



Subject card

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|---|---|--|---|-------------------------------------|--|------------|-----|
| Subject name and code | Designing of measurement systems in integrated programming environments, PG_00053431 | | | | | | |
| Field of study | Electrical Engineering | | | | | | |
| Date of commencement of studies | October 2021 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | first-cycle studies | Subject group | | | | | |
| Mode of study | Part-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 | Department of Metrology and Information Systems -> Faculty of Electrical and Control Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Beata Pałczyńska | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | 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 | | 4.0 | | 41.0 | 75 |
| Subject objectives | To introduce students with the principles of organization of measurement systems, with communication standards used in wired and wireless systems. Developing skills in the field of software design of measurement systems. Ability to virtualize measurement and adapt the results. Developing skills in designing the hardware structure of measurement systems. Getting to know the operation of the programming environment fully based on the graphical interface of the G language, which is the basis for programming in the LabVIEW graphical environment (National Instruments). | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | K6_K05 | | The student knows the rules of conduct in the event of a failure of the measuring stand-up. | | [SK5] Assessment of ability to solve problems that arise in practice | | |
| | K6_K01 | | The student knows the software supporting the measurement systems software. | | [SK3] Assessment of ability to organize work | | |
| Subject contents | <p>Lecture: Organization of measurement systems. Measuring instruments for work in computer measuring systems, measuring instruments of the Virtual Instruments class. Integrated software environments. Methodology of designing and creating applications, i.e. graphical source code, graphical user interface, running and testing programs. Communication with measuring instruments. Definition of remote measurement. Standards for communication with instruments. Interface in the measurement system. Interface system bus. Serial interfaces. IEC-625 interface system standard. VISA library. Programming of Data Acquisition Board (DAQ) card. Characteristics of card drivers and ways of using them in the software. Internet technologies in measurement systems (Data Socket Server, TCP Connection, Network Streams, Shared Variables). Laboratory: Getting to know the methods of programming, building a software project using external devices and measuring instruments. Practical aspects of programming in the LabVIEW environment. Data Acquisition Board (DAQ) card's software. Remote control of measuring instruments via GPIB. Analysis of the design task, determining the requirements for the system, design stages. Starting the measuring system. Running the hardware and software. Causes of measurement systems failures.</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 - running application | 60.0% | 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. Lesiak P., Świsulski D.: Komputerowa technika pomiarowa w przykładach, Agenda Wydawnicza PAK, Warszawa, 2002. 4. 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 | Adresy na platformie eNauczenie: | |
| 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 | | |
| Work placement | Not applicable | | |