



# POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

## COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

### 1. GENERAL COURSE INFORMATION

<b>1.1 Course name</b>	Organization of transport and safe handling of hazardous substances			
<b>1.2 Study program/s</b>	Undergraduate professional study Sustainable Development			
<b>1.3 Course status (O,E)</b>	O	<b>1.6 Mode of instruction (number of hours)</b>	<b>Lectures</b>	15
<b>1.4 Course code</b>			<b>Exercises</b>	30
<b>1.5 Course abbreviation</b>	OPSROT		<b>Seminars</b>	-
<b>1.6 Semester</b>	5.		<b>E-learning</b>	Merlin
<b>1.7 ECTS</b>	4	<b>1.7 Place and time of instruction</b>	The premises of the Polytechnic of Međimurje in Čakovec, according to the schedule published on the website	

### 2. TEACHING STAFF

<b>2.1 Course leader/s-title</b>	Goran Sabol, pred.	<b>contact</b>	goran.sabol@mev.hr
		<b>contact</b>	
<b>2.2 Assistant/s- title</b>		<b>contact</b>	
		<b>contact</b>	
<b>2.3 Instruction held by-title</b>		<b>contact</b>	

### 3. COURSE DESCRIPTION

<b>3.1 Course goals</b>	Get acquainted with the construction of the landfill, the structure and processes that take place in the body of the landfill, as well as the activities necessary for the rehabilitation of the landfill after closure.									
<b>3.2 Prerequisites</b>	There are no prerequisites									
<b>3.3 Course outcomes</b>	I1	Identify hazardous substances and categorize them within the organization								
	I2	Anticipate potential hazards and risks when working with hazardous substances								
	I3	Assess the level of safety in transportation and work with chemicals and other hazardous substances within the organization								
	I4	Distinguish hazardous substances according to the degree of hazard within the organization								
	I5	Recommend the use of adequate equipment and other safety measures within the organization								
	I6	Recommend adequate packaging for the transport and handling of hazardous substances								
<b>3.4 Course content</b>	Familiarization with hazardous substances and their classification and obligations within the plant									
<b>3.5 Types of coursework</b>	X	Lectures	X	Exercises		Blended e-learning	X	Individual activities		Laboratory
		Seminars and workshops		Distant learning		Field classes		Multimedia and network		Mentorship
		Other								

