

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                    |                                                          |                                         |                                     |                                                                                                                      |            |     |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | Plant anatomy, PG_00154391                                                                                                                                                                                                                                                                                         |                                                          |                                         |                                     |                                                                                                                      |            |     |
| Field of study                              | Biology                                                                                                                                                                                                                                                                                                            |                                                          |                                         |                                     |                                                                                                                      |            |     |
| Date of commencement of studies             | October 2025                                                                                                                                                                                                                                                                                                       |                                                          | Academic year of realisation of subject |                                     | 2025/2026                                                                                                            |            |     |
| Education level                             | Bachelor's studies                                                                                                                                                                                                                                                                                                 |                                                          | Subject group                           |                                     | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                                                                                                  |                                                          | Mode of delivery                        |                                     | at the university                                                                                                    |            |     |
| Year of study                               | 1                                                                                                                                                                                                                                                                                                                  |                                                          | Language of instruction                 |                                     | Polish                                                                                                               |            |     |
| Semester of study                           | 2                                                                                                                                                                                                                                                                                                                  |                                                          | ECTS credits                            |                                     | 2.0                                                                                                                  |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                           |                                                          | Assessment form                         |                                     |                                                                                                                      |            |     |
| Conducting unit                             | Laboratory of Plant Cytology and Embryology -> Department of Experimental Biology and Plant Biotechnology -> Faculty of Biology -> Rector                                                                                                                                                                          |                                                          |                                         |                                     |                                                                                                                      |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                 |                                                          | dr Emilia Brzezicka                     |                                     |                                                                                                                      |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                                                           |                                                          |                                         |                                     |                                                                                                                      |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                                                        | Lecture                                                  | Tutorial                                | Laboratory                          | Project                                                                                                              | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                              | 0.0                                                      | 0.0                                     | 30.0                                | 0.0                                                                                                                  | 0.0        | 30  |
|                                             | E-learning hours included: 0.0                                                                                                                                                                                                                                                                                     |                                                          |                                         |                                     |                                                                                                                      |            |     |
| Learning activity and number of study hours | Learning activity                                                                                                                                                                                                                                                                                                  | Participation in didactic classes included in study plan |                                         | Participation in consultation hours |                                                                                                                      | Self-study | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                              | 30                                                       |                                         | 6.0                                 |                                                                                                                      | 14.0       | 50  |
| Subject objectives                          | <ul style="list-style-type: none"><li>Understanding the basic and essential concepts of the anatomy of flowering plants.</li><li>Overview of histology and organography of flowering plants</li><li>Understanding the basic concepts related to tissue structure and functional tissue systems in plants</li></ul> |                                                          |                                         |                                     |                                                                                                                      |            |     |

