



POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION

1.1 Course name	Environmental engineering			
1.2 Study program/s	Undergraduate professional study Sustainable Development			
1.3 Course status (O,E)	4059	1.6 Mode of instruction (number of hours)	Lectures	30
1.4 Course code	INZO		Exercises	30
1.5 Course abbreviation	3		Seminars	-
1.6 Semester	5		E-learning	Merlin
1.7 ECTS	4059	1.7 Place and time of instruction	The 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	Goran Sabol, pred.	contact	goran.sabol@mev.hr
		contact	
2.2 Assistant/s- title		contact	
		contact	
2.3 Instruction held by- title		contact	

3. COURSE DESCRIPTION

3.1 Course goals	Acquisition of knowledge about command-supervisory and economic instruments of environmental protection, system and tools for environmental management and standards used for the purpose of continuous improvement and implementation of the general environmental protection policy.										
3.2 Prerequisites	There are no prerequisites										
3.3 Course outcomes	After successfully completing the course, students will be able to:										
	I1	Propose, connect and cooperate in the execution of all types of works with the aim of removing pollutants or remediation of soil and water with special materials for environmental protection - R6									
	I2	Formulate a feasibility study for moderately complex problems in environmental engineering - R6									
	I3	Critically evaluate the concepts of sustainable development - R5									
	I4	Recommended environmental interventions - R5									
	I5	Propose the most acceptable way to dispose of pollutants in soil, water, air - R6									
3.3 Course outcomes	I6	Integrate adequate environmental engineering interventions and cooperate in the development of studies to solve problems in environmental engineering - R6									
	3.4 Course content										
	Introduce students to the definition and concept of sustainable development and legislation and basic principles of environmental protection										
	3.5 Types of coursework	X	Lectures	X	Exercises		Blended e-learning	X	Individual activities		Laboratory
			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)	2	Class attendance	0,5	Seminars		Essay																																																																						
	0,5	Class activity		Project		Report/paper																																																																						
	1	Midterm exams		Practical task		Continuous knowledge check																																																																						
	0,5	Written exam		Experimental work																																																																								
	0,5	Oral exam		Research																																																																								
3.8 Assessment and evaluation of students' work during classes and at the final exam	<table><tr><th>Activity specification</th><th>Percent %</th><th>Points</th></tr><tr><td colspan="3">Assessment during instruction</td></tr><tr><td>Attendance</td><td>2,5%</td><td>2,5</td></tr><tr><td>Class activity</td><td>2,5%</td><td>2,5</td></tr><tr><td>Seminar/ project/ essay</td><td>10%</td><td>10</td></tr><tr><td>Midterm exam 1</td><td>42%</td><td>42</td></tr><tr><td>Midterm exam 2</td><td>43%</td><td>43</td></tr><tr><td colspan="3">Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</td></tr><tr><td>Written exam</td><td>50%</td><td>50</td></tr><tr><td>Oral exam</td><td>50%</td><td>50</td></tr><tr><td>Total:</td><td>100%</td><td>100</td></tr></table>						Activity specification	Percent %	Points	Assessment during instruction			Attendance	2,5%	2,5	Class activity	2,5%	2,5	Seminar/ project/ essay	10%	10	Midterm exam 1	42%	42	Midterm exam 2	43%	43	Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester			Written exam	50%	50	Oral exam	50%	50	Total:	100%	100																																					
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3.9 Assessment criteria – analysis per learning outcomes	<table><tr><th colspan="6">Ways of evaluating learning outcomes</th><th></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><tr><td>Outcome 1</td><td></td><td></td><td>10</td><td></td><td></td><td>10</td></tr><tr><td>Outcome 2</td><td></td><td></td><td>10</td><td>15</td><td></td><td>25</td></tr><tr><td>Outcome 3</td><td></td><td></td><td>22</td><td></td><td></td><td>22</td></tr><tr><td>Outcome 4</td><td></td><td></td><td></td><td>23</td><td></td><td>23</td></tr><tr><td>Outcome 5</td><td></td><td></td><td></td><td>5</td><td></td><td>5</td></tr><tr><td>Outcome 6</td><td></td><td></td><td>2,5</td><td>5</td><td></td><td>7,5</td></tr><tr><td>Outcome not-related</td><td>2,5</td><td></td><td>2,5</td><td>2,5</td><td></td><td>7,5</td></tr><tr><td>Total</td><td>2,5</td><td></td><td>47,5</td><td>50,5</td><td></td><td>100</td></tr></table>						Ways of evaluating learning outcomes								Attendance	Activity	Mid-term exam 1	Mid-term exam 2	Practical work	Total	Outcome 1			10			10	Outcome 2			10	15		25	Outcome 3			22			22	Outcome 4				23		23	Outcome 5				5		5	Outcome 6			2,5	5		7,5	Outcome not-related	2,5		2,5	2,5		7,5	Total	2,5		47,5	50,5		100
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	Grading of outcomes (in order to pass the mid-term exam/exam the student must achieve at least 50% points for each learning outcome)																																																																											
Points Grade																																																																												
89 – 100 excellent (5)																																																																												
76 – 88 very good (4)																																																																												
63 – 75 good (3)																																																																												
50 – 62 pass (2)																																																																												
0 – 49 fail (1)																																																																												
3.10 Specific features related with taking the course	If the student collects 50% of the points of each outcome directly access orally exam. If a student does not achieve a sufficient number of points on the midterm exam, he cannot take the next midterm exam. Once won 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. A student cannot access the																																																																											