<b>3.6 Language of instruction</b>	Croatian/English																																																																											
<b>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)</b>	1,5	Class attendance	1,0	Seminars		Essay																																																																						
		Class activity		Project		Report/paper																																																																						
		Midterm exams		Practical task		Continuous knowledge check																																																																						
	1,0	Written exam		Experimental work																																																																								
	0,5	Oral exam		Research																																																																								
<b>3.8 Assessment and evaluation of students' work during classes and at the final exam</b>	<table border="1" data-bbox="603 593 1327 958"> <thead> <tr> <th data-bbox="609 602 948 629">Activity specification</th> <th data-bbox="954 602 1133 629">Percent %</th> <th data-bbox="1139 602 1318 629">Points</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="609 638 1318 665" style="text-align: center;">Assessment during instruction</td> </tr> <tr> <td data-bbox="609 669 948 696">Attendance</td> <td data-bbox="954 669 1133 696">2,5%</td> <td data-bbox="1139 669 1318 696">2,5</td> </tr> <tr> <td data-bbox="609 701 948 728">Class activity</td> <td data-bbox="954 701 1133 728">2,5%</td> <td data-bbox="1139 701 1318 728">2,5</td> </tr> <tr> <td data-bbox="609 732 948 759">Seminar/ project/ essay</td> <td data-bbox="954 732 1133 759">10%</td> <td data-bbox="1139 732 1318 759">10</td> </tr> <tr> <td data-bbox="609 763 948 790">Midterm exam 1</td> <td data-bbox="954 763 1133 790">42%</td> <td data-bbox="1139 763 1318 790">42</td> </tr> <tr> <td data-bbox="609 795 948 822">Midterm exam 2</td> <td data-bbox="954 795 1133 822">43%</td> <td data-bbox="1139 795 1318 822">43</td> </tr> <tr> <td colspan="3" data-bbox="609 826 1318 875" 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 data-bbox="609 880 948 907">Written exam</td> <td data-bbox="954 880 1133 907">50%</td> <td data-bbox="1139 880 1318 907">50</td> </tr> <tr> <td data-bbox="609 911 948 938">Oral exam</td> <td data-bbox="954 911 1133 938">50%</td> <td data-bbox="1139 911 1318 938">50</td> </tr> <tr> <td data-bbox="609 943 948 969"><b>Total:</b></td> <td data-bbox="954 943 1133 969"><b>100%</b></td> <td data-bbox="1139 943 1318 969"><b>100</b></td> </tr> </tbody> </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	<i>Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</i>			Written exam	50%	50	Oral exam	50%	50	<b>Total:</b>	<b>100%</b>	<b>100</b>																																					
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<b>3.9 Assessment criteria – analysis per learning outcomes</b>	<table border="1" data-bbox="523 1050 1461 1413"> <thead> <tr> <th colspan="7" data-bbox="529 1059 1455 1086" style="text-align: center;">Ways of evaluating learning outcomes</th> </tr> <tr> <th data-bbox="529 1095 663 1122"></th> <th data-bbox="670 1095 804 1122">Attendance</th> <th data-bbox="810 1095 944 1122">Activity</th> <th data-bbox="951 1095 1085 1122">Mid-term exam 1</th> <th data-bbox="1091 1095 1225 1122">Mid-term exam 2</th> <th data-bbox="1232 1095 1366 1122">Practical work</th> <th data-bbox="1372 1095 1455 1122">Total</th> </tr> </thead> <tbody> <tr> <td data-bbox="529 1131 663 1158">Outcome 1</td> <td data-bbox="670 1131 804 1158"></td> <td data-bbox="810 1131 944 1158"></td> <td data-bbox="951 1131 1085 1158">10</td> <td data-bbox="1091 1131 1225 1158"></td> <td data-bbox="1232 1131 1366 1158"></td> <td data-bbox="1372 1131 1455 1158">10</td> </tr> <tr> <td data-bbox="529 1162 663 1189">Outcome 2</td> <td data-bbox="670 1162 804 1189"></td> <td data-bbox="810 1162 944 1189"></td> <td data-bbox="951 1162 1085 1189">10</td> <td data-bbox="1091 1162 1225 1189">15</td> <td data-bbox="1232 1162 1366 1189"></td> <td data-bbox="1372 1162 1455 1189">25</td> </tr> <tr> <td data-bbox="529 1193 663 1220">Outcome 3</td> <td data-bbox="670 1193 804 1220"></td> <td data-bbox="810 1193 944 1220"></td> <td data-bbox="951 1193 1085 1220">22</td> <td data-bbox="1091 1193 