

1.	Field of study	Biotechnology
2.	Faculty	Faculty of Natural Sciences
3.	Academic year of entry	2021/2022 (winter term), 2022/2023 (winter term), 2023/2024 (winter term), 2024/2025 (winter term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

Module: Modelling of plant organ growth

Module code: 2BT_E_19

1. Number of the ECTS credits: 4

2. Learning outcomes of the module			
code	description	learning outcomes of the programme	level of competence (scale 1-5)
2BT_E_19_1	Student realizes significance of biotechnology and utility of computer modelling as a research tool.	2BT_E_W01_P	3
2BT_E_19_2	Student organizes data, selects and specifies computer programs appropriate for growth modelling.	2BT_E_U01_P	4
2BT_E_19_3	Student applies knowledge about mechanisms and molecular basis of growth and plant morphogenesis.	2BT_E_W03_P	3
2BT_E_19_4	Student projects modelling and performs growth simulations in application to exemplary plant organs.	2BT_E_W02_P	3
2BT_E_19_5	Student visualizes results in the form of growth sequences and performs their critical analysis taking limitation of the modelling into account.	2BT_E_U01_P 2BT_E_U02_P 2BT_E_W02_P	4 3 4

3. Module description	
Description	The objective of the unit is to present growth of plant organs, methods of its studied, overall description and computer modelling. The growth is considered as accompanied with cell divisions. Its description Includes tensor bases and biomechanical aspects related to stresses in cell wall system.
Prerequisites	Basic knowledge of plant biology, mathematics, physics and computer using from the first level of studies.

4. Assessment of the learning outcomes of the module			
code	type	description	learning outcomes of the module
2BT_E_19_w_1	Continuous assessment of practical skills	Participation in discussion on the considered problems.	2BT_E_19_2, 2BT_E_19_3, 2BT_E_19_4

2BT_E_19_w_2	Laboratory report	Ability to work with a compute, use modelling and discuss obtained results.	2BT_E_19_2, 2BT_E_19_4, 2BT_E_19_5
2BT_E_19_w_3	Tests of the lecture	Written test verifying a knowledge gained during lectures and seminar.	2BT_E_19_1, 2BT_E_19_3

5. Forms of teaching						
code	form of teaching			required hours of student's own work		assessment of the learning outcomes of the module
	type	description (including teaching methods)	number of hours	description	number of hours	
BT_E_19_fs_1	lecture	Presentation of selected problems related to growth, its description and modelling with the use of audiovisual tools.	10	Individual study, work with the recommended literature to increase and systematize student's knowledge.	15	2BT_E_19_w_3
BT_E_19_fs_2	discussion classes	Discussion on specific methods and programming tools used in growth modelling.	15	Work with the literature that broadens and systematizes knowledge recommended in the syllabus.	10	2BT_E_19_w_1
BT_E_19_fs_3	laboratory classes	Work with a computer and simulation model applied to generate growth	20	Self-preparation to modelling in practice, reports and tests	55	2BT_E_19_w_2