

Course code:

Plan position:

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	Hydrology, meteorology, irrigation and drainage
Field of studies	
Level of studies	First degree
Profile of studies	
Form of studies	
Specialty	
Unit responsible for the field of studies	Faculty of Agriculture and Biotechnology
Name and academic degree of teacher(s)	Prof. Roman Rolbiecki, Dr. Renata Kuśmierk-Tomaszewska, Prof. Stanisław Rolbiecki
Introductory courses	-
Introductory requirements	-

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
winter/sommer	10		20			5	7

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	Knows the terminology in the field of meteorology and climatology, can define meteorological elements, indicators, and phenomena as well as climatological factors and processes in connection with the state of the natural environment, based on them can determine the size and quality of climatic natural resources Is aware of the existence and functioning of the infrastructure of domestic and foreign meteorological monitoring networks and portals; knows systems for measuring meteorological elements and statistical and mathematical methods used to develop the results of measurements of the most important physical parameters occurring in the atmospheric environment	K_W01 K_W02 K_W08	P6S_WG
W2			

...			
SKILLS			
U1	He is able to acquire selected meteorological data generated by the infrastructure of state and commercial meteorological monitoring networks Can use appropriate IT techniques to develop, interpret and present the results and conclusions of the analysis of selected meteorological and climatic indicators important in monitoring the natural environment	K_U03 K_U04	P6S_UW P6S_UU
U2			
...			
SOCIAL COMPETENCES			
K1	He is aware of the technological progress taking place in weather and climate monitoring systems and sees the need to improve his competencies in this area Using the available meteorological and climatic studies as well as public and commercial databases of meteorological measurements, he is guided by ethical principles in the field of intellectual property protection	K_K01 K_K02	P6S_KK P6S_KR
K2			
...			

3. TEACHING METHODS

A. Traditional methods used ***

multimedia lecture, computer lab

B. Distance learning methods used ***

Synchronous method Remote lecture via the MS Teams platform; used in emergency situations (specified by the Rector's Ordinance)

Asynchronous method In order to supplement the material presented in classroom, access to: multimedia presentations placed in a cloud, meteorological and related portals, online thematic resources (e.g. www.imgw.pl , <https://cloudatlas.wmo.int/en/home.html>, <https://cloudatlas.wmo.int/en/home.html> ://power.larc.nasa.gov/data-access-viewer/), online educational videos, online multimedia presentations,

4. METHODS OF EXAMINATION

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5. SCOPE

Lectures	Solar radiation, greenhouse effect, albedo, heat balance of the earth and atmosphere, water cycle; clouds and their classification, evaporation and rainfall; the hydrological cycle, precipitation processes ; Weather and climate: Climatological elements and their seasonal distribution over latitudes. Climatic classification: Koppen, climatic zones; Frequencies of disastrous weather events, climatological factors and their effect on crop growth and yield. Climatic change and its causes, global warming. Water and its role in plants. Water resources of Poland. Soil water movement and water availability, uptake, transport and transpiration in plants. Crop plant adaptation to moisture stress condition; quality of irrigation water. Effect of saline water and soil salinity on plant-water relation
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	and management of crops. Hydrologic cycle and its modifications. Measurement of runoff, infiltration, moisture retention of soil. Drought and its effect on water balance.
Laboratories	Fundamentals of measurement techniques, theory and working principles of weather measuring instruments; Methods of developing and presenting meteorological elements. Basic climatological indicators. Methods of developing climatic conditions; analysis of results for the purposes of estimating environmental climatic resources. Examples of climatological studies. Project of different methods of irrigation; microirrigation system; fertigation an open field; management of water in controlled environments and polyhouses; water use efficiency of different irrigation systems. Measurement of soil moisture using tensiometer, pressure plate and membrane. Computation of water requirement of crops using simple formulas, such as: Hargreaves, Grabarczyk. Calculation of water use efficiency and scheduling of irrigation based on evapotranspiration and tensiometer methods.
Field exercise	Visit at the experimental field with the irrigation equipment (forest nursery).

6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Presentation
W1		x				
...						
U1				x		
...						
K1					x	
...						

7. LITERATURE

Basic literature	Mölders N., Kramm G., 2014. Lectures in Meteorology. Springer Press, PDF available from the teacher Mavi H., Tupper G.J., 2004. Agrometeorology. Principles and Applications of Climate Studies in Agriculture. Food Products Press, Oxford. Barry R.G., Chorley R.J., 2003. Atmosphere, Weather and Climate. London. Karczmarczyk S., Nowak L., (red.) 2006. Plant irrigation. Aneks. PWRiL Poznań - PDF available from the teacher K. C. Patra. 2000. Hydrology and Water Resources Engineering. Narosa 2000-12-11, ISBN-10 : 0849309336 OECD. 1998. Water Management: Performance and Challenges in OECD Countries, OECD Publishing, Paris. ISBN-13:9780849309335. http://dx.doi.org/10.1787/9789264162600-en
Supplementary literature	Mölders N., Kramm G., 2014. Lectures in Meteorology. Springer Atmospheric Sciences, Cham: Springer. PDF available from the teacher Prochal P.,(ed.) 1986. Land reclamation – I i II. PWRiL Warszawa - PDF available from the teacher

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	35
	Supervision hours	
Student's own work	Preparation for classes	80
	Reading assignments	40
	Other (preparation for exams, tests, carrying out a project etc)	20
Total student workload		175
Number of ECTS points		7