1225 1220"></td> <td data-bbox="1232 1193 1366 1220"></td> <td data-bbox="1372 1193 1455 1220">22</td> </tr> <tr> <td data-bbox="529 1225 663 1252">Outcome 4</td> <td data-bbox="670 1225 804 1252"></td> <td data-bbox="810 1225 944 1252"></td> <td data-bbox="951 1225 1085 1252"></td> <td data-bbox="1091 1225 1225 1252">23</td> <td data-bbox="1232 1225 1366 1252"></td> <td data-bbox="1372 1225 1455 1252">23</td> </tr> <tr> <td data-bbox="529 1256 663 1283">Outcome 5</td> <td data-bbox="670 1256 804 1283"></td> <td data-bbox="810 1256 944 1283"></td> <td data-bbox="951 1256 1085 1283"></td> <td data-bbox="1091 1256 1225 1283">5</td> <td data-bbox="1232 1256 1366 1283"></td> <td data-bbox="1372 1256 1455 1283">5</td> </tr> <tr> <td data-bbox="529 1288 663 1314">Outcome 6</td> <td data-bbox="670 1288 804 1314"></td> <td data-bbox="810 1288 944 1314"></td> <td data-bbox="951 1288 1085 1314">2,5</td> <td data-bbox="1091 1288 1225 1314">5</td> <td data-bbox="1232 1288 1366 1314"></td> <td data-bbox="1372 1288 1455 1314">7,5</td> </tr> <tr> <td data-bbox="529 1319 663 1391">Outcome not-related</td> <td data-bbox="670 1319 804 1391">2,5</td> <td data-bbox="810 1319 944 1391"></td> <td data-bbox="951 1319 1085 1391">2,5</td> <td data-bbox="1091 1319 1225 1391">2,5</td> <td data-bbox="1232 1319 1366 1391"></td> <td data-bbox="1372 1319 1455 1391">7,5</td> </tr> <tr> <td data-bbox="529 1395 663 1422"><b>Total</b></td> <td data-bbox="670 1395 804 1422"><b>2,5</b></td> <td data-bbox="810 1395 944 1422"></td> <td data-bbox="951 1395 1085 1422"><b>47</b></td> <td data-bbox="1091 1395 1225 1422"><b>50,5</b></td> <td data-bbox="1232 1395 1366 1422"></td> <td data-bbox="1372 1395 1455 1422"><b>100</b></td> </tr> </tbody> </table> <p data-bbox="523 1422 1461 1485">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 data-bbox="523 1494 1461 1682"> Points      Grade  89 – 100    excellent (5)  76 – 88     very good (4)  63 – 75     good (3)  50 – 62     pass (2)  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			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	<b>Total</b>	<b>2,5</b>		<b>47</b>	<b>50,5</b>		<b>100</b>
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<b>3.10 Specific features related with taking the course</b>	<p data-bbox="523 1704 1471 1807">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.</p> <p data-bbox="523 1816 1471 2018">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 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>						
<b>3.11 Students obligations</b>	<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>						
<b>3.12 Written assignments</b>	<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>						
<b>3.13 Required reading</b>	<table border="1"> <tr> <td>1.</td> <td>Europski sporazum o međunarodnom cestovnom prijevozu opasnih tvari (ADR)</td> </tr> <tr> <td>2.</td> <td>Z. Duraković i sur. (2000): Klinička toksikologija, Sveučilište u Zagrebu, Zagreb</td> </tr> <tr> <td>3.</td> <td>F.Plavšić A. Wolf-Čoporda, Z. Lovrić, D. Čepelak (2006): Siguran rad s kemikalijama, Hrvatski zavod za toksikologiju, Zagreb</td> </tr> </table>	1.	Europski sporazum o međunarodnom cestovnom prijevozu opasnih tvari (ADR)	2.	Z. Duraković i sur. (2000): Klinička toksikologija, Sveučilište u Zagrebu, Zagreb	3.	F.Plavšić A. Wolf-Čoporda, Z. Lovrić, D. Čepelak (2006): Siguran rad s kemikalijama, Hrvatski zavod za toksikologiju, Zagreb
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<b>3.14 Additional reading</b>	<table border="1"> <tr> <td>1.</td> <td>Mr.sc. I. Aurer-Jezerčić, M. Žunić, D. Čolja (2013): Prijevoz opasnih tvari u cestovnom prometu, ZIRS, Zagreb</td> </tr> </table>	1.	Mr.sc. I. Aurer-Jezerčić, M. Žunić, D. Čolja (2013): Prijevoz opasnih tvari u cestovnom prometu, ZIRS, Zagreb				
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<b>4 ADDITIONAL COURSE INFORMATION</b>							
<b>4.1 Quality control</b>	<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>						
<b>4.2 Contact the teacher</b>	<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 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.</p>						
<b>4.3 Information about the course</b>	<p>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</p>						

