Annex 6

DISCIPLINE DESCRIPTION

1. Information on the study programme

1.1 Academic institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**FACULTY OF ENVIRONMENTAL PROTECTION**
1.3 Department	**ENVIRONMENTAL ENGINEERING**
1.4 Field of study	**ENVIRONMENTAL ENGINEERING**
1.5 Cycle of study	**BACHELOR**
1.6 Study programme/Qualification	**ENGINEERING OF BIOTECHNICAL AND ECOLOGICAL SYSTEMS / ENGINEER**

2. Information on the discipline

2.1 Name of discipline			SOIL POLLUTION				
2.2 Course holder			Prof. PHD. SABĂU NICU CORNEL				
2.3 Seminar/Laboratory/Project holder			Prof.PHD SABĂU NICU CORNEL				
2.4 Year of study	III	2.5 Semester	VI	2.6 Type of evaluation	Ex	2.7 Regime of discipline	C

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	4	out of which: 3.2 course	2	out of which 3.3 seminar/laboratory/project	2
3.4 Total hours in the curriculum	56	out of which: 3.5 course	28	out of which 3.6 seminar/laboratory/project	28

Time allotment	hours
Study assisted by manual, course support, bibliography and notes	22
Additional documentation in the library/ on specialised electronic platforms and in the field	20
Preparation of seminars/laboratories/ topics/reports, portfolios and essays	10
Tutorship	-
Examinations	4
Other activities.....	-
3.7 Total hours of individual study	**104**
3.9 Total hours per semester	**48**
3.10 Number of credits	4

4. Prerequisites (where appropriate)

4.1 curriculum	Promotion of exams in the disciplines Soil Science I and II
4.2 competences	General knowledge about soil science

5. Conditions (where appropriate)

5.1. related to course	PC, video projector
5.2. related to seminar/laboratory/ project	The specific equipment needed to carry out the practical work

6. Specific competences acquired	
Professional competences	▪ C2. Managing and solving specific environmental problems for sustainable development. C2.1. Description and application of practical/technological/engineering concepts, theories and methods for determining the state of environmental quality; C2.4. Qualitativeandquantitativeevaluation of natural phenomenaandhumanactivities on the quality of environmentalfactors; ▪ C3. Analysis of the technical solutions necessary for the prevention, reduction and elimination of negative phenomena on the environment C3.1. Identification and use of methods and techniques, tools necessary for monitoring environmental factors
Transversal competences	▪ CT2. Identifying roles and responsibilities in a multidisciplinary team and applying communication techniques and effective work within the team ▪ CT3. Effective use of information sources and communication resources and assisted professional training (portals, Internet, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation

7.Objectives of discipline (coming from the specific competencesacquired)

7.1 General objective	▪ The discipline is part of the category of field disciplines, with the objective of familiarizing students with the notions of soil degradation and pollution, the main sources of physical-chemical and biological soil degradation.
7.2 Specific objectives	Competencies regarding pedogenesis, soil properties and their taxonomy. ▪ Theoretical knowledge – Knowledge, understanding and easy use of basic concepts and methods specific to the field of soil degradation and pollution. ▪ Acquired skills – Effective use of the basic knowledge accumulated in the course, for the correct explanation and interpretation of the concepts and processes aimed at soil degradation and pollution; ▪ Acquired skills – The ability to apply and use the knowledge acquired throughout the year, to solve problems related to soil properties and their taxonomy. ▪ Attitudinal - The ability to work in a team, responsible execution of work tasks.

8. Content*/

8.1 Course	Methods of teaching	No. of hours/Remarks
Soil degradation and pollution, Definitions, generalities, classifications, ICPA Classification	Interactive Lecture	2
International andnationalregulationsregarding soil degradationandpollution	Interactive Lecture	2
Soildegradationandpollutionthroughdailyexcavationworks (mining, ballastquarries, etc.)	Interactive Lecture	2
Degradationandpollution of thesoilbycovering with deposits, dumps, ponds, etc.	Interactive Lecture	2
Soilpollutionwithwasteandinorganicresidues of an industrial nature, including extractive ones	Interactive Lecture	2
Soilpollutionwithairbornesubstances (hydrocarbons, ethylene, ammonia, sulfurdioxide, nitrogen oxides, leadcompounds, etc.)	Interactive Lecture	2
SoildegradationandpollutionthrougherosionandlandslidesSoilpollutionthrough sediment coverproducedbyerosion	Interactive Lecture	2
Soildegradationbycompactionincludingcrustformation.	Interactive Lecture	2
Degradationandpollution of thesoilthrough deficit or excess of moisture	Interactive Lecture	2
Soilpollutionthroughacidificationand salinization and/or alkalization	Interactive Lecture	2
Soil pollution with radioactive materials. Soil pollution with organic residues from the food and textile industry. Soil pollution with plant and forestry waste and residues.	Interactive Lecture	2
Soil pollution with animal and human droppings. Soil pollution with contaminating pathogenic agents (infectious agents, toxins, allergens, etc.)	Interactive Lecture	2
Soil pollution through excess or lack of nutrients Soil pollution with pesticides (insecticides, herbicides, etc.)	Interactive Lecture	2
Complex soil pollution as a result of poorly designed, executed or exploited land reclamation. Complex soil pollution with oil residues and salt water	Interactive Lecture	2
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Bibliography

