



POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION

1.1 Course name	Sustainable soil management			
1.2 Study program/s	Undergraduate professional study Sustainable Development			
1.3 Course status (O,E)	O	1.6 Mode of instruction (number of hours)	Lectures	30
1.4 Course code	4068		Exercises	30
1.5 Course abbreviation	SSM		Seminars	
1.6 Semester	V		E-learning	
1.7 ECTS	5	1.7 Place and time of instruction	Premises of the Polytechnic of Međimurje in Čakovec, according to the schedule published on the website	

2. TEACHING STAFF

2.1 Course leader/s-title	Silvija Zeman, Ph.D, senior lecturer	contact	szeman@mev.hr
		contact	
2.2 Assistant/s- title		contact	
		contact	
2.3 Instruction held by- title		contact	

3. COURSE DESCRIPTION

3.1 Course goals	The student gets acquainted with all theoretical solutions on which sustainable soil management is based through the prism of sustainable agriculture, which is the strongest branch of the economy in which cultivated plants and domestic animals, as central biological units of agriculture, are inextricably linked into a harmonious whole. The module aims to point out the problem of permanent loss / conversion of soil. The student is trained in proper soil management and conducting analyses of soil chemical properties.									
3.2 Prerequisites	To take the course, it is necessary to pass the course Chemistry in Sustainable Development									
3.3 Course outcomes	After successfully completing the course, students will be able to: 11 Link the importance of sustainable agriculture, the impact of intensive agriculture on the environment and the principles of sustainability 12 Present soil as a conditionally renewable resource 13 Present the role of soil in the formation of organic matter, soil functions 14 Present measures for repair of physical, chemical and biological complex of soil 15 Assess the benefits of fertilizers to soil and to the ecosystem 16 Present the position and importance of organic farming in relation to other soil management systems									
3.4 Course content										
3.5 Types of coursework	x	Lectures	x	Exercises		Blended e-learning		Individual activities		Laboratory

