



Subject card

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|---|---|--|--------------------------|---------------------------------------|--|------------|-----|
| Subject name and code | The programming of distributed measurement systems, PG_00044111 | | | | | | |
| Field of study | Electrical Engineering | | | | | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | first-cycle studies | Subject group | | | | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 3 | Language of instruction | | | English | | |
| Semester of study | 5 | ECTS credits | | | 2.0 | | |
| 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 | | 15.0 | 50 |
| Subject objectives | Introducing the principles of the organization of distributed measurement systems (DMS), with particular emphasis on network systems (NDMS). Ability to use major techniques used in DMS software. Formation of skills in the field of NDMS software, 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_U10 | | | | | | |
| | K6_U09 | | | | | | |
| | K6_W10 | | | | | | |
| | K6_K01 | The student knows the basics of programming in a graphical programming environment. The student selects the tools appropriate to the measurement task. | | | [SK5] Assessment of ability to solve problems that arise in practice | | |
| K6_K05 | The student knows the rules of the safe operation of measuring instruments. | | | [SK1] Assessment of group work skills | | | |

| Subject contents | <p>Lectures: The organization of the distributed measurement system (DMS). Main techniques using the possibilities of the dispersion of the measurement system. The hardware architecture of the DMS. The special requirements of programming of the DMS. The design methodology of distributed measurement systems in the integrated programming environment LabVIEW. LabVIEW communication techniques for network distributed applications: communication methods, implementing communication tasks. The data transfer; non-deterministic (LabVIEW Shared Variable, Low Level Protocols (TCP/UDP), Data Socket); deterministic (NI Time-Triggered Variables, Reflective Memory). The remote application automation (VI Server). Communication tasks (data streaming, remote user interface, automating execution of remote system, Closed-loop control over Ethernet).</p> <p>Laboratory: Practical aspects of DMS network programming in the LabVIEW environment. Analysis of the design task, determining the requirements for the system, design stages. Preparation of applications that control the transfer of measurement results between computers in the network, using the functions from the Data Communication palette.</p> <p>Launch of SRSP built on the basis of one of the following technologies: Data Socket Write-Read, TCP Open-Close Connection, Network Streams, Shared Variables.</p> | | | | | | | | | | | |
|--|--|-------------------------------|--|--------------------------|--|-------------------------------|----------------------------------|---|-------|----------------------|----------------------------------|-------|
| Prerequisites and co-requisites | | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1"> <thead> <tr> <th data-bbox="453 828 794 857">Subject passing criteria</th> <th data-bbox="799 828 1141 857">Passing threshold</th> <th data-bbox="1145 828 1493 857">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 864 794 893">Laboratory - running application</td> <td data-bbox="799 864 1141 893">60.0%</td> <td data-bbox="1145 864 1493 893">80.0%</td> </tr> <tr> <td data-bbox="453 900 794 929">Lecture - test</td> <td data-bbox="799 900 1141 929">60.0%</td> <td data-bbox="1145 900 1493 929">20.0%</td> </tr> </tbody> </table> | | | Subject passing criteria | Passing threshold | Percentage of the final grade | Laboratory - running application | 60.0% | 80.0% | Lecture - test | 60.0% | 20.0% |
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| Laboratory - running application | 60.0% | 80.0% | | | | | | | | | | |
| Lecture - test | 60.0% | 20.0% | | | | | | | | | | |
| Recommended reading | <table border="1"> <tbody> <tr> <td data-bbox="453 940 794 1133">Basic literature</td> <td colspan="2" data-bbox="799 940 1493 1133"> <ol style="list-style-type: none"> 1. Winiiecki 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. Haasz, V., ed. Advanced Distributed Measuring Systems: Exhibits of Application. Vol. 8. River Publishers, 2012. </td> </tr> <tr> <td data-bbox="453 1140 794 1169">Supplementary literature</td> <td colspan="2" data-bbox="799 1140 1493 1169">Wells L.: LabVIEW Student Edition User's Guide, Prentice Hall. 2010</td> </tr> <tr> <td data-bbox="453 1176 794 1205">eResources addresses</td> <td colspan="2" data-bbox="799 1176 1493 1205">Adresy na platformie eNauczanie:</td> </tr> </tbody> </table> | | | Basic literature | <ol style="list-style-type: none"> 1. Winiiecki 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. Haasz, V., ed. Advanced Distributed Measuring Systems: Exhibits of Application. Vol. 8. River Publishers, 2012. | | Supplementary literature | Wells L.: LabVIEW Student Edition User's Guide, Prentice Hall. 2010 | | eResources addresses | Adresy na platformie eNauczanie: | |
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| Example issues/ example questions/ tasks being completed | <ol style="list-style-type: none"> 1. Characterize a DMS concept. 2. Describe an exemplary structure of the DMS. 3. List communication methods using in the DMS. 4. Describe features of Data Socket Technology 5. Describe features of TCP/IP Technology 6. Describe features of LabVIEW Shared Variable 7. Describe features of Network Data Streaming <p>The student designs the DMS in group. Starts the application that controls the transfer of measurement results between computers in the network, which is presented during a short presentation.</p> | | | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | | | |