A COURSE SYLLABUS – DOCTORAL SCHOOL
regarding the qualification cycle from 2022/2023 to 2025/2026

GENERAL INFORMATION ABOUT COURSE	
Course title	***OPTIONAL SPECIALIZED SUBJECT:*** ***Determinants of soil fertility and productivity.***
Name of the unit running the course	Doctoral School at University of Rzeszów
Type of course *(obligatory, optional)*	obligatory - optional specialist subject
Year and semester of studies	year III: semester VI
Discipline	agriculture and horticulture
Language of Course	Polish language
Name of Course coordinator	dr hab. Małgorzata Szostek, prof. UR
Name of Course lecturer	dr hab. Małgorzata Szostek, prof. UR
Prerequisites	Basic knowledge of soil science and agricultural chemistry

BRIEF DESCRIPTION OF COURSE
(100-200 words)

The purpose of the course is:
1. to expand knowledge of the importance of natural and anthropogenic factors shaping soil fertility and productivity.
2. to get acquainted in detail with the influence of different methods of soil utilization on their properties shaping fertility and productivity.
3. to acquire the ability to independently plan activities that promote the maintenance of soils in good agricultural condition.
4. To draw attention to the importance of proper management of soil resources in agriculture.

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, has knowledge			
P8S_WG1	He has advanced knowledge of the importance of physical, chemical and biological properties of soils and biological properties of soils in shaping their fertility and productivity, and the influence of land use on shaping these parameters.	**P8S_WG**	Conversation, Laboratories:	Written exam, colloquium
P8S_WG2	He has advanced knowledge of the latest trends in the proper use of soils and the implementation of the latest methods that promote fertility and productivity of soils.	**P8S_WG**	Conversation, Laboratories:	Written exam, colloquium
P8S_WG3	He has interdisciplinary knowledge of the complex mechanisms that occur in soils, affecting their fertility and productivity.	**P8S_WG**	Conversation, Laboratories:	Written exam, colloquium

P8S_WK1	He knows and understands the necessity of proper management of soil resources to maintain agricultural production.	**P8S_WK**	Conversation, Laboratories:	Written exam, colloquium
Skills (no.)	can			
P8S_UW1	Based on interdisciplinary knowledge, he can identify and solve problems concerning complex relationships occurring in the soil, as well as apply various solutions to maintain the quality of soils at a level that determines their high fertility and fertility.	**P8S_UW**	Conversation, Laboratories:	Written exam, colloquium
P8S_UW2	Use the acquired knowledge, including that acquired independently in diagnosing and solving complex problems related to related to the proper management of agricultural soils.	**P8S_UW**	Laboratories:	Colloquium
P8S_UW3	Use interdisciplinary knowledge to analyze and evaluate relationships affecting soil properties in planning the use and utilization of crop soil resources	**P8S_UW**	Conversation, Laboratories:	Written work
P8S_UK6	Discuss and initiate discussions on scientific topics, including for the presentation of obtained research results on parameters affecting fertility and fertility of soils, including in an international environment.	**P8S_UK**	Conversation,	Written exam,
Social competence (no.)	is ready to			
P8S_KK3	Implement the acquired knowledge and skills in solving scientific and practical problems.	**P8S_KK**	Conversation, Laboratories:	Written exam,

LEARNING FORMAT – NUMBER OF HOURS

Semester (no.)	Lectures	Seminars	Lab classes	Internships	others	ECTS
VI	-	-	7	-	8	2

METHODS OF INSTRUCTION

- CONVERSATIONS/LABORATORIES IN TRADITIONAL FORM;
- CLASSES WITH MULTIMEDIA PRESENTATION;
- PERFORMING AND PLANNING EXPERIMENTS;
-LABORATORY WORK USING LABORATORY EQUIPMENT;
- DISCUSSION.

