

**A COURSE SYLLABUS – DOCTORAL SCHOOL  
REGARDING THE QUALIFICATION CYCLE FROM 2021 TO 2025**

<b>GENERAL INFORMATION ABOUT COURSE</b>				
Course title		<b>Water resources management in agriculture</b>		
Name of the unit running the course		Doctoral School at University of Rzeszów		
Type of course ( <i>obligatory, optional</i> )		Compulsory, optional (specialized) subject to choose from		
Year and semester of studies		Year III, summer semester 2023/2024		
Discipline		Agriculture and gardening		
Language of Course		English		
Name of Course coordinator		Prof. dr hab. Jadwiga Stanek-Tarkowska		
Name of Course lecturer		Prof. dr hab. Jadwiga Stanek-Tarkowska		
Prerequisites		Knowledge of the basics of soil science and hydrology		
<b>BRIEF DESCRIPTION OF COURSE (100-200 words)</b>				
The aim of the course is: <b>1.</b> to present and expand knowledge of the possibilities of managing water resources in agriculture (traditional and ecological). Applied methods of saving water resources and measurement techniques. <b>2.</b> Acquiring the ability to independently develop recommendations on how to rationally manage scarce water resources in agriculture. <b>3.</b> Drawing attention to the importance of proper management of water resources.				
<b>COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES</b>				
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,...)
<b>Knowledge (no.)</b>	He knows and understands			
1	Basic phenomena and processes related to the movement of groundwater. How the soil reacts to precipitation depending on its physico-chemical properties	P8S-WG/1  P8S-WG/2	L, Ex	Written exam, test
2	Is aware of the need for rational management of water resources in agriculture and horticulture. Principles and methodology of performing analyzes (determining water content in soil)	P8S-WG/3  P8S-WG/4	L, Ex	Written exam, test
<b>Skills (no.)</b>	Can			
3	Use knowledge and independently perform analyzes and measurements, draw conclusions and describe relationships	P8S-UW/1	L, Ex	Written exam, test
4	Discuss and initiate discussions on scientific topics, using acquired skills and knowledge	P8S-UW/2 P8S-UK/2 P8S-UK/3	Ex	Seminar

	related to water resources management.	P8S-UK/4 P8S-UK/1 P8S-UK/5				
<b>Social competence (no.)</b>	He is ready to					
5	Critically evaluate your own knowledge and skills and that of other scientists and discussions	P8S-KK/1	L, Ex			Seminar
6	Implementation of acquired knowledge and skills in solving scientific and practical problems.	P8S-KK2 P8S-KK/3 P8S-KO/2	Ex			Seminar
<b>LEARNING FORMAT – NUMBER OF HOURS</b>						
Semester (no.)	Lectures	Seminars	Lab classes	Internships	others	ECTS
VI	5	10				0
<b>METHODS OF INSTRUCTION</b>						
<p><i>E.G, LECTURE: A PROBLEM-SOLVING LECTURE/A LECTURE SUPPORTED BY A MULTIMEDIA PRESENTATION/ DISTANCE LEARNING CLASSES: TEXT ANALYSIS AND DISCUSSION/PROJECT WORK (RESEARCH PROJECT, IMPLEMENTATION PROJECT, PRACTICAL PROJECT)/ GROUP WORK (PROBLEM SOLVING, CASE STUDY, DISCUSSION)/DIDACTIC GAMES/ DISTANCE LEARNING LABORATORY CLASSES: DESIGNING AND CONDUCTING EXPERIMENTS)</i></p> <p><b>LECTURE, EXERCISES</b></p>						
<b>COURSE CONTENT</b>						
<p><b>1. Lectures/ Seminars:</b></p> <ul style="list-style-type: none"> <li>• Groundwater - origin, types and circulation</li> <li>• Which promotes water retention in agricultural soils</li> <li>• How to properly manage water resources in the event of water shortage</li> </ul> <p><b>2. Seminars / Lab classes/ others:</b></p> <ul style="list-style-type: none"> <li>• Is it possible to increase soil water retention - treatments in practice</li> <li>• Determination of water content in various types of soil</li> <li>• Determination of the easily dispersible clay content of selected soils using the turbidimetric method</li> <li>• Determination of soil compactness and determination of the influence of this parameter on the water content in the soil</li> </ul>						
<b>COURSE ASSESSMENT CRITERIA</b>						
<p>5-hour lectures end with a written assessment (examination)  Exercises: theoretical part - colloquium - written for assessment and practical part - assessment (pass/fail)  Completion of the course 60% DST grade; 65-70% dst plus; 75-80% good; 85-90% plus good 90-100% very good</p>						
<b>TOTAL PhD STUDENT WORKLOAD REQUIRED TO ACHIEVE THE INTENDED LEARNING OUTCOMES – NUMBER OF HOURS AND ECTS CREDITS</b>						
Activity			Number of hours			

Scheduled course contact hours	15
Other contact hours involving the teacher (consultation hours, examinations)	5
Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.)	15
<b>Total number of hours</b>	35
<b>Total number of ECTS credits</b>	0

#### INSTRUCTIONAL MATERIALS

Compulsory literature:	<ol style="list-style-type: none"> <li>1. BAJKIEWICZ-GRABOWSKA E., MIKULSKI Z. HYDROLOGIA OGÓLNA. WYDAWNICTWO PWN, WARSZAWA, 2007</li> <li>2. BUCKMAN H C., BARDY N. C. GLEBA I JEJ WŁAŚCIWOŚCI. PWR I L WARSZAWA , 1971</li> <li>3. PRACA ZBIOROWA. RED. M. HAJNOS I J. SZCZYPA . FIZYKOCHEMICZNE METODY BADAŃ MATERIAŁU GLEBOWEGO. POLSKA AKADEMIA NAUK ZAKŁAD AGROFIZYKI W LUBLINIE, 1979</li> <li>4. CZYŻ E.A., DEXTER A.R. PLANT WILTING CAN BE CAUSED EITHER BY THE PLANT OR BY THE SOIL. 2012. SOIL RESEARCH 50(8) 708-713 <a href="https://doi.org/10.1071/SR12189">HTTPS://DOI.ORG/10.1071/SR12189</a></li> </ol>
Complementary literature:	<ol style="list-style-type: none"> <li>1. Czyż E.A., Uwilgotnienie gleb i zużycie wody przez rośliny w zależności od wybranych czynników agrotechnicznych. Pamiętniki Puławskie. 2000</li> <li>2. Praca zbiorowa. red. M. Hajnos i J. Szczypha . Fizykochemiczne metody badań materiału glebowego. Polska Akademia Nauk Zakład Agrofizyki w Lublinie, 1979</li> </ol>