# COURSE DESCRIPTION CARD

<table>
<tr><td colspan="10">Faculty of Civil and Environmental Science</td></tr>
<tr><td>Field of study</td><td colspan="6"></td><td colspan="2">Degree level and programme type</td><td></td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td colspan="2">Study profile</td><td>Academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Industrial water technology</td><td colspan="2">Course code</td><td>IS-FCEE-00221W</td></tr>
<tr><td colspan="2">Course type</td><td>Erasmus</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>winter</td></tr>
<tr><td>15</td><td>15</td><td>30</td><td></td><td></td><td></td><td></td><td>No. of ECTS credits</td><td>5</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Water technology</td></tr>
<tr><td>Course objectives</td><td colspan="9">Characteristics of the water taken for the industrial and technological purposes, its quantity and quality. Presentation of mechanical, physico-chemical, biological and chemical methods of water purification. Phenomena occurring during individual processes of industrial water purification. The selection of proper treatment processes and whole purification line depending on the type, quality and purpose of the water.</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture: Removal of dissolved substances and suspended solids from water. Methods, technological parameters and efficiency of industrial and technological water treatment,. Examples of technological systems and lines of water treatment plants for industrial and technological purposes.<br>Exercises: water types, operation characteristics, water parameters, and application of particular methods and unit processes for industrial water treatment. Calculation tasks.<br>Laboratory: quality assessment of indyvidual water treatment processes, proper technology depending on the type of water to be purified, its quality demand and purpose of use. Methods, technological parameters and efficiency water purification for industrial purposes.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Lecture – presentation, discussion with students, case study explanation, classes – calculation tasks, laboratory classes – laboratory tests</td></tr>
<tr><td>Assessment method</td><td colspan="9">Lecture – final exam, classes- calculation tasks, laboratory classes – laboratory activities confirmation, tests</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">Student has knowledge to an advanced degree in the field of</td><td colspan="2">IS1_W07<br>IS1_W06</td></tr>
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|---|---|---|
| | basic methods of physico-chemical analyses, processes and phenomena occurring in water and the latest methods of water treatment | |
| LO2 | Student knows in an advanced degree - issues from mathematics, physics, chemistry, biology, which are the basis of processes in environmental engineering. The student is able to use scientific, popular and branch literature, norms, legal acts, internet databases. The student is able to use the acquired information appropriately, draws conclusions, formulates and presents opinions, discuss them | IS1_W02 |
| LO3 | The student is able to properly plan and perform physicochemical research of water using specialized scientific and research apparatus, interpret the results and draw adequate conclusions on this basis conclusions, | IS1_U02 |
| LO4 | Students is able to analyse and evaluate technical, technological and organisational solutions concerning of arising pollution, is able to act in a creative and entrepreneurial way cooperate in a group, taking various roles in it. | IS1_U08 |
| LO5 | The student is ready to analyze the content obtained from sources and to critically evaluate the possibility of use them in professional work | IS1_K01 |
| LO6 | | |

| Symbol of learning outcome | Methods of assessing the learning outcomes | Type of tuition during which the outcome is assessed |
|---|---|---|
| LO1 | Exam | L |
| LO2 | Exam, calculation tasks, laboratory classes tests | L, C, LC |
| LO3 | Exam, calculation tasks, | L,C |
| LO4 | Exam, calculation tasks, laboratory classes tests | L, C, LC |
| LO5 | Exam, calculation tasks, | L,C |
| LO6 | | |

| Student workload (in hours) | | No. of hours |
|---|---|---|
| Calculation | Attendance at lectures | 15 |
| | Attendance at laboratory classes | 30 |
| | Attendance at classes | 15 |
| | Preparation for exam | 10 |
| | Preparation for classes and laboratory classes | 15 |
| | Preparation for every type of classes assessment | 30 |
| | Writing reports from laboratory classes | 5 |
| | Consultations with theacher | 5 |
| | TOTAL: | 125 |

| Quantitative indicators | HOURS | No. of ECTS credits |
|---|---|---|

| | | |
|---|---|---|
| **Student workload – activities that require direct teacher participation** | **67** | **2.5** |
| **Student workload – practical activities** | **102** | **4** |
| **Basic references** | **1. Binnie C., Kimber M.,Smethurst G. (2002) Basic Water Treatment, Londyn Thomas Telford Ltd.<br>2. Carter M.R., Gregorich E.G. Soil sampling and methods of analysis, II edition, Taylor & Francis Publ. NW 2008<br>3. Cheremisinoff P. (2002). Handbook of Water and Wastewater Treatment Technologies. Butterworth-Heinemann.** | |
| **Supplementary references** | **1. Beverly P (2005). Filter Troubleshooting and Design Handbook. American Water Works Association<br>2. Crittenden J.C., Rhodes Trussell R., Hand D.W., Howe K.J., Tchobanoglous G. (2005) Water treatment: Principles and design, 2nd edition, John Wiley & Sons, Inc.<br>3. Frayne C. (2011) The metro handbook of water treatment for HVAC systems, The metro group. Servicing water systems with environmental care, NY USA** | |
| **Organisational unit conducting the course** | **Department of Technology in Environmental Engineering** | **Date of issuing the programme** |
| **Author of the programme** | **Professor Iwona Skoczko** | **2021.03.15** |

**L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar**