

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Technology		
DEPARTMENT	Department of Forestry, Wood Sciences and Design (Karditsa)		
LEVEL	<i>Undergraduate</i>		
CODE	KM111	STUDENT SEMESTER	1st
COURSE TITLE	Plant Morphology and Physiology		
ACTIVITIES		WEEKLY HRS	ECTS
	Lectures	2	6
	Laboratories	1	
	<i>Total</i>		6
TYPE OF COURSE	Generic knowledge and Skills Development		
PREREQUISITES:	none		
LANGUAGE TEACHING AND EXAMINATION:	Greek		
THE COURSE OFFERED TO STUDENTS ERASMUS	No		
WEBPAGES COURSE (URL)	https://eclass.uth.gr/courses/FWSD_U_101/		

2. LEARNING OUTCOMES

Learning Outcomes
<p>The aim of the course is to provide basic knowledge regarding the structure, morphological differentiation and growth of plants, as well as the understanding of their main functional processes. Specific objectives of the course are to offer students:</p> <ul style="list-style-type: none"> • The basic knowledge of plant biology at the level of cell, tissues, organs and organism. • Knowledge of the structure, morphological diversity and environmental adaptations of plants. • The ability to understand in depth the mechanisms and the importance of physiological functions and processes in the life of a plant, from embryogenesis and germination, to aging and death. • The ability to attend more specialized courses of the Departments' curriculum. <p>Upon successful completion of the course the student will be able to:</p> <ul style="list-style-type: none"> • Recognize the elements that distinguish plants from other organisms (animals, fungi, etc.). • Understand basic information about the structure and reproduction of higher plants. • Understand how the structure of cellular organelles serves and contributes to plant functions. • Use the optical microscope and other basic laboratory instruments and tools for the microscopic examination of plant samples. • To recognize macroscopically and microscopically the morphological characters of higher plants. • Understand clearly key issues related to basic plant functions and processes and their importance for plant survival and the life cycle on earth. • To utilize the knowledge acquired in the specific subject and in subsequent courses that will be developed by the curriculum of the Department.
General Skills
<p>Upon successful completion of the course, the students will be able to develop and cultivate basic professional skills:</p> <ul style="list-style-type: none"> • Adaptation to new situations

- Production of new ideas
- Autonomous work
- Exercise criticism and self-criticism
- Respect for the natural environment
- Promoting free, creative and inductive thinking

3. COURSE CONTENT

Lectures (2 hours/week)

- **Introduction - Plant cell biology:** the main groups of organisms (prokaryotic and eukaryotic organisms), elements of plant origin and evolution, structure and organization of plant cells, cell cycle, movement of substances inside and outside the cell.
- **Histology:** the internal organization of the plant body, fundamental tissues (parenchyma, colchicum, sclerosis), duct tissues, epidermal tissues.
- **Organography:** the organs of plants and their distinct roles.
- **Stem and root:** primary structure, secondary structure and growth of stem and root, root systems.
- **Leaf and Flower:** morphology, structure and development of the leaf and the flower.
- **Plant reproduction:** fruits, seeds and initial growth of the plant body.
- **Energy flow and enzymes:** the laws of thermodynamics, oxidation - reduction, enzymes, metabolic pathways, regulation of enzyme activity, ATP.
- **Photosynthesis:** light reactions, carbon capture reactions, CO₂ accumulation mechanisms.
- **Respiration:** glycolysis, aerobic and anaerobic respiration.
- **Phytohormones:** auxins, cytokinins, ethylene, cut-off acid, gibberellins, brassinosteroids.
- **Plant nutrition and soil:** macronutrients and micronutrients, nitrogen cycle, phosphorus cycle.
- **External factors and plant growth:** tropics, photoperiodism, lethargy, nasty movements, sunbathing.
- **Abiotic stresses:** defense mechanisms, secondary metabolites, acclimatization and plant adaptations.

Laboratory sessions (1 hour/week)

Study of the morphology and anatomy of higher plants. Microscopic observation (using optical microscope) and description of the plant cell and plant tissues. Macroscopic observation and description (using plant samples) of plant organs:

- Optical Microscope - Plant cell (cell wall, nucleus, plastids).
- Vacuoles - Osmotic phenomena (turgor pressure, plasmolysis).
- Parenchyma and supporting tissue
- Dermal and Secretory tissue
- Morphology - Stem anatomy
- Morphology - Root anatomy
- Morphology - Leaf anatomy
- Morphology - Flower anatomy
- Morphology - Fruit and sperm anatomy
- Seed germination. Attendance of laboratories by students is mandatory, by at least 80%.

4. TEACHING AND LEARNING METHODS - EVALUATION

DELIVERY METHOD	<ul style="list-style-type: none"> • Lectures • Teamwork • Laboratory sessions with the use of microscopes 				
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	<ul style="list-style-type: none"> • Use of a course website on the e-class platform for posting (a) notes, (b) internet links, (c) announcements, search tools and social networks • Use of microscopes in the laboratory sessions 				
MANAGEMENT OF TEACHING	<table border="1"> <thead> <tr> <th><i>Activity</i></th> <th><i>Semester Workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>26</td> </tr> </tbody> </table>	<i>Activity</i>	<i>Semester Workload</i>	Lectures	26
	<i>Activity</i>	<i>Semester Workload</i>			
Lectures	26				

	Laboratory sessions	13
	Short individual works	30
	Individual study	81
	Course Total	150
STUDENT EVALUATION	I. Final written exams (70%) that include <ul style="list-style-type: none"> • Multiple choice questions from all the material of the book and the presentations of the course • Questions based on the laboratory sessions II. Presentation of work (30%)	

5. RECOMMENDED-BIBLIOGRAPHY

- Αϊβαλάκης Γ., Καραμπουρνιώτης Γ. και Φασσέας Κ. 2005. Γενική Βοτανική. Εκδόσεις (Στυλ. Βασιλειάδης – ΕΜΒΡΥΟ), Αθήνα. [Κωδικός Βιβλίου στον Εύδοξο: 358]
- Raven P.H., Evert R.F., Eichhorn S.E. (επιμ. Κ. Θάνος, Γ. Ιατρού, Ν. Χριστοδουλάκης), 2014. Βιολογία των φυτών. Εκδόσεις Υτορία Ε.Π.Ε., Αθήνα. ISBN 978-618-80647-4-4.
- Bidlack J.E., Shelley J.H., Stern K.R., 2020. Stern's Βασικές Αρχές Βιολογίας των Φυτών. Εκδόσεις Broken Hill Publishers Ltd, ISBN: 9789925575145
- Μποζαμπαλίδης Α., 2015. Βοτανική. Εκδόσεις University Studio Press, Θεσσαλονίκη. ISBN: 978-960-12-2208-0
- Καρατάγλης Στυλ. Φυσιολογία φυτών. Τρίτη έκδοση, Art of Text, Θεσσαλονίκη. ISBN 960-312-009-Χ.
- Ρουμπελάκη – Αγγελάκη Καλλιόπη. Φυσιολογία φυτών. Πανεπιστημιακές εκδόσεις Κρήτης. ISBN 960-524-168-4.

Scientific Journals

- Plant Physiology
- Plant Physiology and Biochemistry,
- The New Phytologist,
- Functional Plant Biology
- Journal of Experimental Botany
- Environmental and Experimental Botany
- Photosynthetica