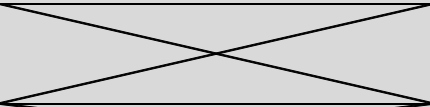




Course title:	Plant Genome Editing
Course title in Polish:	Edycja genomów roślinnych
Course for discipline:	Biology, Agriculture and horticulture

Semester:	3	Status of course:	faculty	Language:	english
Academic year:	2026/27	Catalog number:	66/2025/26		

Coordinator of course:	dr hab. Piotr Gawroński	
Lecturer od course:	dr hab. Piotr Gawroński and KGHIBR teachers	
Executing unit:	KGHiBR	
Ordering unit:	Doctoral School SGGW	
Assumptions, goals and description of the course:	The course "Plant Genome Editing" aims to familiarize PhD students with modern methods of precise plant genome modification, with a particular focus on CRISPR-Cas systems. The course integrates theoretical knowledge with practical laboratory skills. The lecture component (4 h) covers the biological and molecular foundations of genome editing, mechanisms of DNA cleavage and repair, and applications of CRISPR-Cas in basic research and plant breeding. The laboratory component (11 h) guides participants through a simplified end-to-end genome editing workflow, including bioinformatic analysis and gRNA design, preparation of vectors for Arabidopsis thaliana transformation, and selection and PCR-based genotyping of mutants.	
Didactic form, number of hours:	15 hours	
Teaching methods:	The course is delivered in the form of problem-oriented lectures and laboratory classes. The lectures cover the theoretical foundations of plant genome editing, supported by examples from current scientific literature. The laboratory classes include work with bioinformatic tools, design of gRNAs and PCR primers, and the application of basic molecular biology techniques. Problem-based learning elements and discussion of experimental results with the instructor are also incorporated.	
Limit of people in the group:	12	
<b>Learning outcomes</b>		
<b>KNOWLEDGE - the graduate knows and understands:</b>	<b>SKILLS - the graduate is able to:</b>	<b>COMPETENCES - the graduate is ready to:</b>
To the extent enabling to revise the existing paradigms in the field/discipline - the world achievements, gathering theoretical background as well as general and selected detailed issues	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	Critically evaluate the achievements in the field/discipline represented
Major general development trends in the field/discipline		Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect
		Support the ethos of scientific circles and conduct independent research
The method of verification of learning outcomes:	Course project and active participation in classes	
Form of documentation of achieved learning outcomes:	Project in the form of a written report including analysis of the obtained results	
Elements and weights of the final grade:	Report – 70%, active participation in classes – 30%	
Place of the course:	Teaching rooms of KGHIBR in Building 37	
<b>Basic and supplementary literature</b>		
<a href="https://www.illumina.com/content/dam/illumina-marketing/documents/products/research_reviews/publication-review-gene-editing-research.pdf">https://www.illumina.com/content/dam/illumina-marketing/documents/products/research_reviews/publication-review-gene-editing-research.pdf</a> ; <a href="https://www.nature.com/articles/s41477-019-0461-5">https://www.nature.com/articles/s41477-019-0461-5</a> ; <a href="https://www.nature.com/articles/nplants2017107">https://www.nature.com/articles/nplants2017107</a> ; <a href="https://www.nature.com/articles/s41477-022-01279-8">https://www.nature.com/articles/s41477-022-01279-8</a>		
Comments:		

Estimated number of hours of work of the doctoral student necessary to achieve the assumed learning outcomes:	40
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Learning outcomes reference to the second degree characteristics of the National Qualification Framework (level 8) covering doctoral competences:		
Symbol:	Learning outcomes:	8 level NQF
SD1_KW01	To the extent enabling to revise the existing paradigms in the field/discipline - the world achievements, gathering theoretical background as well as general and selected detailed issues	P8S_WG
SD1_KW02	Major general development trends in the field/discipline	P8S_WG
SD1_KU05	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	P8S_UW
SD1_KK01	Critically evaluate the achievements in the field/discipline represented	P8S_KK
SD1_KK03	Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect	P8S_KK
SD1_KK08	Support the ethos of scientific circles and conduct independent research	P8S_KR