Course name: Soil Science and Plant Fertilization

ECTS	5
Course status	Complementary
Course final assessment /evaluation of outcomes	exam
Prerequisite	None

Main field of study:

Educational profile	General-academic
Code of studies and education level	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	Soil Science and Agrophysics Department, Agricultural and Environmental Chemistry
Course coordinator	Krystyna Ciarkowska

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands			
SSC.SI_W01	Basis on soil science and soil classification	RO1_W07	RR
SSC.SI_W02	Means of developing soil fertility	RO1_W07	RR
SKILLS – student is able to			
SSC.SI_U01	Manage the soil resources and plan their proper use	RO1_U15	RR
SSC.SI_U02	Perform the analysis and prepare a plan of the soil fertility improvement	RO1_U16	RR
SOCIAL COMPETENCIES – student is ready to:			
SSC.SI_K01	organize a team work and lead the experiments	RO1_K02	RR
SSC.SI_K02	Estimate the significance of the environment care in a local and global scale	RO1_K06	RR

Teaching contents

Lectures	**30 hours**
Topics	1-2. Soil definition and functions, soil shaping factors 3-4. Properties of the solid phase of soil, clay minerals 5-6. Organic matter in soil - transformation processes and environmental functions 7-8. Soil water and air 9-10. Soil classification(according to WRB) 11-12. Soil buffering, nutrient abundance, soil fertility and use 13-14. Nutritional and fertilization needs of plants - definitions and methods for their determination 15-16. Natural fertilizers: manure, fermented and unfermented liquid manure 17-18. Other organic fertilizers and carbon sequestration in soil 19-20. Nitrogen and phosphorus fertilizers 21-22. Potassium and multi-component fertilizers 23-24. Micronutrient fertilizers, fertilizer application methods, fertilizer laws

	25-26. Loss of fertilizer components and chemical degradation of soils - methods of counteracting 27-30. Soil erosion and soil protection basics
Accomplished learning outcomes	*SSC.SI_W01, SSC.SI_W02*
Means of verification, rules and criteria of assessment	*Single-choice test (minimum 50% correct answers to pass the exam); the proportion of the lecture pass mark in the final mark is 50%.*
Classes:	**30 hours**
Topics	1-3. Characteristics of selected minerals and parent rocks of soil 4-6. Nomenclature of soil texture and determination of soil texture using the aerometric and sieve methods 7-9. Measurement of pH, acidity and assessment of soil salinity; approximate determination of soil liming needs 10-13. Determination of organic carbon and mobile nitrogen content in soil 14-16. Determination of soil base exchange capacity and hydrolytic acidity 17-19. Assessment of available phosphorus and potassium in soil 20-22. Assessment of total nitrogen content and its ammonium form in composts and manure 23-24. Determination of chemical composition and quality of plant feed 25-30. Qualitative and quantitative analysis of mineral fertilizers
Accomplished learning outcomes	*SSC.SI_U01, SSC.SI_U02, SSC.SI_K01, SSC.SI_K02*
Means of verification, rules and criteria of assessment	*demonstration of practical skills.* *The contribution of the pass mark for the design exercises to the final mark is 50%."*

References:

Basic	*1.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.* *2.Brady N.C., Weil R.C. 2007. The Nature and Properties of Soil. Edition 14, Prentice Hal*
Supplementary	Unger P.W. Soil and Water Conservation Handbook: Policies, Practices, Conditions and Terms, Haworth Pr Inc, 2006.

Structure of learning outcomes

Area of academic study: R	5 ECTS

Structure of student activity

Contact hours	R	67	hrs.	2,7	ECTS**
Including:	lectures	30	hrs.		
	classes and seminars	30	hrs.		
	consultations	5	hrs.		
	participation in research		hrs.		
	obligatory traineeships		hrs.		
	participation in examination	2	hrs.		
e-learning			hrs.		ECTS**
student own work		58	hrs.	2,3	ECTS**

*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

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