

OC 17

Structural Botany: Anatomy of Plants

Code	OC 17
ECTS credits	3
Attendance time	1 Semester
Language of instruction	Ukrainian
Duration	1
Cycle	Each Winter Semester
Coordinator	Associate Professor, PhD, Yukhno Yuliya
Instructor(s)	Associate Professor, PhD, Yukhno Yuliya
Allocation of study programmes	Biology
Recommended prerequisites	Knowledge of the disciplines of natural science (school courses)
Learning objectives	<ul style="list-style-type: none">- knowledge of historical information of plant anatomy;- knowledge of plant anatomy terms and definitions;- knowledge of the structure of plant cell, its differences from animal and fungi cells;- understanding of the anatomical and functional characteristics of plant tissues;- knowledge of the anatomical structure of vegetative organs;- ability to investigate plant cell, tissues and vegetative organs using light microscopy;- to do histochemical preparations of plant tissues.
Syllabus	<p>Introduction to Structural Botany Plant anatomy as a science. Plants in the living world. Features of the plant organism. The plant as a biological system.</p> <p>Chapter 1. Anatomy of a plant cell Topic 1. Plant cell as an elementary structural and functional unit. Diversity of plant cells. Structural organization of the cell. Non-membrane organelles. Topic 2. Characteristics of the membrane structures of the plant cell. The concept of endomembranes. Double-membrane organelles. Topic 3. Vacuole and plant cell wall. Reserve nutrients. Cellular reproduction (cell cycle, stages of mitosis and meiosis, cytokinesis)</p>

	<p>Chapter 2. Plant tissues</p> <p>Topic 4. Concept of plant tissue systems - Meristematic tissues, Ground tissues, Dermal tissues and Vascular tissues. Classification and characteristic of Meristems: based on location (apical, intercalary and lateral), origin (promeristem, primary and secondary meristem) and function (protoderm, procambium and ground meristem). Protection tissues (Epidermis and Periderm) and Support tissues (Collenchyma and Sclerenchyma).</p> <p>Topic 5. Ground tissues: Absorbing tissues, assimilating tissues (Chlorenchyma), Secretory tissues (external and internal). Aerenchyma. Characteristics of Vascular (transport) tissues (Xylem and Phloem). Vascular bundles.</p> <p>Chapter 3. Vegetative and generative organs of plants.</p> <p>Topic 6. Types of organs. Stem: primary and secondary growth, functions. Structure and function of stem apical meristem (SAM). Stem modifications.</p> <p>Topic 7. Structure and function of the leaf. Influence of environmental factors on leaf anatomy.</p> <p>Topic 8. Root: structure (root zones) and functions. Structure and function of root apical meristem (RAM). Primary and secondary growth of roots. Root modifications.</p> <p>Topic 9. Structure, function and development of Generative organs of plants: flower, seed, fruit.</p>
Literature	<ol style="list-style-type: none"> 1. Dickison W. C. Integrative Plant Anatomy. – Academic Press, 2000. – 518 pp. 2. Cutler D. F. Plant Anatomy [Anapplied approach] / D. F. Cutler, T. Botha, D. Wn. Stevenson. – Blackwellpublishing, 2007. – 288 pp. 3. Beck C. B. An introduction to Plant Structure and Development. Plant Anatomy for the Twenty First Century. – Cambridge University Press, 2005. – 434 pp. 4. Krasilnikova L.A. Plant Anatomy. Plant cell, tissues, vegetative organs / L.A. Krasilnikova, O.O. Avksentyeva, Yu.A. Sadovnichenko. – Kharkiv: V.N. Karazin Kharkiv National University, 2013. – 260 p.
Teaching and learning methods	Lecture (1 WH), Laboratory (2 WH)
Workload	Classroom hours: 48 h Individual study time: 42 h Total: 90 h
Assessment	The assessment consists of final test and preliminary graded achievements in practical tasks and theoretical tests.
Grading procedure	The module grade is the sum of preliminary study achievements (70%) and the final test grade (30%).

Basis for	Botany: Thallobiontes, Biotechnology, Plants Physiology and Biochemistry, Biology of Individual Development, Intracellular Signaling Systems and Mechanisms of Adaptation of Plants and Microorganisms, Ecophysiology of Plants and Microorganisms
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