# POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

## COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

### 1. GENERAL COURSE INFORMATION

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|---|---|---|---|---|
| **1.1 Course name** | **Ecological protection** | | | |
| **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** | 15 |
| **1.4 Course code** | 4052 | | **Exercises** | 30 |
| **1.5 Course abbreviation** | EP | | **Seminars** | |
| **1.6 Semester** | VI | | **E-learning** | |
| **1.7 ECTS** | 4 | **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

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| **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

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| **3.1 Course goals** | Acquisition of basic knowledge about the sources and ways of entering pollutants into the ecosystem, about the methodology of cleaner production and the environmental management system and in general about the principles of preventive environmental protection. |
| **3.2 Prerequisites** | There are no conditions |
| **3.3 Course outcomes** | After successfully completing the course, students will be able to:<br><br>I1 Present the sources of pollution and the way pollutants enter the ecosystem.<br>I2 Present the methodology of cleaner production.<br>I3 explain the waste management system from the mechanical engineering and metallurgy sectors.<br>I4 To connect anthropogenic impact with emissions of power plants on physical and chemical processes in the atmosphere.<br>I5 Support international environmental management systems.<br>I6 Connect sustainable forms of agricultural production, conventional production and their environmental impact. |
| **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 |

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| | | 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)** | 1,5 | Class attendance | 0,25 | Seminars | | Essay |
| | 0,25 | Class activity | | Project | | Report/paper |
| | 1,00 | Midterm exams | | Practical task | | Continuous knowledge check |
| | | Written exam | | Experimental work | | |
| | 1,0 | Oral exam | | Research | | |

**3.8 Assessment and evaluation of students' work during classes and at the final exam**

| 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 |
| *Exam assessment for the students who failed to fullfil all the obligatory requirements during the semester* | | |
| *Written exam* | *60%* | *60* |
| **Total:** | **100%** | **100** |

**3.9 Assessment criteria – analysis per learning outcomes**

| 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 |

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 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 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).

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| | If a student does not achieve a sufficient number of points on the midterm exam, he / she cannot take the next midterm exam.<br>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.<br>The final grade is obtained on the exam period and is the sum of points earned during classes.<br>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. | |
| **3.11 Students obligations** | 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.<br>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.<br>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.<br>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. | |
| **3.12 Written assignments** | 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. | |
| **3.13 Required reading** | 1. | OP Springer, D. Springer, Poisoned Blue-Green Planet, Handbook from of Ecology, Ecotoxicology and Nature and Environmental Protection, Meridians, Samobor,<br>2008, selected chapters |
| | 2. | Lecture notes |
| **3.14 Additional reading** | 1. | Udovicic, Bozo (2009). Man and the environment. Zagreb, Kigen |
| | 2. | T. Sofilić: Ecotoxicology, Sisak, 2014, selected chapters |
| **4 ADDITIONAL COURSE INFORMATION** | | |
| **4.1 Quality control** | 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. | |
| **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. | |

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| **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** | Interpret information, ideas, problems and solutions to professional and general audiences<br>Use foreign languages in professional communication and use of professional literature<br>Analyze the collected data in the field of sustainable development<br>Identify significant environmental aspects within the organization for the purpose of management and compliance with standards and obligations<br>Formulate simple problems in the field of environmental protection in order to solve them by applying the principles 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<br>• Direct teaching (lecture, instruction, pp presentation)<br>• Discovery learning (individual, lead, discussion)<br>• Group learning<br>• Case study<br>• Field classes… | Learning outcomes | Course outcome |
|---|---|---|---|---|
| **1.** | Introduction to the course and a detailed syllabus. Basic definitions and concepts in the field of environmental protection and ecology. Ecology as a scientific discipline. | Presentation, pp presentation | Interpret ecology as a scientific discipline | I1 |
| **2.** | Sources of pollution and ways of introducing pollutants into the ecosystem. | Presentation, pp presentation | Connect the sources and routes of introduction of pollutants into the ecosystem. | I1 |
| **3.** | Sources of pollution and ways of introducing pollutants into the ecosystem. | Presentation, pp presentation | Connect the sources and routes of introduction of pollutants into the ecosystem. | I1 |
| **4.** | Cleaner production methodology and waste management hierarchy. | Presentation, pp presentation | Use cleaner production methods and waste management hierarchy | I5 |
| **5.** | Categorization, disposal of waste materials in mechanical engineering, shipbuilding and metallurgy. | Presentation, pp presentation | Describe the disposal of waste materials in mechanical | I3 |

