

| STUDY MODULE DESCRIPTION FORM | | |
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| Name of the module/subject Control and Automation of the Thermal and Flow Processes | | Code 1010632231010633731 |
| Field of study Mechanical Engineering | Profile of study (general academic, practical) (brak) | Year /Semester 2 / 3 |
| Elective path/specialty Thermal Engineering | Subject offered in: Polish | Course (compulsory, elective) obligatory |
| Cycle of study: Second-cycle studies | Form of study (full-time, part-time) full-time | |
| No. of hours Lecture: 1 Classes: 1 Laboratory: - Project/seminars: - | | No. of credits 2 |
| Status of the course in the study program (Basic, major, other) (brak) | | (university-wide, from another field) (brak) |
| Education areas and fields of science and art technical sciences Technical sciences | | ECTS distribution (number and %) 2 100% 2 100% |
| Responsible for subject / lecturer: dr inż. Rafał Urbaniak email: rafal.urbaniak@put.poznan.pl tel. x Working Machines and Transportation Piotrowo 3, 60-965 Poznań | | |
| Prerequisites in terms of knowledge, skills and social competencies: | | |
| 1 | Knowledge | Student has a knowledge gained through the courses: thermodynamics, flow mechanics, base automation, control and automatic, boiler equipment, steam and gas turbines, compressors, pumps, fans, heat and mass transfer, energy management. |
| 2 | Skills | Student is able to use the basic terms and methods used in automatic and digital technology. He is able to read and make simple block schemes of automation systems and computer programs. He is able to use the basic function of any higher level language of software. He is able to used the knowledge he previously gained through the analyzing and solving the problems of thermal and flow processes. |
| 3 | Social competencies | Student is able to cooperate in team, taking various roles in it. Student is able to indicate the priorities which are important during the problems solving and also determine the hierarchy of another tasks he has. Student shows self-reliance in problem solving, getting and improving the knowledge and skills. |
| Assumptions and objectives of the course: The purpose of the lecture is thorough learning the basics of theory of heat-flow processes. And also: introducing with currently used technical solutions and directions of technological development in this field. | | |
| Study outcomes and reference to the educational results for a field of study | | |
| Knowledge: | | |
| 1. Has a basic knowledge of linear measurement methods, temperature, pressure, humidity, fluid streams, velocity, torque measurement, including electrical methods of this measurement. - [K1A_W14] | | |
| 2. Has an extended knowledge of: measurement sensors, electronic controllers, automation systems, presents modular digital interfaces applied in control systems, its construction and logical organization computer control systems and its basic software. - [K2A_W17] | | |
| Skills: | | |

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| <p>1. Is able to obtain information from the technical literature, internet, databases and other sources of knowledge. Can integrate the information to interpret and learn from them, create and justify opinions on specific technical solutions - [K1A_U03]</p> <p>2. Is able to properly use modern measurement equipment for the main physical quantities used in problems of thermal engineering and use appropriate programming environments - especially graphically oriented - [K1A_U16]</p> <p>3. Is able to perform rudimentary technical calculations in fluid mechanics and thermodynamics, such as heat and mass balance, pressure loss in pipes, selected parameters of blowers and fans in ventilation and transportation systems, and also is able to choose the instrumentation and control system for the specified process properly. - [K1A_U17]</p> <p>4. Is able to formulate requirements for electronic and automatic control systems for industry professionals in automatic regulation and control systems - [K1A_U19]</p> |
| <p>Social competencies:</p> <p>1. Understands the need and knows the possibilities of lifelong learning, knows the need for continuous acquisition of new knowledge in order to develop professional, is aware of the transfer of knowledge to society. - [K1A_KO1]</p> <p>2. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for own decisions. - [K1A_KO2]</p> <p>3. Is able to think and act in an entrepreneurial manner, prepare a cost-effective solution in terms of economic - [K1A_KO5]</p> |

| Assessment methods of study outcomes | | |
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| <p>Fragmentary inspection of the knowledge of the previous lecture:</p> <p>? written exams,</p> <p>? oral exams,</p> <p>? measurement and control computer programs preparing.</p> | | |
| Course description | | |
| <p>Control of the unsteady liquids and gases transport processes. Constitutive equations. Currently used mathematical models of flow transport systems. Technical means necessary for their implementation. Analysis and synthesis of control systems of basic processes of thermal engineering. Analysis of control systems of basic thermal and flow processes in power station. Software of contemporary modular measurement and control systems. Techno-economic problems related to implementation of project work, construction and exploitation of control systems, with particular emphasis on specificity of industrial power and distracted, local systems of power station of small and medium power.</p> | | |
| Basic bibliography: | | |
| Additional bibliography: | | |
| Result of average student's workload | | |
| Activity | Time (working hours) | |
| 1. Preparation for the lecture | 2 | |
| 2. Participation In the lecture | 15 | |
| 3. Fixing the lecture | 20 | |
| 4. Consultations | 4 | |
| 5. Preparation for the exercises | 3 | |
| 6. Participation in the exercises | 15 | |
| 7. Preparation for the summary test | 2 | |
| 8. Participation in the summary test | 15 | |
| Student's workload | | |
| Source of workload | hours | ECTS |
| Total workload | 76 | 2 |
| Contact hours | 25 | 1 |
| Practical activities | 2 | 1 |