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| **STUDY PROGRAMME:** | **Professional Graduate Study Programme *Agriculture* – *Sustainable and Organic Agriculture***  |
| **Course:** | **SOIL PROTECTION** |
| **Course Code: 141707****Course status: compulsory** | **Semester:** II | **ECTS credits: 6** |
| **Course holder:**  | **Andrija Špoljar,** Ph.D., professor of professional studies |
| **Modes of delivery:** | **Number of hours**  |
| Lectures | 40 |
| Excersises, | 8 |
| Seminars | 12 |

**COURSE OBJECTIVES**

The aim of the course is to present the sources of pollutants, their movement and retention in the environment, and entry into the food chain with harmful consequences for animal and human health. With the goal of sustainable soil management, students will recommend soil conservation and remediation measures according to the principles of soil damage classification of the Republic of Croatia.

**COURSE CONTENT**

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|  | Course units | **L** | **E** | **S** | **Places of delivery** |
| 1. | **Introduction to sustainable environmental (soil) management** | **1** |  |  | Lecture hall |
| 2. | **Movement of pollutants (atmosphere, soil, water)** | **1** |  |  | Lecture hall |
| 3 | **Pollution of the atmosphere** |  |  |  | Lecture hall |
| 3.1. | Harmful phenomena in the atmosphere | **2** |  |  | Lecture hall |
| 3.2. | Oxides of carbon, nitrogen and sulfur and their impact on the environment | **2** |  |  | Lecture hall |
| 3.4. | The influence of important pollutants on plants | **2** |  |  | Lecture hall |
| 3,5. | Air pollution monitoring | **2** |  |  | Lecture hall |
| 4. | **Soil pollution** |  |  |  | Lecture hall |
| 4.1. | The role of soil in the environment | **2** |  |  | Lecture hall |
| 4.2. | Reactions of pollutants in the soil | **4** |  |  | Lecture hall |
| 4.3. | Chemical time bomb, biological bomb | **2** |  |  | Lecture hall |
| 4.4. | Heavy metals and other toxic elements in the soil | **2** |  |  | Lecture hall |
| 4.5. | Soil protection – sustainable soil management |  |  |  | Lecture hall |
| 4.5.1. | Inventory of existing pedological data | **2** |  |  | Lecture hall |
| 4..5.2  | Permanent soil monitoring | **2** |  |  | Lecture hall |
| 4.5.3. | Classification of soil damage in Croatia | **4** |  |  | Lecture hall |
| 5. | **Water pollution** |  |  |  | Lecture hall |
| 5.1. | Drinking water | **1** |  |  | Lecture hall |
| 5.2. | Processes in wastewater, the possibility of their use | **1** |  |  | Lecture hall |
| 6.  | **Sustainable agricultural production as the basis of sustainable development** |  |  |  | Lecture hall |
| 6.1. | Agricultural regions of Croatia | **2** |  |  | Lecture hall |
| 6.2. | Soil pollution caused by organic and mineral fertilization - "soil - plant - animal", impact of pollution on plants | **2** |  |  | Lecture hall |
| 7. | **Soil conservation treatment** |  |  |  | Lecture hall |
| 7.1. | Introduction, historical development of tillage, definition of tillage | **1** |  |  | Lecture hall |
| 7.2. | Tillage systems | **1** |  |  | Lecture hall |
| 7.2.1. | Tillage systems on arable land | **1** |  |  | Lecture hall |
| 7.2.2. | Tillage systems for woody crops | **1** |  |  | Lecture hall |
| 7.3. | Reducing tillage | **1** |  |  | Lecture hall |
| 7.4. | The future of tillage | **1** |  |  | Lecture hall |
| 8. | **Changes in soil water regime caused by drought** |  |  |  | Lecture hall |
| 8.1. | Analysis of climate elements, water balance  |  |  **4** |  | Lecture hall |
| 9. | Soil value assessment |  | **2** |  | Lecture hall |
| 10. | Recultivation of contaminated soil |  | **2** |  | Lecture hall |
| 11. | **Presentations of student works according to selected topics (suggested topics or by choice):** |  |  |  | Lecture hall |
|  | Agricultural materials that contribute to soil pollution |  |  | **1** | Lecture hall |
|  | The impact of acid rain on vegetation cover and soil |  |  | **1** | Lecture hall |
|  | Sustainable and ecological agriculture as an alternative to intensive agriculture |  |  | **1** | Lecture hall |
|  | Pollution of the environment (soil) caused by the exploitation of fossil fuels |  |  | **1** | Lecture hall |
|  | Soil organic matter as an indicator of quality |  |  | **1** | Lecture hall |
|  | Classification of soil damage (I - IV degree of damage) |  |  | **1** | Lecture hall |
|  | Adaptation of soil to climate change |  |  | **1** | Lecture hall |
|  | Agroecological preconditions for the introduction of reduced tillage |  |  | **1** | Lecture hall |
|  | Soil treatment to prevent erosion |  |  | **2** | Lecture hall |
|  | **Changes in soil water regime caused by drought** |  |  | **2** | Lecture hall |
| **In total:** | **40** | **8** | **12** | 60 |

L=Lectures, E=Excersises, S=Seminars

**Learning outcomes (LO)**

LO 1. Present basic concepts from soil protection (pollution, pollutant, heavy metals, etc.)

LO 2. Valorize climatic elements and calculation data of components of the balance of precipitation water in the soil

LO 3. Assess the land according to the Ordinance on particularly valuable and valuable agricultural land

LO 4. Create a report with recommendations for the development of the damaged land

LO 5. Create tables, graphs and text and draw conclusions and recommendations

LO 6. Present the results of student's own work (public presentation)

Course holder:

Andrija Špoljar, Ph.D., professor of professional studies

Križevci, July 2024