| Faculty of Civil and Environmental Engineering | | | | | |
|---|---|---|---|---|---|
| Study programme: | **Environmental Engineering** | Degree level: full-time programme: | **Master's degree** | | |
| Specialization | **Advanced Technologies in Environmental Engineering** | Diploma path: | **-** | | |
| Module name: | **Deodorization in environmental engineering** | | | | |
| Module type: | **obligatory** | Semester: **II** | ECTS **3** | Module ID: | |
| No. of hrs in semester: | L - 15 C - LC- P- 15 SW- S- | | | | |
| Prerequisites: | *Complete with prerequisites or "-"* | - | | | |
| Teaching methods: | *lectures, project* | *Assessment:* | *Evaluation must be relevant to the intended learning outcomes* | | |
| | | lectures - test on lectures content, project - completion, presentation and discussion of the project | | | |
| Aims and objectives: | *By the end of this module students should be able to:*<br>*- determine and evaluate sources of odors in different sanitary engineering ssystems*<br>*- determine appropriate method of reducing odor problems in selected objects* | | | | |
| Module content: | *Types of odors. Odor nuisance. Measuring odors – olfactometry.*<br>*Legal aspects of odor control in Poland and other countries.*<br>*Characteristic of selected objects according to their odor nuisance.*<br>*Methods of deodorization. Application examples.* | | | | |
| 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: can list and describe basic properties of odours | | K_W05 | | |
| LO2 | knows methods and devices used in deodorization | | K_W06, K_U08 | | |
| LO3 | calculates concentration of odours based on data from olfactometry | | K_U21 | | |
| LO4 | is able to determine parameters of installation for deodorization | | K_U09 | | |
| LO5 | understands necessity of air quality protection in therms of elimination of odours | | K_K02 | | |
| LO6 | | | | | |
| LO7 | | | | | |
| LO8 | | | | | |
| t workload | lecture attendance | | 15 x 1h | 15 | |
| | participation in project classes | | 15 x 1h | 15 | |
| | preparation for projects | | | 15 | |
| | work on projects, reports, etc. | | | 20 | |
| | participation in student-teacher sessions related to the project | | | 3 | |
| | implementation of project tasks | | | 5 | |

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| studen | preparation for and participation in exams/tests | | 5 |
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| | | | |
| | | TOTAL: | 78 |
| quantitative indicators | Student workload - activities that require direct teacher participation | 38 | ECTS |
| | | | 1,5 |
| | Student workload - practical skills activities | 55 | 2 |

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|---|---|
| basic references: | *1. BS EN 13725:2003 - Air quality. Determination of odour concentration by dynamic olfactometry*<br>*2. BS EN 12255-9: 2002 - Wastewater treatment plants. Odour control and ventilation*<br>*3. Horizontal Guidance for Odour, Part 1 – Regulation and Permitting. Scottish EPA. Available as PDF at: http://www.zut.edu.pl/fileadmin/pliki/odory/pdf/IPPC_H4_part_1.pdf*<br>*4. Horizontal Guidance for Odour, Part 2 – Assessment and control. Scottish EPAAvailable as PDF at: http://www.zut.edu.pl/fileadmin/pliki/odory/pdf/IPPC_H4_part_2.pdf* |
| supplementary references: | *1. Buck L.B.: Unraveling sens of smell. Available as zip file at: http://www.nobelprize.org/nobel_prizes/medicine/laureates/2004/buck-lecture.pdf*<br>*2. McGinley M.A., McGinley Ch.M.: Developing a Credible Odor Monitoring Program. Available as PDF at: http://www.zut.edu.pl/fileadmin/pliki/odory/pdf/NR_DevelCredibleOdorMonProgr.pdf* |

| learning outcomes | *methods of assessing learning outcomes* | type of class (if more than one) where the outcomes are assessed |
|---|---|---|
| LO1 | test on lectures content | L |
| LO2 | test on lectures content, evaluating the project documentation | L, P |
| LO3 | evaluating the project documentation | P |
| LO4 | evaluating the project documentation | P |
| LO5 | discussion of the student's projects | P |
| LO6 | | |
| LO7 | | |
| LO8 | | |

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| Department: | Dept. of Sanitary Engineering Systems | Group instructors: | Dariusz Andraka, PhD<br>Tomasz Kiełbasa, MSc |
| Date: | 10.01.2013 | Coordinator: | Dariusz Andraka, PhD |

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