A COURSE SYLLABUS – DOCTORAL SCHOOL

REGARDING THE QUALIFICATION CYCLE FROM 2022 TO 2026

GENERAL INFORMATION ABOUT COURSE	
Course title	**Doctoral Laboratory**
Name of the unit running the course	Doctoral School at University of Rzeszów
Type of course *(obligatory, optional)*	obligatory
Year and semester of studies	Year I - IV/Semester I-VIII
Discipline	Biological sciences
Language of Course	polish
Name of Course coordinator	dr hab. Tomasz Durak, prof. UR
Name of Course lecturer	dr hab. Tomasz Durak, prof. UR
Prerequisites	Completion of studies in the field of: biology, at the level of studies II degree

BRIEF DESCRIPTION OF COURSE
(100-200 words)

The aim of the Ph.D. thesis laboratory is to implement the Ph.D. student to independent research work, including the definition of the research problem and the selection of research methods and solving methodological problems. The main aim of the classes carried out in the doctoral laboratory is to prepare the doctoral student to carry out the research necessary for the preparation of the doctoral dissertation. In particular, the doctoral student will conduct breeding experiments and laboratory tests of collected material and then statistical analysis and elaboration of the results of the conducted research. The developed results will be confronted with the existing state of knowledge, which will provide the basis for the preparation of the doctoral dissertation. The aim of the doctoral laboratory is also to train the ability to find and use various sources of scientific data and to train the doctoral student in the continuous need to follow the literature in leading scientific journals.

COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES

Learning outcome	The description of the learning outcome defined for the course	Relation to the degree programme outcomes (symbol)	Learning Format (Lectures, classes,...)	Method of assessment of learning outcomes (e.g. test, oral exam, written exam, project,...)
Knowledge (no.)	**(Knows and understands)**			
1	world achievements, conceptual grid and directions of development, covering theoretical foundations and general issues and selected specific issues (also in a foreign language), including those relevant to the research topic being carried out in the field of sciences and life sciences, especially in the leading discipline of biological sciences;	**P8S_WG1** **P8S_WG3**	Lab.	Project
2	directions of the latest research in the field of plant response to environmental changes;	**P8S_WG2**	Lab.	Project
3	methodology of research applied in biological, physical, chemical and medical sciences, including	**P8S_WG4**	Lab.	Project

	applied interdisciplinary techniques and research tools;			
Skills (no.)	**(Able to)**			
1	use knowledge of biological and chemical sciences to identify, plan research and describe phenomena concerning physiological and biochemical responses of plants to changes in environmental conditions and the consequences of these changes for the functioning of plant communities and the ecosystem;	**P8S_UW1**	Lab.	Project
2	use the research literature from his/her area of research, critically evaluate it and make his/her own contribution resulting from the research carried out;	**P8S_UW2** **P8S_UW3**	Seminar	Project
Social competence (no.)	**(Ready to)**			
1	critically evaluate the scientific output in the field of research on the effects of environmental changes on the functioning of plants and their consequences at the ecosystem level.	**P8S_KK1**	Seminar	Project

LEARNING FORMAT – NUMBER OF HOURS

Semester (no.)	Lectures	Seminars	Lab classes	Internships	others	ECTS
I - VIII			8 x 30 hrs. – 240 hrs.			24

METHODS OF INSTRUCTION

laboratory, discussion, project

COURSE CONTENT

The programme contents are connected with the realised research problem realised in semesters I to VIII:

1. Operation of the plant breeding room;
2. Principles and methods of plant breeding;
3. Research techniques in the scope of the addressed research problem;
4. Development of a concept, methodology and research plan;
5. Plant breeding in selected habitat conditions in order to collect research material;
6. Analysis and development of the research material ;
7. Gathering and familiarizing with the literature on the analyzed issues;
8. Interpretation of the obtained research results and drawing conclusions;
9. Preparation of the dissertation;

COURSE ASSESSMENT CRITERIA

Credit with marks after each semester on the basis of observation and assessment of progress in carrying out the research work and preparing the dissertation.

Possible semester grades are: 2.0, 3.0, 3.5, 4.0, 4.5, 5.0.
Percentage requirements for the grading scale:
In order to obtain a pass grade, a conversion factor for the corresponding percentage of points obtained is applied:
- up to 50% - insufficient, (the doctoral student does not make progress in scientific research, does not expand knowledge, does not study the primary literature, does not participate in substantive discussion, does not meet scientific obligations);
- 51% - 60% - sufficient, (the doctoral student makes negligible progress in scientific research, expands knowledge, studies the primary literature, the discussion conducted is limited to a narrow range of substantive knowledge, meets basic scientific obligations);
- 61% - 70% - satisfactory plus, (the doctoral student makes progress in scientific research, broadens knowledge, studies basic literature, participates in the discussion in a substantial way, fulfils his/her scientific duties);
- 71% - 80% - good, (a doctoral student makes significant progress in scientific research, broadens knowledge, studies basic and supplementary literature, substantively participates in discussion, fulfils all the scientific duties);
- 81% - 90% - good plus, (a doctoral student makes significant progress in scientific research, systematically broadens knowledge, studies basic and supplementary literature, substantively participates in discussion, fulfils all the scientific duties);
- 91% - 100% - very good (doctoral student makes significant progress in scientific research, systematically extends knowledge, studies basic, complementary and beyond obligatory literature, substantively participates in discussion, meets all scientific obligations).

TOTAL PhD STUDENT WORKLOAD REQUIRED TO ACHIEVE THE INTENDED LEARNING OUTCOMES – NUMBER OF HOURS AND ECTS CREDITS

Activity	Number of hours
Scheduled course contact hours	240 hrs. – 30 hrs. x 8
Other contact hours involving the teacher (consultation hours, examinations)	60
Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.)	420
Total number of hours	720 hrs.
Total number of ECTS credits*	24

INSTRUCTIONAL MATERIALS

Compulsory literature:	SCIENTIFIC ARTICLES IN POLISH AND FOREIGN LANGUAGES IN THE FIELD OF PLANT PHYSIOLOGY AND ECOLOGY JAN KOPCEWICZ J., KRZYSZTOF JAWORSKI K., STANISŁAW LEWAK S., 2019. FIZJOLOGIA ROŚLIN. WYDAWNICTWO NAUKOWE PWN. LAMBERS H., CHAPIN F.S., ONS T.L. 2008. PLANT PHYSIOLOGICAL ECOLOGY. SPRINGER INTERNATIONAL PUBLISHING.

	WEINER J., 2028. TECHNIKA PISANIA I PREZENTOWANIA PRZYRODNICZYCH PRAC NAUKOWYCH. WYD. NAUKOWE PWN, WARSZAWA.
Complementary literature:	Pessarakli M. Ed. 1999. Handbook of Plant and Crop Stress. 2nd edn, Revised and Expanded. New York. Reigosa, MJ. 2001. Handbook of Plant Ecophysiology Techniques. Kluwer Academic Publishers, The Netherlands. Włodzimierz Meissner W., 2014. Metody statystyczne w biologii. Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk.

*(1 ECTS CREDIT CORRESPONDS TO 25 - 30 HOURS OF TOTAL WORKLOAD OF THE DOCTORAL STUDENT NEEDED TO ACHIEVE THE EXPECTED OUTCOMES)

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DATE AND SIGNATURE OF THE COURSE TUTOR

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APPROVAL OF THE HEAD OF THE UNIT OR AUTHORISED PERSON