	posted on the bulletin board and on the website of the Polytechnic at least 24 hours in advance.
<b>4.4 Course contribution to the study program</b>	I1 - Interpret information, ideas, problems, and solutions to professional and general audiences I8 - Interdisciplinary to solve engineering problems of sustainable development

**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.	Legal basis for the transport of dangerous goods, toxicology and environmental protection, EU guidelines on dangerous goods and the reduction of the use of dangerous goods (REACH Regulation)	Presentation, PP presentation	Use of the legislative aspect	I1
2.	Classification of hazardous substances according to ADR	Presentation, PP presentation	Classify hazardous substances within the plant	I1, I2, I3
3.	Professional training of drivers and first aid in the transport of dangerous goods	Presentation, PP presentation	Provide assistance to the casualty with regard to the type of dangerous substance	I1, I5
4.	Transport of dangerous goods and vehicles for the transport of dangerous goods	Presentation, PP presentation	Analyze the type of vehicle for a particular type of hazardous substance	I3
5.	Personal protection of means and protection measures during the transport of dangerous goods	Presentation, PP presentation	Use protective equipment for a specific hazardous substance	I1, I2, I3
6.	Safety requirements that must be met before, during and after the transport of dangerous goods	Presentation, PP presentation	Check that all safety procedures are met	I3
7.	Packaging, testing and deciphering examples of UN codes on packaging	Presentation, PP presentation	Know how to choose adequate packaging for a certain hazardous substance	I1
8.	Obligations of the employer in relation to hazardous substances	Presentation, PP presentation	Know the obligations of employers and legislation	I1, I2
9.	Safety procedures when working with harmful substances	Presentation, PP presentation	Apply safety procedures	I4, I5

10.	Safety Data Sheets (STL)	Presentation, PP presentation	Use STL	I2
11.	Volatile organic compounds and preparation of reports on emissions of volatile organic compounds	Presentation, PP presentation	Making a report	I2
12.	Chemical groups of hazardous substances in industry	Presentation, PP presentation	Handling of chemically hazardous substances	I1, I4
13.	Substances harmful to health (chemical substances - dusts, solvents, corrosive substances, gases)	Presentation, PP presentation	Know how to handle substances harmful to health	I1, I3
14.	Harmful substances in industry (toxic and toxic substances, MDK)	Presentation, PP presentation	Know how to handle toxic and toxic substances	I1, I3
15.	Flammable and explosive substances, flammable gases and protection measures against them	Presentation, PP presentation	Know how to handle explosive substances	I1, I3
<b>EXERCISES/ SEMINARS</b>				
<b>Hours</b>	<b>Topic and description</b>	<b>Method</b>	<b>Learning outcomes</b>	<b>Course outcome</b>
1. 2.	Analysis of guidelines and legislation	Examples, discussion	Analyze the legislative framework	I1
3. 4.	Overview of hazardous substances and their classification	Examples, discussion	Develop a classification of hazardous substances	I1, I2, I3
5. 6.	Recognize the type of accident and learn to provide first aid properly	Examples, discussion	Interpret the example	I1, I5
7. 8.	Identification of vehicles for the transport of dangerous goods	Examples, discussion	Interpret the example	I3
9. 10.	Proper handling and use of protective equipment when handling and transporting hazardous substances	Examples, discussion	Examples of proper handling of certain hazardous substances	I1, I2, I3
11. 12.	Defining and verifying fulfilled requirements	Examples, discussion	Interpret the example	I3
13. 14.	Examples of packaging testing for security and how UN numbers are coded	Examples, discussion	Interpret the example	I1
15. 16.	Defining obligations	Examples, discussion	Interpret the example	I1, I2
17. 18.	Defining procedures	Examples, discussion	Interpret the example	I4, I5
19. 20.	Completion and analysis of STL	Examples, discussion	Processing of STL examples	I2
21. 22.	Making a report	Examples, discussion	Making a report	I2

<b>23.</b> <b>24.</b>	Analysis, identification and review of hazardous substances in industry	Examples, discussion	Overview of the most common hazardous substances and their side effects	I1, I4
<b>25.</b> <b>26.</b>	Examples of side effects	Examples, discussion	Interpret the example	I1, I3
<b>27.</b> <b>28.</b>	Examples of side effects	Examples, discussion	Interpret the example	I1, I3
<b>29.</b> <b>30.</b>	Example analysis	Examples, discussion	Interpret the example	I1, I3