micrometeorological observation and practices
Meteorological Instruments
Measurements and data
Temperature
Relative air humidity
Atmospheric pressure
Wind speed and direction.
Fundamental Units
Meteorological data
Radiation
Electromagnetic spectrum of radiation
Flux Density of Shortwave Radiation (Rs)
Surface brightness (Albedo)
Longwave Radiation Flux Density (Rl)
Net Radiant Flux Density (Rnet)
Photosynthetic Active radiation (PAR)
Radiation balance
Energy Balance
Sensible Heat flux and Latent Heat of Evaporation
Vertical transfer of momentum, heat and water vapor in plant crops
Soil moisture measurement
Evaporation from free water surface
Potential Evapotranspiration
Reference evapotranspiration
Actual evapotranspiration
Lysimeters
Water balance in the soil profile.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	The teaching methodology employed in the classroom involves active student participation through interactive question and answer sessions.
USE OF INFORMATION AND	

<table>
<tr><td>COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS
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</td><td><table><tr><th>Activity</th><th>Semester workload</th></tr><tr><td>Lectures</td><td>26</td></tr><tr><td>Lab exercises</td><td>26</td></tr><tr><td>Field works</td><td>25</td></tr><tr><td>Autonomous Study</td><td>48</td></tr><tr><td>Course total</td><td>125</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
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.</td><td>The laboratory examination is part of the:
- Written final examination (short answer or multiple choice or a combination thereof)
- A written laboratory examination consisting of a written computational test.
- Identification of micrometeorological instrument characteristics in laboratory and field</td></tr>
</table>

5. ATTACHED BIBLIOGRAPHY

- Monteith, J., & Unsworth, M. (2013). Principles of environmental physics : plants, animals, and the atmosphere. Academic Press.
- Allen, R. G., Pereira, L. S., Raes, D., & Smith, M. (1998). Crop evapotranspiration Guidelines for computing crop water requirements-FAO Irrigation and drainage paper 56.FAO, Rome, 300(9), D05109.
- Foken, T., & Napo, C. J. (2008). Micrometeorology (Vol. 2). Berlin: Springer.