1. Cojocaru I., - 1995 – Surse, procese şi produse de poluare. – Ed Junimea, Iaşi;
2. Domuţa, C., 2005, Agrotehnica terenurilor în pantă din nord-vestul României, Edit. Univ. din Oradea.
3. Oanea N., Rogobete Gh.,- 1977 - Pedologie generală şi ameliorativă. Ed. Didactică şi Pedagogică Bucureşti;
4. Răuţă C., Cârstea St. -1983 – Prevenirea şi combaterea poluării solului, Ed. Ceres Bucureşti;
5. Rogobete Gh. – Ştiinţa Solului, Bazele ştiinţei solului. Ed. Mirton, Timişoara;
6. Sabău N.C. – 1997- Impactul Lucrărilor Hidroameliorative asupra Solurilor din Perimetrul Valea Ier. – Ed. Universităţi din Oradea;
7. Sabău N.C. Domuţa C. Berchez O. – 1999 – Geneza degradarea şi poluarea solului. – Ed. Universităţi din Oradea.
8. Sabău N.C. – 2008 – Poluarea Mediului Pedosferic, Ed. Univ. din Oradea,
9. Sabău N.C. – 2009 - Îmbunătăţiri Funciare, I.F., Edit. Univ. din Oradea;
10. Sabău N.C. – 2016 – Geneza, Degradarea și Poluarea Solului, partea I-a, Știința Solului-Geneza și Proprietățile Solului, Ediția a II-a, Ed.Universității din Oradea;
11. Sabău N.C. – 2017 – Geneza, Degradarea și Poluarea Solului, partea a II-a, Știința Solului-Taxonomia solurilor României, Ed.Universității din Oradea;

8.2 Seminar	Methods of teaching	No. of hours/ Remarks

Bibliography

8.3 Laboratory		
Laborprotectionandthepresentation of thePedologyandSoilPollutionLaboratory.	Explanations, exemplification, dialogue, case study, video	2
Determination of soil acidity	Explanations, exemplification, dialogue, case study	2
Determination of potential acidity, redox potential and soil buffering capacity	Explanations, exemplification, dialogue, case study	2
Determination of the total cation exchange capacity, exchangeable cations and degree of saturation in bases	Explanations, exemplification, dialogue, translations	2
Determination of calcium carbonate	Explanations, exemplification, dialogue, case study	2
Determination of soluble salts in the soil	Explanations, exemplification, dialogue, case study	2
Determination of sodium in the soil	Explanations, exemplification, dialogue, case study	2
Recognizingthetypes of humus and determining the humus in thesoil	Explanations, exemplification, dialogue, case study	4
Determination of soil nitrogen	Explanations, exemplification, dialogue, case study, video	2
Determination of phosphorusandpotassium in thesoil	Explanations, exemplification, dialogue, case study, video	4
Determination of heavymetals in thesoil	Explanations, exemplification, dialogue, case study, video	2
Determination of thebiologicalproperties of thesoil	Explanations, exemplification, dialogue, case study, video	2
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8.4 Project		
Bibliography		

1. Blaga Gh., Bunescu V. – 1999 – Lucrări practice la pedologie, Tipo Agronomia, Cluj-Napoca;
2. Canarache A., Şerbănescu I., Teaci D., Savapol L. – 1967 – Îndrumător pentru studiul solului pe teren şi în laborator, Ed. Agrosilvică, Bucureşti;
3. Ciobanu Gh. – 2002 - Metode agrochimice de analiză interpretare şi îmbunătăţire a fertilităţii solului, Ed. Universităţii din Oradea;
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5. Domuţa, C. şi colab., 2011, *Practicum de monitoring al mediului*, Edit. Univ. din Oradea;

Sabău N.C. – 2012 - Metode pentru analiza solului – Pentru uzul studenților, Ed. Universității din Oradea

* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectationsof the epistemic community, professional associations and representative employers from the field corresponding to the study programme

- By learning the theoretical concepts and dealing with the practical aspects included in the discipline, students acquire a consistent body of knowledge, in accordance with the skills required for the occupations provided in the RNCIS Grid
- The content of the discipline can be found in the curricula of the Biotechnical and Ecological Systems Engineering specialization and in other university centers that have accredited these specializations.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	Exam	Oral	67 %
10.5 Seminar			
10.6 Laboratory	Periodic check	Grid test	33 %
10.7 Project			
10.8 Minimum standard of performance			
- The minimum standard of performance assumes the partial acquisition, in proportion of 50%, of the basic knowledge of the discipline studied.			

Date of completion — Signature of course holder** — Signature of seminar laboratory/project holder **

25.05.2023 — **Prof. PHD SABĂU NICU CORNEL** nicusabau@yahoo.com — **Prof. PHD SABĂU NICU CORNEL** nsabau@uoradea.ro

Date of approval in the department — Signature of the Head of Department

25.05. 2023 — **Prof. PHD. SABĂU NICU CORNEL**

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Dean signature

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cristina_maerescu@yahoo.com

** - Name, first name, academic degree and contact details (e-mail, web page, etc)will be specified.
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Signature of the Head of Department***

.....

Dean Signature***

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*** - Name, first name, academic degree and contact details (e-mail, web page, etc) of the academic entity beneficiary of the Discipline Outlinewill be specified.
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