GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2020 | Academic year of realisation of subject | 2023/2024 |
| 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 | 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 | 5.0 | 40.0 | 75 |

**Subject objectives**

Introduce students with the methods and tools for programming of virtual measurement systems.

**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 | The student is able to design a virtual instrument in a graphical environment supporting measurement system software. | [SW3] Assessment of knowledge contained in written work and projects |
| [K6_W10] has basic knowledge related to mechatronics and robotics systems | The student knows measurement tools and programs cooperating with these tools in measurement systems. | [SW3] Assessment of knowledge contained in written work and projects<br>[SW1] Assessment of factual knowledge |
| [K6_U03] can prepare and present a presentation on the problems and results of an engineering task | The student is able to interpret measurement results obtained in a measurement system based on virtual instruments. | [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 | The student knows the block structure of a measurement system based on virtual instruments. | [SU2] Assessment of ability to analyse information |

<table>
<tr><td>Subject contents</td><td>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.<br><br>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.<br><br>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.<br><br>Integration of VIs to computer network. VIs working under RTOS.<br><br>Design and implementation of VIs, practical aspects.<br><br>Advantages and disadvantages of VIs - analysis of development.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of electrical metrology.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Laboratory - completed exercises</td><td>100.0%</td><td>80.0%</td></tr>
<tr><td>Lecture - final test</td><td>60.0%</td><td>20.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. Winiecki W.: Organizacja komputerowych systemów pomiarowych, Oficyna Wydawnicza PW, Wyd. 1, Warszawa 1997.<br>2. Świsulski D.: Komputerowa technika pomiarowa, Agenda Wydawnicza PAK, Warszawa 2005.<br>3. Lesiak P., Świsulski D.: Komputerowa technika pomiarowa w przykładach, Agenda Wydawnicza PAK, Warszawa, 2002.<br>4. Jerome, Jovitha. Virtual instrumentation using LabVIEW. PHI Learning Pvt. Ltd., 2010.</td></tr>
<tr><td>Supplementary literature</td><td>Wells L.: LabVIEW Student Edition User`s Guide, Prentice Hall. 2010</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Characterize a virtual instrument concept.<br>2. Describe a data acquisition path in a typical computer-based measurement system<br>3. The serial interface basic characteristics.<br>4. The parallel interface basic characteristics.<br>5. The principles of using standard interfaces like RS-232, USB, GPIB to configure a virtual measurement system controlled by a PC.<br>6. The principles of designing DAQ measurement system.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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