COURSE CONTENT

1 Conversation:
- Physical, chemical and biological properties of soils - their importance, relationships and influence on soil quality;
- The impact of different uses of soils on their properties;

- The role of proper management of soil resources in preserving their productive functions.
2 Laboratories:
- Determination of basic physical properties of soils;
- Determination of factors affecting the assimilability of nutrients in soils;
- Determination of the abundance of soils in assimilable forms of nutrients and determination of fertilization needs;
- Determination of the quantity and analysis of quality parameters of soil organic matter and assessment of organic carbon abundance of soils;
- Determination of selected indicators of biological activity of soils.

COURSE ASSESSMENT CRITERIA

Conversation: - 7 hours ends with a written credit (exam);
Exercises theoretical part - written colloquium for a grade and practical part for a grade (pass/fail);
Possible semester grades are: 2.0, 3.0, 3.5, 4.0, 4.5, 5.0.
Course credit - exam: up to 59% - failing grade; 60% satisfactory grade; 61-70% satisfactory plus; 71-80% good; 81-90% good plus; 91-100% very good.
Active attendance in class can raise the grade by half a grade.

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	**15**
Other contact hours involving the teacher (consultation hours, examinations)	**1**
Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.)	**39**
Total number of hours	**55**
Total number of ECTS credits	**2**

INSTRUCTIONAL MATERIALS

Compulsory literature:	**1. MOCEK A., DRZYMAŁA S., OWCZARZAK W. BASICS OF SOIL ANALYSIS AND CLASSIFICATION. PUBLISHING HOUSE OF THE UNIVERSITY OF LIFE SCIENCES IN POZNAŃ, POZNAŃ 2022.** **2. TYSZKIEWICZ Z.E., CZUBASZEK R., ROJ-ROJEWSKI S. BASIC METHODS OF LABORATORY ANALYSIS OF SOILS. OFICYNA WYDAWNICZA POLITECHNIKI BIAŁOSTOCKIEJ, BIAŁYSTOK 2019.** **3 MOCEK A. (ED.) 2015 SOIL SCIENCE. PWN, WARSAW.** **4. BEDNAREK R., DZIADOWIEC H., POKOJSKA U., PRUSINKIEWICZ Z. 2004.** **ECOLOGICAL AND SOIL SCIENCE RESEARCH, PWN, WARSAW.** **5. GONET S. (ED.) 1990. METHODOLOGICAL GUIDE TO THE STUDY OF ORGANIC MATTER ORGANIC MATTER OF SOILS. [IN:] WORKS OF THE SCIENTIFIC COMMISSIONS OF THE POLISH SOIL SCIENCE SOCIETY. SOIL SCIENCE. ZG PTG. WARSAW.** **6 KOŁACZ B. (2020). THE IMPORTANCE OF ORGANIC MATTER IN THE SOIL AND AGROTECHNICAL MEASURES TO SUPPORT ITS MAINTENANCE. AGRICULTURAL ADVISORY CENTER IN BRWINÓW, RADOM BRANCH, RADOM.**
Complementary literature:	1. Szostek, M., Szpunar-Krok, E., Pawlak, R., Stanek-Tarkowska, J., & Ilek, A. (2022). Effect of Different Tillage Systems on Soil Organic Carbon and

	Enzymatic Activity. Agronomy, 12(1), 208. https://doi.org/10.3390/agronomy12010208 2. Pabin J. (2007) Tillage and soil physical properties and crop yield. Studies and Reports of IUNG-PIB, 8, doi: 10.26114/sir.iung.2007.08.13. 3. Smagacz J. (2023). The importance of conservation tillage in shaping soil fertility. Studies and Reports of IUNG-PIB, 71)25), 87-103. https://doi.org/10.26114/sir.iung.2023.71.05

*(1 ECTS CREDIT CORRESPONDS TO 25 - 30 HOURS OF THE TOTAL WORKLOAD OF A DOCTORAL STUDENT, NEEDED TO ACHIEVE THE ESTABLISHED EFFECTS).

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Date and signature of the Course lecturer

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Approved by the Head of the Department or an authorised person