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| | | | engineering, shipbuilding and metallurgy | |
| **6.** | Anthropogenic influences on the atmosphere; Influence of energy plant emissions on physical and chemical processes in the atmosphere. | Presentation, pp presentation | Describe the impact of emissions on air quality | I4 |
| **7.** | Influence of energy plant emissions on physical and chemical processes in the atmosphere. | Presentation, pp presentation | Describe the impact of emissions on air quality | I2<br>I3<br>I4 |
| **8.** | Colloquium 1 | | | I1,2,3,4 |
| **9.** | Environmental impact studies and ecological sustainability: content of studies, assessment procedures on the need for impact assessment, strategic environmental impact study. | Presentation, pp presentation | Give an example of an Environmental Impact and Environmental Sustainability Study | I5 |
| **10.** | Risks of environmental pollution and their assessment. | Presentation, pp presentation | Identify risks of contamination | I5 |
| **11.** | Human impact on nature and the environment. Global environmental problems. | Presentation, pp presentation | Define global environmental problems | I5<br>I6 |
| **12.** | Sustainable forest management. | Presentation, pp presentation | Describe Sustainable Forest Management | I6 |
| **13.** | Permaculture. Biodynamic agriculture. | Presentation, pp presentation | Describe permaculture and biodynamic agriculture | I5<br>I6 |
| **14.** | Organic agriculture. | Presentation, pp presentation | Describe organic farming | I4<br>I5 |
| **15.** | Colloquium 2 | | | I4,5,6 |
| **EXERCISES/ SEMINARS** | | | | |
| **Hours** | **Topic and description** | **Method**<br>• Direct teaching (lecture, instruction, pp presentation)<br>• Discovery learning (individual, lead, discussion)<br>• Group learning<br>• Case study<br>• Field classes… | **Learning outcomes** | **Course outcome** |
| **1.** | Ecology as a scientific discipline | collaborative learning | Define ecology as a scientific interdisciplinary discipline | I1 |

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| **2.** | Sources of pollution and ways of introducing pollutants into the ecosystem. | Discovery learning, guided (scientific papers and scientific shows) | Connect and predict the sources and pathways of pollutants into the ecosystem. | I1 |
| **3.** | Sources of pollution and ways of introducing pollutants into the ecosystem. | Learning by discovery, discussion | Connect and predict the sources and pathways of pollutants into the ecosystem. | I1 |
| **4.** | Cleaner production methodology and waste management hierarchy. | Case study, discussion | Apply Cleaner Production Methodology and waste management hierarchy. | I5 |
| **5.** | Categorization, disposal of waste materials in mechanical engineering, shipbuilding and metallurgy. | Case study, discussion | Classify waste categorization | I3 |
| **6.** | Influence of energy plant emissions on physical and chemical processes in the atmosphere. | Guided learning (scientific shows and scientific papers) | Recognize the impact of energy plant emissions on physical and chemical processes in the atmosphere. | I4 |
| **7.** | Influence of energy plant emissions on physical and chemical processes in the atmosphere. | Case study, discussion | Influence of energy plant emissions on physical and chemical processes in the atmosphere. | I2<br>I3<br>I4 |
| **8.** | The main features of the IPPC directive and connect with the best available technologies. Environmental management systems, International standards ISO 9001, ISO 14001, EMAS. | Case study | Interpret the features of the IPPC directive, and the international standards ISO 9001, ISO 14001, EMAS | I5 |
| **9.** | Environmental impact studies and ecological sustainability: content of studies, assessment procedures on the need for impact assessment, strategic environmental impact study. | Case study , discussion | Explain and give an example of an environmental impact study | I5 |
| **10.** | Field teaching, environmental management systems | Tehnix, Donji Kraljevec | Understand the environmental impact study | I5 |
| **11.** | Human impact on nature and the environment. Global environmental problems. | Seminars, discussion | Summarize global environmental issues | I5<br>I6 |
| **12.** | Sustainable forest management. | Guest lecturer, discussion | Describe problems related to forest management | I6 |

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| **13.** | Permaculture. Biodynamic agriculture. Organic agriculture. | Guest lecturer, discussion | Understand the difference between permaculture, biodynamic agriculture and organic farming. | I5<br>I6 |
| **14.** | Risks of environmental pollution and their assessment. | Guided learning, discussion<br>Case study | Identify risks of environmental pollution | I5 |
| **15.** | Seminars | discussion | Discuss environmental problems and human impact on the environment | I1,2,3,4,5,6 |