GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Electronic Systems Programming and Organization, PG_00048813 | | |
| Field of study | Electronics and Telecommunications | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | 2025/2026 |
| Education level | first-cycle studies | Subject group | Optional subject group<br>Subject group related to scientific research in the field of study |
| 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 | 4.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Department of Metrology and Optoelectronics -> Faculty of Electronics, Telecommunications and Informatics | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Grzegorz Lentka | |
| | Teachers | dr hab. inż. Grzegorz Lentka | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 0.0 | 15.0 | 0.0 | 0.0 | 45 |

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 | 45 | 4.0 | 51.0 | 100 |

**Subject objectives**

Getting familiar with hardware components of electronic systems, layers of electronic system integration, methods of system integration on the basis of available hardware modules and own software.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment | Creates user interfeces using selected programming environments. Organizes systems on the basis of available hardware modules and own software. Selects and uses technologies DDE, ActiveX, COM. Integrates systems based on TCP/IP protocol. Uses virtual instruments to develop and test software and systems. | [SU4] Assessment of ability to use methods and tools |
| [K6_W04] knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices | Student presents layered model of electronic system and splits standalone instruments and virtualinstruments. Differentiates hardware components of electronic systems. Classifies layers of electronic system integration. | [SW1] Assessment of factual knowledge |

<table>
<tr><td>Subject contents</td><td>1. Introduction: course outline, course grading, references. 2. Layered model of electronic system. 3. Standalone instruments and virtual instruments. 4. Hardware components of electronic systems. Multifunction data acquisition cards (DAQ). 5. Specialized DAQ cards synchronous sampling DAQ cards. 6. Advanced triggering on DAQ cards. Connecting and synchronizing multiple DAQ cards. 7. Standalone measurement and control modules. Autonomous instruments 8. Signal conditioning systems on the example of SCXI. 9. Modular standards: cPCI/PXI, VME/VXI/MXI 10. Layers of electronic system integration - interface layer (specialized and network). 11. SCPI language as an example of standardization of device messages of multi-interface systems 12. VISA uniform software interface of interface systems 13. IVI driver technique definition of equivalent class of measurement instruments. 14. Configuration and management of device driver on the example of the Measurement and Automation Explorer. 15. Labview environment the use of graphic language to integrate hard-ware and software of systems. 16. LabView project hierarchization the use of library modules, own library design. 17. Execution time optimalization in LabView - LabView RT 18. Methodology of software development with LabWindowsCVI 19. The rules of virtual instruments development in LabWindows/CVI. 20. System development and testing with simulated virtual instruments. 21. Hardware modules for measurement and control programming in Lab-Windows/CVI and LabView 22. Survey on other graphical environments: HP VEE, DasyLAB 23. Development of industrial applications with Lookout and InTouch 24. Electronic systems user interface development using high level language environment on the example of MS Visual C++ 25. Hardware modules programming using MS VC++. 26. DDE protocol organisation 27. The use of DDE for electronic system programming. 28. ActiveX and COM techniques survey in high level environments 29. ActiveX controls integration in electronic systems software. 30. Communication in electronic system using TCP/IP protocol in high level environments. 31. Distributed systems integration using TCP/IP in high level languages.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>No requirements</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>Lab exercises</td><td>0.0%</td><td>30.0%</td></tr>
<tr><td>Activity/Homeworks</td><td>0.0%</td><td>10.0%</td></tr>
<tr><td>Exam</td><td>40.0%</td><td>60.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. W. Nawrocki: Komputerowe systemy pomiarowe, WKiŁ 2006 2. W. Winiecki: Organizacja komputerowych systemów pomiarowych, Oficyna Wydawnicza PW 1997</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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