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| Learning outcomes               | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Subject outcome                                                                                                                                                                                 | Method of verification                                                                                                                                                                 |
|                                 | [BIOLL3_K06] The graduate is prepared to take responsibility for the equipment/materials entrusted to them and for their own work and that of others                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The graduate is responsible for the entrusted equipment ( light microscope), materials (including permanent specimens) and their own work, and respects the work of others.                     | [SK8] observation of student's independent or team work                                                                                                                                |
|                                 | [BIOLL3_U02] The graduate will be able to make observations individually and in teams, and carry out basic physical, biological and chemical measurements in the field or laboratory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The graduate conducts microscopic observations and performs basic anatomical measurements in the laboratory.                                                                                    | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written<br>[SU5] implementation of a problem task<br>[SU8] observation of student's independent or team work |
|                                 | [BIOLL3_W04] The graduate is conversant with the course of physiological processes and their relationship to the adaptation of the organism to changing environmental conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The graduate understands the basic developmental processes related to tissue and organ formation in plants and their connection to organism adaptation under changing environmental conditions. | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/report<br>[SW5] implementation of a problem task                                                                 |
|                                 | [BIOLL3_W03] The graduate knows the structure and functional relationships at the cellular, tissue, organ and organismal levels                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The graduate describes the structure of plant organisms and their functional relationships at the cellular, tissue, organ, and organismal levels using light microscopy.                        | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/report<br>[SW5] implementation of a problem task                                                                 |
|                                 | [BIOLL3_U01] The graduate will be able to use basic apparatus and research tools and follow the correct sequence of operations in laboratory and field work                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The graduate is proficient in using basic research equipment and maintaining the correct sequence of tasks in laboratory work.                                                                  | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written<br>[SU8] observation of student's independent or team work                                           |
| Subject contents                | Plant cell structure. Structure and functioning of meristems as a source of stem cells. Basics of histogenesis. Structure and functions of plant tissues. Morphology and anatomy of higher plant organs: stems (primary structure and secondary growth); leaves (anatomy of unifacial and bifacial leaves; differences in leaf anatomy between plants with varying water access); roots (primary and secondary structure); introduction to plant embryology (flower anatomy atructure of male and female gametophytes, seeds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                 |                                                                                                                                                                                        |
| Prerequisites and co-requisites |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                 |                                                                                                                                                                                        |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Passing threshold                                                                                                                                                                               | Percentage of the final grade                                                                                                                                                          |
|                                 | Method used to conduct experiments and observations, results documentation and interpretation, notes, presentations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 51.0%                                                                                                                                                                                           | 25.0%                                                                                                                                                                                  |
|                                 | Tests                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 51.0%                                                                                                                                                                                           | 75.0%                                                                                                                                                                                  |
| Recommended reading             | <p>Basic literature</p> <p>Literature used during laboratory</p> <ul style="list-style-type: none"> <li>• Hejnowicz Z. 2002. Anatomia i histogeneza roślin naczyniowych. PWN, Warszawa.</li> <li>• Steeves TA and Sawhney VK. 2017. Essentials of Developmental Plant Anatomy. Oxford University Press.</li> <li>• Eshel A, Tom Beeckman T. 2013. Plant Roots: The Hidden Half, Fourth Edition.CRC Press</li> <li>• Williams, M.E. (October 23, 2012). Evolutionary and Developmental Origin of Leaves. Teaching Tools in Plant Biology: Lecture Notes. The Plant Cell</li> <li>• (online), doi/10.1105/tpc.109.tt1109.</li> <li>• Braune W, Leman A, Taubert H. 1975. Praktikum z anatomii roślin. PWN, Warszawa</li> <li>• Gorczyński T. (red). 1979. Ćwiczenia z botaniki. PWN, Warszawa</li> </ul> <p>Literature studied by the student individually</p> <ul style="list-style-type: none"> <li>• Hejnowicz Z. 2002. Anatomia i histogeneza roślin naczyniowych. PWN, Warszawa.</li> <li>• Esau K. 1973. Anatomia roślin. PWRiL, Warszawa.</li> <li>• Braune W, Leman A, Taubert H. 1975. Praktikum z anatomii roślin. PWN, Warszaw</li> </ul> |                                                                                                                                                                                                 |                                                                                                                                                                                        |

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|----------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                | Supplementary literature | <ul style="list-style-type: none"> <li>• Crang, R., Lyons-Sobaski, S., Wise, R. (2018). Plant anatomy: a concept-based approach to the structure of seed plants. <i>Springer</i>.</li> <li>• Malinowski E. (1973). Anatomia roślin. <i>PWN</i>, Warszawa</li> <li>• Brzezicka, E., Karwowska, K., Kozieradzka-Kiszkurno, M., Chernetsky, M. (2015). Leaf micromorphology of <i>Kalanchoë laciniata</i> (Crassulaceae). <i>Modern Phytomorphology</i>, 8.</li> <li>• Karwowska, K., Brzezicka, E., Kozieradzka-Kiszkurno, M., &amp; Chernetsky, M. (2015). Anatomical structure of the leaves of <i>Crassula cordata</i> (Crassulaceae). <i>Modern Phytomorphology</i>, (8), 53-54.</li> <li>• Brzezicka, E., Kozieradzka-Kiszkurno, M. (2019). Female gametophyte development in <i>Sedum sediforme</i> (Jacq.) Pau (Crassulaceae): an anatomical, cytochemical and ultrastructural analysis. <i>Protoplasma</i>, 256(2), 537-553.</li> </ul> |
|                                                                | eResources addresses     | Adresy na platformie eNauczenie:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Example issues/<br>example questions/<br>tasks being completed |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Work placement                                                 | Not applicable           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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