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| <b>The Faculty of:</b>          | Faculty of Electrical Engineering and Informatics |
| <b>Field of study:</b>          | Computer Engineering (EF)                         |
| <b>Speciality:</b>              | FZA   |
| <b>Study degree (BSc, MSc):</b> | Bsc, , first circle part time studies             |

### COURSE UNIT DESCRIPTION

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| <b>Course title:</b>   | Process visualization and archiving of process data |
| <b>Lecturer responsible for course:</b>                            | Marcin Bednarek, PhD                                |
| <b>Contacts: phone:</b> +48178651543                               | <b>e-mail:</b> bednarek@prz.rzeszow.pl              |
| <b>Department :</b> Department of Computer and Control Engineering |   |

| Semester | Weekly load | Type of classes |                       |               |           | Number of ECTS credits |
|----------|-------------|-----------------|-----------------------|---------------|-----------|------------------------|
|          |             | L Lectures      | C Theoretical Classes | Lb Laboratory | P Project |                        |
| 8        | 1,67        | 10              |                       | 10            | 5         | 4                      |

| Course description   |
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| <p><b>Lecture:</b><br/>           Distributed control systems DCS and SCADA. Architecture – subsystems and communication networks. DCS Freelance ABB. AC 800F process station. Modules overview. IEC 61131. Engineer package – Control Builder F. Configuration, resources, tasks, programs. Data types, variable. Programming languages: FBD, ST, LD, IL. Standard function and function blocks. Visualization planning and designing. Process station emulator. Examples of control programs (FBD, ST) and visualization. Operator action. Freelance Graphics Editor. Static and movable graphic symbols. Faceplates. Standard displays – overview display, group display , trend display, alarms. DigiVis package software. SCADA systems and PLCs. Wonderware package. Graphic displays – InTouch. Scripts. Examples. Graphic symbols. Alarms and trends. Communication: Modbus (RS-485), Modbus TCP (Ethernet). Historian. Data compression. Web tools. DCS – examples. Future trends. Archiving of process data – Industrial SQL (Wonderware).</p> |
| <p><b>Classes:</b></p>   |
| <p><b>Laboratory:</b><br/>           Network configuration (Freelance AC800F operation). Hardware structure configuration. Commissioning. Sorter unit – visualization and control. Alarm system – visualization and control. Configuration of communication between InTouch and controller, visualization.</p>   |
| <p><b>Project:</b><br/>           Designing of visualization systems, control program (IEC 61131 languages - FBD, ST) and simulation.</p>  |

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| <b>Objectives of the course</b> |
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| General knowledge about design, configuration and programming of visualization in distributed control systems. |
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| <b>Examination method</b> |
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| Computer solutions of two problems, written test, oral discussion. |
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| <b>Bibliography</b> |
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| <ol style="list-style-type: none"><li>1. Kasprzyk J.: Programowanie sterowników przemysłowych. WNT, Warszawa 2006.</li><li>2. Bednarek M.: Wizualizacja procesów – laboratorium. Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów 2004.</li><li>3. Documentation (help) of Digimatik, Freelance, AC800F systems and InTouch package software.</li><li>4. Legierski T.: Programowanie sterowników PLC. Wyd. J. Skalmierski, Gliwice 1998.</li><li>5. Trybus L.: Rozproszone systemy sterowania DCS. PAK, 2006, nr 1, 26–296.</li><li>6. Trybus L.: Systemy sterowania w energetyce. XV KKA, Warszawa 2005, t. 1, 29–40.</li><li>7. Trybus L.: Funkcje stacji operatorskich i serwerów archiwizujących w systemach sterowania. Control Engineering Polska, 2006, nr 1, 2.</li><li>8. Kwaśniewski J.: Programmable logic controllers. ROMA–POL, Kraków 2002.</li></ol> |
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| <b>Lecturer signature</b>           |  |
| <b>Head of Department signature</b> |  |
| <b>Dean signature</b>               |  |