



Subject card

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| Subject name and code | , PG_00053427 | | | | | | |
| Field of study | Automation, Robotics and Control Systems | | | | | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | | | 2026/2027 | | |
| Education level | first-cycle studies | Subject group | | | | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 4 | Language of instruction | | | Polish | | |
| Semester of study | 7 | ECTS credits | | | 3.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Partment of Metrology and Information Systems -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Beata Pałczyńska | | | | |
| | Teachers | | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 15.0 | 0.0 | 0.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 30 | | 5.0 | | 40.0 | 75 |
| Subject objectives | To familiarize the student with methods and tools for programming virtual measurement systems. The student will master the ability to design and test a virtual measuring instrument. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W06] knows the structure of computers and microprocessors and the tasks of operating systems, has basic knowledge of the basics of computer software, drivers, microprocessor technology, design of simple algorithms and the operation of information networks | | designs an application in a graphical measurement environment that performs the function of a measuring instrument. | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K6_W10] has basic knowledge related to mechatronics and robotics systems | | implements a measurement system based on virtual instruments. Selects tools appropriate to the measurement task. | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K6_U03] can prepare and present a presentation on the problems and results of an engineering task | | presents the concept of a measurement system programmed in a graphical software environment. | | [SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task | | |
| | [K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions | | analyzes available methods of implementing a system based on virtual instruments. | | [SU2] Assessment of ability to analyse information | | |

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| Subject contents | <p>Course content – lecture LECTURE: The virtual instrument (VI) as a generous trend in measurement instrumentation. The conception of the virtual measuring instruments. The structure and the organization of computer-based measuring systems. The basis functional blocks. The measurement system configuration. The programming panels. The graphical user interface. The hardware of VIs. The multi-function data acquisition board DAQ - construction and applications. DAQ signals, The signal conditioning. The interface standards in measuring system. The system interface bus. The serial interface. Measuring systems based on IEC-625 interface. The software environment for development of measurement systems. Introduction to LabVIEW development environment, graphical programming language G, Virtual Instrument as basic module of creating application in G language. Integration of VIs to computer network. VIs working under RTOS.</p> <p>LABORATORY Design and implementation of VIs, practical aspects. Advantages and disadvantages of VIs - analysis of development.</p> | | |
| Prerequisites and co-requisites | Basic knowledge of electrical metrology. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Laboratory - completed exercises | 100.0% | 80.0% |
| | Lecture - final test | 60.0% | 20.0% |
| Recommended reading | Basic literature | <ol style="list-style-type: none"> 1. Winiecki W.: Organizacja komputerowych systemów pomiarowych, Oficyna Wydawnicza PW, Wyd. 1, Warszawa 1997. 2. Świsulski D.: Komputerowa technika pomiarowa, Agenda Wydawnicza PAK, Warszawa 2005. 3. Świsulski D.: Przykłady cyfrowego przetwarzania sygnałów w LabVIEW, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2014 4. Lesiak P., Świsulski D.: Komputerowa technika pomiarowa w przykładach, Agenda Wydawnicza PAK, Warszawa, 2002. 5. Jerome, Jovitha. Virtual instrumentation using LabVIEW. PHI Learning Pvt. Ltd., 2010. | |
| | Supplementary literature | Wells L.: LabVIEW Student Edition User's Guide, Prentice Hall. 2010 | |
| | eResources addresses | | |
| Example issues/ example questions/ tasks being completed | <ol style="list-style-type: none"> 1. Characterize a virtual instrument concept. 2. Describe a data acquisition path in a typical computer-based measurement system 3. The serial interface basic characteristics. 4. The parallel interface basic characteristics. 5. The principles of using standard interfaces like RS-232, USB, GPIB to configure a virtual measurement system controlled by a PC. 6. The principles of designing DAQ measurement system. | | |
| Practical activities within the subject | Not applicable | | |

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