

Software for measurement and control equipment - opis przedmiotu

| Informacje ogólne | |
|---------------------|--|
| Nazwa przedmiotu | Software for measurement and control equipment |
| Kod przedmiotu | 11.3-WE-INFP-SoMaCE-Er |
| Wydział | Wydział Nauk Inżynieryjno-Technicznych |
| Kierunek | Informatyka |
| Profil | ogólnoakademicki |
| Rodzaj studiów | Program Erasmus pierwszego stopnia |
| Semestr rozpoczęcia | semestr zimowy 2021/2022 |

| Informacje o przedmiocie | |
|---------------------------------|--------------------------------|
| Semestr | 6 |
| Liczba punktów ECTS do zdobycia | 4 |
| Typ przedmiotu | obowiązkowy |
| Język nauczania | angielski |
| Sylabus opracował | • dr inż. Leszek Furmankiewicz |

| Formy zajęć | | | | | |
|--------------|---|--|--|---|---------------------|
| Forma zajęć | Liczba godzin w semestrze (stacjonarne) | Liczba godzin w tygodniu (stacjonarne) | Liczba godzin w semestrze (niestacjonarne) | Liczba godzin w tygodniu (niestacjonarne) | Forma zaliczenia |
| Wykład | 15 | 1 | - | - | Zaliczenie na ocenę |
| Laboratorium | 30 | 2 | - | - | Zaliczenie na ocenę |

Cel przedmiotu

To provide knowledge about organization of measurement systems and measurement and control systems.

To provide knowledge about structures, principles of work and properties of measurement system elements.

Forming the design skills of communication and visualization software for measurement systems and measurement and control systems

Wymagania wstępne

Principles of programming, computer networks, Computer-aided design, Industrial computer networks

Zakres tematyczny

Measurement and control systems - introduction. Classification of measuring systems. Structure and organization of measuring and control systems. Algorithm of measuring system. Selection of programming language and computer aided design tools.

Data transmission standards in measuring systems. Definition and classification of the interface. Interfaces used in measuring systems. Serial interfaces: RS - 232, RS - 422, RS - 485, Serial interface programming. Parallel interface IEEE 488: principal tags of IEEE 488 standard, bus of the interface, state of work reporting. IEEE 488.2 standard. IEEE 488.2 controller programming and IEEE 488.2 driver functions. IO-Link interface.

Data acquisition systems. Classification and basic functional blocks of the data acquisition systems. Data acquisition systems programming, description of the software functions.

SCPI standard. SCPI device model, structure of commands, trigger system, status system. Profile of commands for example devices.

Software development environments for measuring and control systems programming. Software development environments: LabWindows, LabView, Keysight Vee. VISA I/O library. Software drivers VXIplug&play. IVI drivers.

Virtual measurement instruments. The definition, structure and basic tags of virtual instruments. Virtual instruments programming. Examples of virtual instruments.

Programmable Automation Controllers (PAC). PAC in measuring and control systems as an example of B&R systems. Hardware and software architecture of PAC. Automation Studio - integrated software development environment. Process visualization in PAC.

Internet technologies in measurement and control systems. Embedded WWW servers. Hardware and software profiles of chosen embedded WWW servers.

Metody kształcenia

Lecture, laboratory exercises.

Efekty uczenia się i metody weryfikacji osiągnięcia efektów uczenia się

| Opis efektu | Symbolikę efektów | Metody weryfikacji | Forma zajęć |
|--|-------------------|---|----------------|
| Can design visualization software for measurement systems with the application of dedicated programming environments | | • obserwacje i ocena umiejętności praktycznych studenta | • Laboratorium |
| Can select measurement systems programming tools | | • kolokwium | • Wykład |
| Can design communication software for measurement systems based on fundamental communication interfaces | | • obserwacje i ocena umiejętności praktycznych studenta | • Laboratorium |
| Understands organization principles of measurement systems and operation principles of measurement systems elements | | • kolokwium | • Wykład |

Warunki zaliczenia

Lecture – the passing condition is to obtain a positive mark from the final test.

Laboratory – the passing condition is to obtain positive marks from all laboratory exercises to be planned during the semester.

Literatura podstawowa

1. Mielczarek W.: *Measuring Instruments and Systems with SCPI Compatibility*, Helion, Gliwice 1999 (in Polish).
2. Lesiak P., Świsulski D.: *Computer Measuring Technique in Examples*, PAK, Warsaw, 2002 (in Polish).
3. Nawrocki W.: *Measurement Systems and Sensors*, Artech, House, Norwood, 2005.
4. Rak R., J.: *Virtual Measuring Instrument - Real Tool of Present Metrology*, Warsaw University of Technology Press, Warsaw, 2003 (in Polish).
5. Nawrocki W.: *Distributed Measuring Systems*, WKŁ, Warsaw 2006 (in Polish).
6. Bentley J. P.: *Principles of Measurement Systems*, Pearson Education Limited, Harlow, England, 2005.
7. Caristi A., J.: *IEEE-488 General Purpose Instrumentation Bus Manual*, Academic Press, INC., San Diego, California, 1992.
8. Johnson G.W., Jennings R.: *LabView Graphical Programming*, MacGraw-Hill, New York, 2006.
9. Khalid Shahid R.: *LabWindows/CVI Programming for Beginners*. Prentice Hall, 2000.

Literatura uzupełniająca

Uwagi

Zmodyfikowane przez dr inż. Leszek Furmankiewicz (ostatnia modyfikacja: 15-07-2021 08:40)

Wygenerowano automatycznie z systemu SylabUZ