Polish name of the course:	Rolnictwo precyzyjne	ECTS	**3**
English name of the course:	Precision agriculture		
Name of study	Organic Agriculture and Food Production		

Language: **English**		Study level: **I**	
Study status: ☒full-time ☐part-time	Status of the course: ☐ basic ☐ obligatory ☐professional ☒ elective	Semester: **5**	☒winter semester ☐spring semester
description applies from the academic year (year):		2020/2021	Catalog number : ROL-ER-…

Coordinator of the course[5]	Dr hab. Stanisław Samborski
Teachers :	Dr hab. Stanisław Samborski
Conducting unit:	Faculty of Agriculture and Biology, Institute of Agriculture, Department of Agronomy
Unit ordering classes :	
Goals and description of the course:	Learning outcomes – upon completion of this course, students will be: • familiar with Precision agriculture (PA) objectives and terminology, • able to understand the potential benefits and barriers of PA development • able to understand the concept of: - automatic guidance, steering, - section control, - soil sampling, - plant and soil variability mapping, - variable application of inputs: fertilizers, pesticides and seeds, - precision weed management, - yield mapping, • able to know examples of equipment for real-time field mapping of some soil and plant characteristics, • able to use Geographical Information System (GIS) software for importing spatial data, creation of: - guidance layer, - soil sampling points, - variable prescription maps, - vegetation index and variable nitrogen rate maps, - yield, nutrient uptake and profitability maps.
Didactic forms, number of hours :	W - lecture, hours **15** LC - laboratory exercises, hours **15**
Teaching methods :	Lecture, individual projects and case studies.
Formal requirements and initial assumptions :	Students should have basic knowledge on information technology, crop production and soil science.

Learning outcomes :	Kowledge: W1 – is familiar with Precision agriculture (PA) objectives and terminology, W2 – is able to understand the potential benefits and barriers of PA development W3 – is able to describe the principle of operation and benefits of automatic guidance of tractors and machinery, and section control, W4 – is able to describe rules of using variable rates of inputs and precise weed management.	Skills: U1 – is able to indicate PA tools useful for different types of farms, U2 – is able to use GIS software for data processing and creation of maps used in PA, U3 – is able to plan PA implementation on a farm and show its benefits and limitations.	Competence: K1 – knows applications of precision agriculture tools in crop production.

The verification way of learning outcomes :	Lectures: written assignment Field and laboratory exercises: assignment – PA technology farm implementation plan. You will select your topic.
Form of documentation achieved learning outcomes:	Lectures – written exam, laboratory exercises – written assignment: implementation plan.
Elements and weights with the impact on the final grade:	The final grade will consist of: 35% – lectures: written exam, 65% – laboratory exercises – written assignment: implementation plan
Place for course:	Lectures and laboratory exercises – Department of Agronomy, building 37, 3rd floor, field exercises – Research Farm of Warsaw University of Life Sciences and WULS campus.

Basic literature:

1. Brase T.A., 2005: Precision Agriculture. Thomson Delmar Learning, ss. 224.
2. Heege H. J. 2013. Precision In Crop Farming: Site Specific Concepts and Sensing Methods: Applications and Results. Springer Publisher, ss. 356.
3. Nicholls C, McCallum M and Hele M. 2012. PA in Practice. Grains Research & Development Corporation, ss. 104.
4. Samborski S. (Ed.). 2018. A team of authors: Dobers E.S., Elliot S., Gnatowski T., Gozdowski D., Kozyra J., Nieróbca A., Pudełko R., Samborski S., Stępień M., Szatyłowicz J. Rolnictwo precyzyjne. Wydawnictwo Naukowe PWN SA, Warszawa, pp. 522. (In Polish).
5. Stafford J. 2019. Precision agriculture for sustainability. ss. 494.
6. Taylor J., Whelan B., 2013. Precision Agriculture for Grain Production Systems. CSIRO Publishing, ss. 199.

Complementary literature: will be provided by the teacher at the end of each lecture.

Quantitative indicators characterizing the module / course:

Estimated total number of student work hours (contact and own work) necessary to achieve the expected learning outcomes – based on this, complete the ECTS field:	**60 h**
The total number of ECTS points that a student obtains in classes requiring direct participation of academic teachers or other persons conducting classes (consultations, cooperation with a supervisor):	**2**

Table of compliance of the directional learning outcomes with the effects of the course:

effect category	Learning outcomes for the course:	Reference to effects for the study program for the field of study	The impact of the course on the field effect *)
Knowledge –W1	is familiar with Precision agriculture (PA) objectives and terminology,	K_W01	2
Knowledge –W2	is able to understand the potential benefits and barriers of PA development,	K_W01, K_W02	3, 3
Knowledge –W3	is able to describe the principle of operation and benefits of automatic guidance of tractors and machinery, and section control,	K_W03	2
Knowledge –W4	is able to describe rules of using variable rates of inputs and precise weed management,	K_W04	2
Skills –U1	is able to indicate PA tools useful for different types of farms,	K_U01	2
Skills – U2	is able to use GIS software for data processing and creation of maps used in PA,	K_U02	2
Skills – U3	is able to plan PA implementation on a farm and show its benefits and limitations.	K_U03	3
Competence –K1	knows applications of precision agriculture tools in crop production.	K_K01, K_W01	2

*)

3 - advanced and detailed,

2 - significant,

1 - basic,