

**Course name:** Soil science and plant fertilization

**COURSE NAME (capital letters) SOIL SCIENCE AND PLANT FERTILIZATION**

ECTS	6
Course status	complementary - obligatory
Course final assesement/evaluation of outcomes	exam, evaluation of student presentations, written report from field classes
Prerequisites	none

**Main field of study:** Agriculture, Environmental protection

**field of study name (capital letters) AGRICULTURE, ENVIRONMENTAL PROTECTION**

Profile of study	General-academic
The code of studies (education level)	SI/SM (bachelor/master)
Semester of studies	winter
Language of instruction	English

**Course offered by:**

Name of faculty offering the course	Faculty of Agriculture and Economics
Name of department offering the course	Department of Agricultural and Environmental Chemistry, Department of Soil Science and Agrophysics,
Course coordinator	Agnieszka Baran, Krystyna Ciarkowska

**Learning outcomes of the course:**

Symbol of outcome	Description of learning outcome	Reference to	
		main field of study outcomes	discipline#
<b>KNOWLEDGE – student knows and/or understands:</b>			
SSPF_W1	environmental phenomena and the chemistry of the lithosphere, hydrosphere and atmosphere	OŚ1_W05	RR
SSPF_W2	geological processes, soil forming factors, pedogenic processes, lists soil types, environmental soil services and how to protect soils against the degradation	OŚ1_W10	RR
SSPF_W3	knows the genesis, systematics, composition and functions of soils as well as the basic laws of plant nutrition and fertilization	RO1_W07	RR
<b>SKILLS – student is able to:</b>			
SSPF_U1	use the basic laboratory technique useful in environmental protection	OŚ1_U08	RR
SSPF_U2	evaluate the quality of soil and the possibility of use	OŚ1_U14	RR
SSPF_U3	performs simple scientific experiments on his own or under the supervision of a tutor, analyzes their results and draws conclusions	OŚ1_U14	RR
<b>SOCIAL COMPETENCE- student is ready to:</b>			
SSPF_K1	is sensitive to the conservation of environmental resources and understands the need to	OŚ1_K01	RR
SSPF_K2	training and self-improvement in the field of the profession and understands the need for lifelong learning	OŚ1_K04	RR
SSPF_K3	thinking and acting in the entrepreneurial way	OŚ1_K06	RR

**Teaching contents:**

<b>Lectures</b>	<b>30</b>	<b>hours</b>
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Topics of the lectures	<ol style="list-style-type: none"> <li>1. Soil definition and functions, soil-forming factors</li> <li>2. Characteristics of parent materials of soils in Poland</li> <li>3. Soil organic matter – properties and function</li> <li>4. Clay minerals, structure, characteristics and functions</li> <li>5. Soil water and soil air properties</li> <li>6. Nomenclature of soils according to the WRB nomenclature</li> <li>7. Soil threats and forms of degradation</li> <li>8. Soil quality indicators</li> <li>9. Plant nutrition and fertilizer needs – definition and methods of determining, Fertilizer laws</li> <li>10. Nitrogen, phosphorus, potassium calcium fertilizers</li> <li>11. Natural fertilizer and organic fertilizers</li> <li>12. Losses of fertilizer components and chemical degradation of environmental</li> <li>13. Fertilizer consumption by agriculture</li> </ol>
Accomplished learning outcomes	OŚ1_W05, OŚ1_W10, RO1_W07
Verification methods, rules and criteria of outcome assessment	<i>Written exam, to pass the exam one must answer at least 60% of questions correctly. In the overall assessment 50% is the assessment of the lectures</i>
<b>Classes</b>	<b>30 hours</b>
	<p>Characteristics of minerals and igneous rocks occurring commonly in Poland</p> <p>Characteristics of minerals and sedimentary rocks occurring commonly in Poland</p> <p>Soil texture, nomenclature and assessment</p> <p>Soil structure, types of aggregates, their resilience</p> <p>Assessment of water retention</p> <p>Determining chemical composition and fodder quality of plants</p> <p>Qualitative and quantitative analysis of fertilizers (nitrogen fertilizers). Determination of nitrogen content in nitrogenous fertilizers by formalin method</p> <p>Assessment of available phosphorus and potassium in soil with the Egner-Riehm method</p> <p>Assessment of the content of total nitrogen and its ammonium form in compost and manure</p> <p>The balance of nutrients on the farm. Calculation of doses of fertilizers</p> <p>pH measurement, Approximate determination of soil liming needs with the using Schaschtschabel method.</p> <p>Determination of total alkalinity of calcium and calcium-magnesium fertilizers</p> <p>Description of the soil profiles in Mydlniki: cambic soils, luvisols and leptosols.</p>
Accomplished learning outcomes	OŚ1_U06, OŚ1_U08, OŚ1_U14, RO1_U06, O1_K01, OŚ1_K04, OŚ1_K06

Verification methods, rules and criteria of outcome assessment	<i>to have a positive mark, it is necessary to make a presentation and a report from the field part. A share of classes in the overall assessment is 50%</i>
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<b>Seminars</b>	<b>hours</b>
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Topics of the seminars	
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Accomplished learning outcomes	<i>symbol of learning outcomes of the seminars</i>
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Verification methods, rules and criteria of outcome assessment	
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<b>References:</b>
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Basic	<i>1.LBrady N.C., Weil R.C. 2007. The Nature and Properties of Soil. Edition 14, Prentice Hall, pp. 876. 2. Benton J. 2012. Plant Nutrition and Soil Fertility Manual, Second Edition 2nd Edition. Crc Press; 304 pp</i>
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Supplementary	<i>1. Hillel D. 2007. Soil in the environment, Crucible of terrestrial life. Academic Press (Elsevier), San Diego, pp. 307. 2.Andrews J.E., Brimblecombe P., Jickells T.D., Liss P.S., Reid B.J. 2004. An introduction to environmental chemistry. Second edition. Blackwell Publishing, pp. 296.</i>
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**Structure of learning outcomes:**

Discipline: # RR	6	ECTS**
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**Structure of student activities:**

Contact hours	68	hours	2,7	ECTS**
including:				
lectures	30*	hours		
classes and seminars	30*	hours		
consultations	6	hours		
participation in research	0	hours		
mandatory traineeships	0	hours		
participation in examinations	2	hours		
e-learning	...	hours	...	ECTS**
student own work	83	hours	3,3	ECTS**

Syllabus valid from the academic year 2021/2022

\* where 10 hours of classes = 1 ECTC (in case of 15 h → 2 ECTS)

\*\* stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes

# academic discipline code: RR - agriculture and horticulture