| Faculty of Civil and Environmental Engineering | | | | | |
|---|---|---|---|---|---|
| Study programme: | **Environmental Engineering** | Degree level: part-time programme | **Master's degree** | | |
| Specialization | **Heating and Ventilation Engineering** | Diploma path: | **-** | | |
| Module name: | **Transitional project with computer application** | | | | |
| Module type: | **obligatory** | Semester: **II** | ECTS **2** | Module ID: | EE1208 |
| No. of hrs in semester: | L - C - LC- P- 30 SW- S- | | | | |
| Prerequisites: | *Complete with prerequisites or "-"* | *Ś13012, Ś14020, Ś15023, Ś16028* | | | |
| Teaching methods: | *specialization workshop* | *Assessment:* | *Evaluation must be relevant to the intended learning outcomes* | | |
| | | project - completion, presentation and discussion of the project | | | |
| Aims and objectives: | *The introduction of students with computer programmes to the designing of installations heating, ventilating and of air-conditioning and to the selection of devices to heat sources. Educating the ability of choice about technical alternative solutions.* | | | | |
| Module content: | *Draw a building plan with use of computer tools. Calculation of building envelope U-value. Calculation of heat demand of a building. Multi-variant testing of central heating hydraulic loops.* | | | | |

| 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 knows standards, guidelines and principles of designing HVAC systems | K_W014, K_W016 | |
| LO2 | Student knows selected computer programs for designing HVAC systems | K_W015 | |
| LO3 | Student identifies devices in HVAC systems. | K_W04, K_W018 | |
| LO4 | Student calculates thermal performance of a building. He makes multivariate analysis of the heating system loops. | K_U13, K_U17, K_U20 | |
| LO5 | Student knows possibilities of raising professional competence. | K_K01 | |
| student workload | work on projects | 15x2h | 30 |
| | participation in student-teacher sessions related to project | 5h | 5 |
| | preparation for project | 5h | 5 |
| | implementation of project tasks | 15h | 15 |
| | preparation for projects defence | 5h | 5 |
| | | TOTAL: | 60 |
| quantitative indicators | Student workload - activities that require direct teacher participation | 35 | ECTS 1,2 |
| | Student workload - practical skills activities | 50 | 1,7 |

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| basic references: | *ASHRAE Handbook - Fundamentals. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., Atlanta, GA. 2009*<br>*W. Larsen Angel. HVAC Design Sourcebook. McGraw-Hill Professional; First edition, 2011.*<br>*Software manual of AUDYTOR/KAN/PURMO OZC 2013r.*<br>*Software manual of AUDYTOR/KAN/PURMO CO 2013r.* |
| supplementary references: | *Ward R. Domestic Central Heating Wiring Systems and Controls. Newnes; 2 edition, 2005*<br>*Reginald J. Central Heating Combination Boilers: Fault Finding and Repair. Copperjob Publishing, 2004*<br>*Vedavarz. A. HVAC - The Handbook of Heating, Ventilation and Air Conditioning for Design and Implementation. Industrial Press, 2007*<br>*Kreider J. F. Handbook of Heating, Ventilation, and Air Conditioning. Taylor & Francis Group, 2001*<br>*Kreider J. F. Heating and Cooling of Buildings: Design for Efficiency. Revised Second Edition, CRC Press, 2009*<br>*Daniel D.C.: The solar house : passive heating and cooling. White River Junction : Chelsea Green Publishing Company, 2002.* |

| learning outcomes | *methods of assessing learning outcomes* | type of class (if more than one) where the outcomes are assessed |
|---|---|---|
| LO1 | evaluation of the student's performance in classes | SW |
| LO2 | evaluating the student's design conceptions | SW |
| LO3 | evaluating the student's presentation of the project stages | SW |
| LO4 | making the design work | SW |
| LO5 | projects defense | SW |

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| Department | of Heat Engineering | Group instructors: | Mirosław Żukowski |
| Date: | 27.10.2013 | Coordinator: | prof. nzw. dr hab. inż. Mirosław Żukowski |