	x	Seminars and workshops		Distant learning		Field classes		Multimedia and network		Mentorship																																																																						
		Other																																																																														
3.6 Language of instruction	Croatian / English																																																																															
3.7 Monitoring students' work (enter the number of ECTS credits for each activity so that the total number of ECTS credits is equal to the total ECTS value of the course, 1 ECTS = 30 hours)	0,5	Class attendance	0,5	Seminars				Essay																																																																								
	0,5	Class activity		Project				Report/paper																																																																								
	1,00	Midterm exams	1,00	Laboratory exercises				Continuous knowledge check																																																																								
		Written exam		Experimental work																																																																												
	1,50	Oral exam		Research																																																																												
3.8 Assessment and evaluation of students' work during classes and at the final exam	<table border="1"> <thead> <tr> <th>Activity specification</th> <th>Percent %</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Assessment during instruction</td> </tr> <tr> <td>Attendance</td> <td>5%</td> <td>5</td> </tr> <tr> <td>Class activity</td> <td>5%</td> <td>5</td> </tr> <tr> <td>Seminar/ project/ essay</td> <td>30%</td> <td>30</td> </tr> <tr> <td>Midterm exam 1</td> <td>30%</td> <td>30</td> </tr> <tr> <td>Midterm exam 2</td> <td>30%</td> <td>30</td> </tr> <tr> <td colspan="3" style="text-align: center;"><i>Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</i></td> </tr> <tr> <td>Written exam</td> <td>60%</td> <td>60</td> </tr> <tr> <td>Total:</td> <td>100%</td> <td>100</td> </tr> </tbody> </table>										Activity specification	Percent %	Points	Assessment during instruction			Attendance	5%	5	Class activity	5%	5	Seminar/ project/ essay	30%	30	Midterm exam 1	30%	30	Midterm exam 2	30%	30	<i>Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</i>			Written exam	60%	60	Total:	100%	100																																								
Activity specification	Percent %	Points																																																																														
Assessment during instruction																																																																																
Attendance	5%	5																																																																														
Class activity	5%	5																																																																														
Seminar/ project/ essay	30%	30																																																																														
Midterm exam 1	30%	30																																																																														
Midterm exam 2	30%	30																																																																														
<i>Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</i>																																																																																
Written exam	60%	60																																																																														
Total:	100%	100																																																																														
3.9 Assessment criteria – analysis per learning outcomes	<table border="1"> <thead> <tr> <th colspan="7">Ways of evaluating learning outcomes</th> </tr> <tr> <th></th> <th>Attendance</th> <th>Activity</th> <th>Mid-term exam 1</th> <th>Mid-term exam 2</th> <th>Practical work</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Outcome 1</td> <td></td> <td></td> <td>5</td> <td></td> <td>5</td> <td>10</td> </tr> <tr> <td>Outcome 2</td> <td></td> <td></td> <td>10</td> <td>10</td> <td>5</td> <td>25</td> </tr> <tr> <td>Outcome 3</td> <td></td> <td></td> <td>5</td> <td>5</td> <td>5</td> <td>15</td> </tr> <tr> <td>Outcome 4</td> <td></td> <td></td> <td>5</td> <td>10</td> <td>5</td> <td>20</td> </tr> <tr> <td>Outcome 5</td> <td></td> <td></td> <td></td> <td>10</td> <td></td> <td>10</td> </tr> <tr> <td>Outcome 6</td> <td></td> <td></td> <td></td> <td>10</td> <td></td> <td>10</td> </tr> <tr> <td>Outcome not-related</td> <td>5</td> <td>5</td> <td></td> <td></td> <td></td> <td>10</td> </tr> <tr> <td>Total</td> <td>5</td> <td>5</td> <td>25</td> <td>45</td> <td>20</td> <td>100</td> </tr> </tbody> </table> <p>Grading of outcomes (in order to pass the mid-term exam/exam the student must achieve at least 50% points for each learning outcome)</p> <p>Points Grade</p> <p>89 – 100 excellent (5)</p> <p>76 – 88 very good (4)</p> <p>63 – 75 good (3)</p> <p>50 – 62 pass (2)</p> <p>0 – 49 fail (1)</p>										Ways of evaluating learning outcomes								Attendance	Activity	Mid-term exam 1	Mid-term exam 2	Practical work	Total	Outcome 1			5		5	10	Outcome 2			10	10	5	25	Outcome 3			5	5	5	15	Outcome 4			5	10	5	20	Outcome 5				10		10	Outcome 6				10		10	Outcome not-related	5	5				10	Total	5	5	25	45	20	100
Ways of evaluating learning outcomes																																																																																
	Attendance	Activity	Mid-term exam 1	Mid-term exam 2	Practical work	Total																																																																										
Outcome 1			5		5	10																																																																										
Outcome 2			10	10	5	25																																																																										
Outcome 3			5	5	5	15																																																																										
Outcome 4			5	10	5	20																																																																										
Outcome 5				10		10																																																																										
Outcome 6				10		10																																																																										
Outcome not-related	5	5				10																																																																										
Total	5	5	25	45	20	100																																																																										
3.10 Specific features related with taking the course	<p>If a student collects 50% of the points of each outcome, he / she directly takes the exam, provided that he / she has done practical work (exercises). A student cannot access the exam period if he / she has not achieved a min for each exercise. 60% correct answers. Practical work-exercises are made according to the instructions published on the Merlin system and are submitted by placing on the Merlin. Checking the completed exercises is done in the exercise classes after prior preparation with the teacher. Throughout the semester, the student</p>																																																																															

