Course Unit Descriptor

Study Programme: Soil, plant and genetics			
Course Unit Title: New technologies			
Course Unit Code: 19.ZB9009			
Name of Lecturer(s): Associate prof. Igor Balaz			
Type and Level of Studies: Master			
Course Status (compulsory/elective): elective			
Semester (winter/summer): Winter			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): face-to-face			
Number of ECTS Allocated: 5			
Prerequisites: none			
Course Aims: The goal of this course is to make students familiar with new technologies that can be applied in soil, plant and genetics research, such as: artificial intelligence and data management, distributed and self-organizing systems, nanotechnology, CRISPR and synthetic biology.			
Learning Outcomes: Students will learn basics of several novel and emerging scientific and technological disciplines. It will give them basic skills necessary for starting or being involved in latest scientific trends in areas of creating adaptation strategies of plants and animals to climate change.			
Syllabus: *Theory* Complex systems – classification and representations; Complex systems – possibilities of manipulating them; Etics of manipulating biological systems; Artificial Intelligence (AI) and data management; Distributed and self-organizing systems; Nanotechnology; CRISPR; Synthetic Biology. *Practice* Access to and handling with databases; machine learning and AI tools; modelling and simulations of self-organizing systems.			
Required Reading: 1. Boldt J. (ed.) 2016: Synthetic Biology: Metaphors, Worldviews, Ethics, and Law. Springer 2. Singh, V., Dhar P.K. 2015 Systems and Synthetic Biology. Springer 3. Ramsden J. 2016 Nanotechnology. An Introduction. Elsevier 4. Ertel W, Black N.T. 2018 Introduction to Artificial Intelligence. Springer			
Weekly Contact Hours:	**Lectures: 45**	**Practical work: 30**	
Teaching Methods: 1. Lectures; 2. Discussions; 3. Visual presentations; 4. Practical work on simulation tools			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations		**Final exam**	

Active class participation		written exam	20
Practical work		oral exam	50
Preliminary exam(s)			
Seminar(s)	30		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			