	<p>exam period if he / she has not submitted and presented seminar paper. The final grade is obtained on the oral part of the exam.</p> <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. 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. 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>	
3.11 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. 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. Attendance can be offset by online consultations, organized 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 the event that a student is absent from more than 50% of classes, and has a justifiable reason / apology, a 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, table appendices, 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 in the size of 250 words. The student guarantees the authenticity of the work with his signature.</p>	
3.13 Required reading	1.	Felicita Briški: Zaštita okoliša, Zagreb 2016.
	2.	S. Zrnčević, Kataliza i katalizatori, HINUS, Zagreb, 2005
	3.	Bilješke s predavanja
3.14 Additional reading	1.	M. Buzuk: Sustavi upravljanja okolišem, interna skripta KTF, Split
	2.	Veinović, Kvasnička: Površinska odlagališta otpada, skripta Rudarsko geološko naftnog fakulteta
	3.	E.S. Rubin, Introduction to engineering and environment, McGraw Hill, , New York, 2001
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	<p>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</p>	

	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>I1 - Interpret information, ideas, problems and solutions to professional and general audiences</p> <p>I4 - Advocate an ethical approach in work and towards associates in project teams</p> <p>I5 - Critically evaluate arguments, assumptions and data in order to form an opinion and contribute to the solution of the problem</p> <p>I6 - Solve engineering problems of sustainable development using mathematics, physics, chemistry and biology</p> <p>I8 - Interdisciplinary to solve engineering problems of sustainable development</p> <p>I10 - Interpret European Union legislation in the field of sustainable development</p> <p>I23 - Manage water, air, soil, waste and energy in a sustainable way</p> <p>I24 - Propose a program for remediation of polluted soil, water and air in compliance with the principles of sustainable development</p> <p>I26 - Formulate simple problems in the field of environmental protection in order to solve them by applying the principles of sustainable development</p> <p>I27 - Assess potential risks to the environment and cooperate in the preparation of environmental studies and studies on the impact of the project on the environment</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
1. 2.	Basic definitions and terms in the field of environmental protection	Presentation, PP presentation	Explain the meanings of basic concepts in the field of environmental protection and engineering	I1
3. 4.	The concept of sustainable development and the role of engineering in the field of environmental protection	Presentation, PP presentation	Explain the concept of sustainable development	I3
5. 6.	Sustainable development instruments and their application in environmental engineering	Presentation, PP presentation	Distinguish instruments of sustainable development	I3
7. 8.	Preventive approach tools in environmental protection and waste management hierarchies	Presentation, PP presentation	Identify tools of preventive approach	I4
9. 10.	Waste disposal with the application of cleaner production and selection of locations for landfills	Presentation, PP presentation	Explain the waste management hierarchy through a	I1, I5

			cleaner production methodology	
11. 12.	Polluting the soil	Presentation, PP presentation	Identify and distinguish pollutants	I5
13. 14.	Remediation procedure	Presentation, PP presentation	Understand the procedure and importance of remediation	I5, I6
15. 16.	Technological wastewater treatment and biological wastewater treatment	Presentation, PP presentation	Understand the method of technological wastewater treatment	I5, I6
17. 18.	Sludges, suspensions and disposal	Presentation, PP presentation	Get acquainted with the methods of sludge disposal	I5
19. 20.	Adverse environmental impacts	Presentation, PP presentation	Identify environmental impacts	I5
21. 22.	Environmental management systems - EMAS	Presentation, PP presentation	Know environmental management systems	I2, I3, I4
23. 24.	Technical standards of air, soil, water, noise and odor	Presentation, PP presentation	Get acquainted with technical standards	I4, I5
25. 26.	Emissions to the environment	Presentation, PP presentation	Apply conservation laws in monitoring emissions of harmful substances into the environment	I4, I5
27. 28.	Control and reduction of emissions into the environment	Presentation, PP presentation	Connect sources and routes of emissions to air, water and soil	I4, I5
29. 30.	Field teaching	Presentation, PP presentation	Get acquainted with interventions such as landfills, wastewater treatment plants and methods of sludge disposal	I4
EXERCISES/ SEMINARS				
Hours	Topic and description	Method	Learning outcomes	Course outcome
1. 2.	Adoption of basic concepts	Independent task	Explain the meanings of basic concepts in the field of environmental	I1

			protection and engineering	
3. 4.	Application of environmental engineering	Independent task	Explain the concept of sustainable development	I3
5. 6.	Application and examples of good practice	Independent task	Distinguish instruments of sustainable development	I3
7. 8.	Analysis of tools for preventive approach to environmental protection	Independent task	Identify tools of preventive approach	I4
9. 10.	Examples of good practice	Independent task	Get acquainted with the procedures	I1, I5
11. 12.	Soil pollutant analysis	Independent task	Get acquainted with soil pollutants	I5
13. 14.	Analysis of the remediation procedure	Independent task	Explain the remediation procedure	I5, I6
15. 16.	Examples of good soil remediation practice	Independent task	Analyze an example from practice	I5, I6
17. 18.	Analysis of sludge disposal examples	Independent task	Analyze an example from practice	I5
19. 20.	Negative impact analysis	Independent task	Identify negative impacts	I5
21. 22.	Examples of established environmental management systems	Independent task	Get acquainted with the environmental management system	I2, I3, I4
23. 24.	Analysis of prescribed standards and limit values	Independent task	Get acquainted with the prescribed standards	I4, I5
25. 26.	Analysis of measures needed to reduce emissions	Independent task	Get acquainted with emission reduction measures	I4, I5
27. 28.	Analysis of measures needed to reduce emissions	Independent task	Get acquainted with emission reduction measures	I4, I5
29. 30.	Field teaching	Independent task	Get acquainted with interventions such as landfills, wastewater treatment plants and methods of sludge disposal	I4