	<p>is required to perform six exercises independently. Practical work (completed exercises) is taught until the last week of lectures. During the exam, it is possible to orally check the knowledge from practical work (exercises).</p> <p>If a student does not achieve a sufficient number of points on the midterm exam, he / she cannot take the next midterm exam.</p> <p>Once achieved points in intermediate exams for each learning outcome are no longer deleted unless the student decides to correct the result for each learning outcome, whereby the points won until then are deleted and newly achieved points for that learning outcome are entered.</p> <p>The final grade is obtained on the exam period and is the sum of points earned during classes.</p> <p>Students who did not take the colloquium access the written part of the exam where all learning outcomes are checked, and are required to have completed exercises before taking the exam.</p>
3.11 Students obligations	<p>Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. Part-time students are required to attend at least 30% of the total number of hours of lectures and exercises in order to exercise the right to take the exam.</p> <p>If the student has not fulfilled all the obligations set by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam.</p> <p>Attendance can be offset by online tuition, organised webinars and added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason/apology, the request should be submitted to the Department Council, which then decides on the justification of student absences with the obligatory opinion of the course leader.</p>
3.12 Written assignments	<p>Seminar papers must be computer written and may have a maximum of 12 text cards (Times New Roman, font 12) from introduction to conclusion, together with pictures, appendices to tables, etc. Seminar papers must have an adequate title page, content, marked pages and literature. The seminar paper should be divided into chapters and contain a list of references and a list of figures and tables and graphs and finally a summary / conclusion of 250 words. The student guarantees the authenticity of the work with his signature.</p>
3.13 Required reading	<ol style="list-style-type: none"> 1. Martinović, J., (1997): Soil Science in Environmental Protection. Zagreb, selected chapters 2. Vukadinović V., Bertić B. (2013): Philosophy of Fertilization, Faculty of Agriculture Osijek Vukadinović, selected chapters 3. Magdo ff, F. and Van Es, H. (2009): Building soils for better crops: Sustainable soil management. Sustainable Agriculture Research & Education, third edition, selected chapters covered through seminars
3.14 Additional reading	<ol style="list-style-type: none"> 1. Kisić I. (2011) Remediation of contaminated soil. University textbook. 2. A. Butorac (1999) General agronomy, School book. 3. Lecture notes
4 ADDITIONAL COURSE INFORMATION	
4.1 Quality control	<p>The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardised ways and in accordance with the by-laws of the Polytechnic of Međimurje in Čakovec.</p>

4.2 Contact the teacher	Students can contact the teacher during the office hours and during classes, while for short questions and explanations they can contact him/her any day during working hours by coming in person or by landline. It is also possible to ask questions by e-mail, which will be answered in 48 hours at the latest. It is desirable for students to come as often as possible for any possible questions during the teacher's office hours.
4.3 Information about the course	It is the obligation of each student to be regularly informed about the course. All notifications about the classes or possible postponement of classes will be posted on the bulletin board and on the website of the Polytechnic at least 24 hours in advance.
4.4 Course contribution to the study program	<p>Interpret information, ideas, problems and solutions to professional and general audiences</p> <p>Use new technologies and techniques as part of the lifelong learning process</p> <p>Advocate an ethical approach to work and to associates in project teams</p> <p>Critically evaluate arguments, assumptions and data in order to form opinions and contribute to solving the problem</p> <p>Analyze the collected data in the field of sustainable development</p> <p>Interdisciplinary to solve engineering problems of sustainable development</p> <p>Interpret European Union legislation in the field of sustainable development</p> <p>Propose a program for the remediation of polluted soil, water and air while adhering to the principles of sustainable development</p> <p>Identify significant environmental aspects within the organization for the purpose of management and compliance with standards and obligations</p> <p>Formulate simple problems in the field of environmental protection in order to solve them by applying the principles of sustainable development</p>

5. ANALYSIS OF COURSE TOPICS (the number of hours is equal to the number of lectures and exercises of the course)

LECTURES				
Hours	Topic and description	Method	Learning outcomes	Course outcome
		<ul style="list-style-type: none"> • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 		
1.	Introductory introduction to the module, literature, methods of teaching, student obligations during classes Soil science in environmental protection	Presentation, pp presentation	Understand the role and importance of soil in environmental protection	I1
2.	Chemical qualitative analysis of soil	Presentation, pp presentation	Describe and apply the parameters of qualitative soil analysis	I2 I4
3.	Chemical properties of soil	Presentation, pp presentation	Describe and apply the parameters of	I4

