

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	AGRICULTURAL SCIENCES		
<b>ACADEMIC UNIT</b>	AGRICULTURE		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	AGR_304	<b>SEMESTER</b>	3 <sup>rd</sup>
<b>COURSE TITLE</b>	Plant Physiology		
<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>CREDITS</b>	
lectures	3		
laboratory exercises	2		
TOTAL	5	5	
<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>	SPECIAL BACKGROUND SPECIALISED GENERAL KNOWLEDGE		
<b>PREREQUISITE COURSES:</b>	Typically, there are not prerequisite course.		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek.		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>			

### 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*

By the end of this course, the student will know about:

- Basic plant physiological procedures such as water and inorganic nutrients transport, transpiration, photosynthesis
- The relationship between the physiology and the structure of the plant organs
- The effect of environmental factors (light, water, temperature, etc.) on the plant physiology

#### 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?*

<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>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> ..... <i>Others...</i>
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By the end of this course the student will, furthermore, have developed the following skills (general abilities):

1. Ability to understand basic aspects of plant physiology and the effect of the environment on it.
2. Ability to use this knowledge to interpret experimental results.
3. Ability to use this knowledge to cope with cultivation problems.
4. Ability to interact with others in plant physiology problems.

Generally, by the end of this course the student will, furthermore, have developed the following general abilities (from the list above):

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*  
*Decision-making*  
*Team work*  
*Project planning and management*  
*Promotion of free, creative and inductive thinking*

**3. SYLLABUS**

1. The effect of the photosynthetic organisms on earth evolution.
  2. Water and plant cells.
  3. Water balance of the plant.
  4. Stomata and transpiration.
  5. Mineral nutrition.
  6. Solute transport.
  7. Photosynthesis: the light reactions.
  8. Photosynthesis: the carbon reactions - C<sub>3</sub> cycle.
  9. Photosynthesis: C<sub>4</sub> cycle and Crassulacean acid metabolism.
  10. Ecological considerations on photosynthesis.
  11. Secondary metabolites.
  12. Plant defense.
  13. Growth and development - embryogenesis.
- Laboratory exercises:
- Seed germination and the effect of light on the growth of the seedlings.
  - The effect of light on the stomata opening and closure.
  - Quantitative determination of photosynthetic pigments.
  - Qualitative separation of photosynthetic pigments.
  - Plant cell plasmolysis.
  - Plant transpiration.

**4. TEACHING and LEARNING METHODS - EVALUATION**

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face lectures and laboratory exercises.
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	<ul style="list-style-type: none"> <li>• Use of Information and Communication Technologies (ICTs) (e.g. powerpoint) in teaching.</li> <li>• Use of ICTs in student communication (learning support through the e-class platform).</li> </ul>

<b>TEACHING METHODS</b>	<b>Activity</b>	<b>Semester workload</b>
<p>The manner and methods of teaching are described in detail.</p> <p>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.</p> <p>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</p>	Lectures (3 conduct hours per week x 13 weeks)	39
	Laboratory exercises (2 conduct hours per week x 6 weeks)	12
	Hours for private study of the student and preparation for mid-term or/and final examination – Participation in the examinations	74
	<b>Course total</b>	<b>125 hours</b>
<p><b>STUDENT PERFORMANCE EVALUATION</b></p> <p>Description of the evaluation procedure</p> <p>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</p> <p>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</p>	<ol style="list-style-type: none"> <li>1. Optionally, two mid-term examinations, the first in the middle and the second at the end of the semester. The evaluation procedure is conducted with short answer questions and/or open-ended questions and/or multiple choice questionnaires and/or oral examination, as well as questions based on laboratory exercises. The final examination grade is the mean mark. It is mandatory to obtain pass grade (<math>\geq 5</math>) in each examination.</li> <li>2. Written examination after the end of the semester. The evaluation procedure is conducted with short answer questions and/or open-ended questions and/or multiple choice questionnaires and/or oral examination, as well as questions based on laboratory exercises (unless the student has successfully participated the mid-term examinations). Minimum passing grade: 5.</li> <li>3. All the above are taking place in Greek.</li> </ol>	

## 5. ATTACHED BIBLIOGRAPHY

1. Aivalakis et al., Plant Physiology, EMBPYO Editions, 2016.
2. Taiz et al., Plant Physiology and Development, UTOPIA Editions, 2017.