| Department of Civil and Environmental Engineering | | | | | |
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| Study programme: | **environment protection** | Degree level: full-time/part-time programme: | | **Bachelor's degree / Master's degree /Doctoral degree** | |
| Specialization | **Subject common** | Diploma path: | | **-** | |
| Module name: | sanitary chemistry | | | | |
| Module type: | **obligatory** | Semester: **III** | ECTS **4** | Module ID: | |
| No. of hrs in semester: | L - 15 C - 0 LC- 30 P- SW- S- | | | | |
| Prerequisites: | *Complete with prerequisites or "-"* | | | | |
| Teaching methods: | *lecture, class, laboratory class, project, seminar, specialization workshop* | *Assessment:* | *Evaluation must be relevant to the intended learning outcomes* | | |
| | | Lecture - two written tests; Laboratory - assessment reports, preparation for exercises, 2 written tests, quizzes; | | | |
| Aims and objectives: | *Acquaint students with the types and characteristics of water and wastewater. Teaching methods for the identification of natural ingredients and contaminants present in water as well as the processes of wastewater biological treatment. Clarification of issues impact of human activity on water quality, the course of reactions in aqueous media and circulation of effluents and the most important chemical elements in the hydrosphere. Discussion of the principles of presenting the results of water quality testing and verification methods and interpretation. Teach students how to prepare chemicals necessary for full and summary analysis of water and wastewater as well as rules for collecting, recording and preparation of environmental samples for analysis.* | | | | |
| Module content: | *Division and the characteristics of water and wastewater. Purpose and scope of research indicators characterizing the physico-chemical properties of water and wastewater after biological treatment processes. Different types of water quality in the light of current regulations. Sources of pollution, changes of physico-chemical and biochemical changes occurring in the water and wastewater problems of the human impact on their quality, circulation of elements in the environment. Environmental sampling methodology for analyzing, testing the quality of water and wastewater, verification and interpretation of the results.* | | | | |
| Learning outcomes | *Write min. 4, max. 8 learning outcomes in the following order: knowledge - skills - competences. Each learning outcome must be verifiable.* | | | *Relevance to the programme learning outcomes* | |
| LO1 | student: lists and describes the source of ingress and migration conditions, both natural ingredients and contaminants hydrosphere | | | K_W03, K_W05, K_W16, K_U02 | |
| LO2 | student defines and explains the chemical processes in the environment, along with the threats caused by human activities | | | K_W03, K_W05, K_W16, K_U02 | |

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| LO3 | student knows and is able to carry out the methodology of the study and evaluate the quality of the water and wastewater in the light of existing legislation | K_W03, K_U02, K_U04, K_U23, K_K02, K_K04 | |
| LO4 | student knows the rules for the collection, utwalania and preparation of environmental samples, properly develops and interprets the results of research | K_W02, K_U02, K_U09, K_U04, K_K02, K_K04 | |
| LO5 | | | |
| student workload | Participation in lectures | 15 x 1h | 15 |
| | Participation in laboratory classes + design | 15 x 2h | 30 |
| | Preparation for tutorials / lab / seminar | 15 x 1h | 15 |
| | Develop reports from the laboratory or workshop and / or completion of homework assignments (homework) | 15 x 2h | 30 |
| | Participation in the consultations related to the exercise / seminar / project | 6 x 1h | 6 |
| | mplementation of the project tasks (including preparing presentations) | | |
| | Preparation for the exam / credit and the presence on it | | 9 |
| | Preparing to pass exercises + presence during tests | | 9 |
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| | | TOTAL: | 114 |
| quantitative indicators | Student workload - activities that require direct teacher participation 10h+20h+6h+2h+3h | 56 | ECTS |
| | | | 2 |
| | Student workload - practical skills activities 30h+15h+30h+5h+9h+9h | 98 | 3 |
| basic references: | *Chełmicki W.: Woda. Zasoby, degradacja, ochrona. Wydawnictwo Naukowe PWN, Warszawa 2001Poskrobko B., Poskrobko T., Skiba K.: Ochrona biosfery. Polskie Wydawnictwo Ekonomiczne. Warszawa 2007Mikuliński Z.: Gospodarka wodna. Dojlido J.: Leksykon: zanieczyszczenie i ochrona wód. Ofic. Wyd. Szkoły Ekol. i Zarządz., W-wa 2006 Wydawnictwo Naukowe PWN, Warszawa 1998* | | |
| supplementary references: | *Hermanowicz W.: Fizyczno - chemiczne badanie wody i ścieków. Wydawnictwo Arkady, Warszawa 1999; Szczykowska J.E., Siemieniuk A.: Chemia wody i ścieków. Podstawy teoretyczne i praktyczne. Oficyna wydawnicza Politechniki Białostockiej, Białystok 2010* | | |

| learning outcomes | *methods of assessing learning outcomes* | type of class (if more than one) where the outcomes are assessed |
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| LO1 | qualifying tests lecture and lab exercises, qualifying tests., discussion during exercise | L, LC |
| LO2 | qualifying colloquium lecture, preparation of materials for the projectlecture, qualifying tests and exercises, qualifying tests lab.oraz discussion of the obtained results of research | L, LC |
| LO3 | qualifying tests lecture and lab exercises., work in the classroom observation | L,LC |

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|---|---|---|---|
| LO4 | practice, qualifying tests lab.oraz discussion of the obtained results of research, lab exercises reports. | | LC |
| LO5 | | | |
| Department: | Department of Engineering and Technology in Environmental Protection | Group instructors: | *dr Joanna Szczykowska* |
| Date: | 2014. 12.03 | Coordinator: | *dr Joanna Szczykowska* |

L - lecture C - class LC - laboratory class P-project
SW - specialization workshop S - seminar