			chemical analysis of soil	
4.	Soil as the foundation of sustainable management and as a conditionally renewable natural resource.	Presentation, pp presentation	Explain soil as a conditionally renewable resource	11 12
5.	The role of soil in the formation of organic matter. Soil functions.	Presentation, pp presentation	Connect soil roles	13
6.	Agrotechnical aspect of sustainable soil management. Tillage. Measures for repair of physico-chemical-biological properties of soil.	Presentation, pp presentation	Understand the relationship between the role of soil and damage to physical, chemical and biological properties of soil	14
7.	Measures for repair of physico-chemical-biological properties of soil.	Presentation, pp presentation	Demonstrate measures to repair the physico-chemical-biological properties of soil.	12
8.	Colloquium 1			11,12,13,14
9.	Integrated plant nutrition. Suitability of the most common soil types for a certain way of use within sustainable agricultural production.	Presentation, pp presentation	Describe in your own words the integrated plant nutrition and connect them with sustainable agriculture	16
10.	Green manure. Calcification. Fertilization. Fertilizers. Principles of fertilization and their impact on the environment.	Presentation, pp presentation	Interpret the process of green manure, fertilizers, calcification	15
11.	Compost and composting and the problems that composting can cause in the environment.	Presentation, pp presentation	Understand and describe the composting process	15 16
12.	Directions of organic agriculture. Permaculture. Directions of organic agriculture. Biologically dynamic agriculture.	Presentation, pp presentation	Describe the system of organic farming and compare organic and biodynamic agriculture	15 16
13.	Crop rotation in organic agriculture. Ecologically acceptable control of harmful organisms in agricultural production.	Presentation, pp presentation	Interpret the importance of crop rotation and connect it with ecological control of harmful organisms	15 16
14.	Placement and market of ecological products. Control and labelling of organic products.	Presentation, pp presentation	Explain how to control and label organic products	16

	Law on Organic Production and Product Labelling.			
15.	Colloquium 2			14,5,6
EXERCISES/ SEMINARS				
Hours	Topic and description	Method	Learning outcomes	Course outcome
		<ul style="list-style-type: none"> • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 		
1.	Exercise 1, introduction to chemical analysis of soil	Laboratory exercises	Interpret chemical analysis of soil	I1 I2
2.	Exercise 2, qualitative soil analysis	Laboratory exercises	Apply analyses of qualitative soil parameters	I4
3.	Exercise 3, soil analytics	Laboratory exercises	Apply analysis of soil chemical properties parameters	I4
4.	Exercise 4, soil analytics	Laboratory exercises	Apply the principles of sampling and soil preparation for chemical analysis	I1 I2
5.	Exercise 5, soil analytics	Laboratory exercises	Apply GIS and GPS when sampling soil	I3
6.	Measures for repair of physico-chemical-biological properties of soil.	Discovery learning, independently, scientific literature	Interpret measures to repair the physical, chemical and biological properties of the soil	I4
7.	Measures for repair of physico-chemical-biological properties of soil.	seminars	Interpret measures to repair the physical, chemical and biological properties of the soil	I4
8.	Soil as a conditionally renewable natural resource	Discussion	Interpret soil as a conditionally renewable resource	I1 I2
9.	Integrated plant nutrition	Discovery learning, independently, scientific literature	Interpret the concept of integrated plant nutrition	I6
10.	Fertilizers. Principles of fertilization and their impact on the environment.	Discovery learning, independently, scientific literature	Show examples of the impact of	I5

			fertilizers on the environment	
11.	Compost	seminars	Apply knowledge in creating compost	15 16
12.	Organic agriculture. Permaculture. Biologically dynamic agriculture.	Guest lecturer Examples, discussion	Apply knowledge and interpret example	15 16
13.	Crop rotation in organic agriculture. organisms in agriculture	Example Crop rotation	Interpret the example	15 16
14.	Control and labelling of organic products. Law on Organic Production and Product Labeling.	Examples, discussion Guest lecturer	Apply knowledge Understand the significance of the law	16
15.	Sustainability and self-sufficiency of agricultural products of neighbouring countries	Guest lecturer, Janja Lužnik, Danijel Davidović	Examine the knowledge and interpret the example	16