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| **WSB University Branch/Department in Jaworzno** |
| **Field of study: Computer Science** |
| **Subject: Fundamentals of Industrial Automation** |
| **Educational profile: practical** |
| **Level of education: undergraduate studies** |
| **Number of hours per semester** | 1 | 2 | 3 | 4 |
| I | II | III | IV | V | VI | VII |
| **Full-time studies**(w/w/lab/pr/e)\* |  |  |  |  | **16w** |  |  |
| **Part-time studies**(w/æw/lab/pr/e) |  |  |  |  | **12w** |  |  |
| **LECTURER** | Dr.-Ing. Paweł  |
| **FORM OF ACTIVITIES** | Lecture, consultation |
| **SUBJECT OBJECTIVES** | Introduce knowledge of the basics of industrial automation and CE standards and directives. |
| **Effect** **DIRECT** | **Reference to effects****PRK** | **Description of the learning outcomes** | **Means of verification of the effect** |
| **Knowledge** |
| INF\_W03 | P6S\_WG | Has the knowledge to explain the phenomena occurring in the electrical circuit under study and to quantify and qualify them,  | Theoretical test |
| INF\_W03 | P6S\_WG | Knows the basic issues related to electrical and electronic measurements, -Knows the principle of operation of the known instruments and electronic circuits and measurement systems, including the use of simulation environments for the operation of electrical circuits, | Theoretical test |
| INF\_W11 | P6S\_WG | Has knowledge of the basics of the EU directives on certification  | Theoretical test |
| **Skills** |
| INF\_U08 | P6S\_UU | He/she is able to independently plan and implement his/her own lifelong learning with emphasis on continuous improvement of professional competences and certification of skills in the field of industrial automation, improve skills by setting directions for his/her own development. | Observation during lecture, discussion with students |
| **Social competence** |
| INF\_K01 | P6S\_KK  | He is ready to critically evaluate his knowledge and perceived content regarding computer science achievements. | Observation during classes |
| INF\_K02 | P6S\_KK  | Is prepared to recognise the importance of scientific knowledge of technical computing and telecommunications in solving practical problems and to consult experts when having difficulty in solving a problem independently. | Observation during classes |
| **Student workload (in teaching hours 1h =45 minutes)\*\***  |
| **Stationary**attendance at lectures = 16participation in the lab = preparation for lab = lecture preparation = 9.5exam preparation = 10implementation of project tasks = e-learning = 0credit/examination = 2other (specify) = 2 consultations**TOTAL: 50****Number of ECTS credits: 2****including in practical classes:** | **Part-time**attendance at lectures = 12participation in the lab = preparation for lab = lecture preparation =13.5exam preparation = 10implementation of project tasks = e-learning = 0credit/examination = 2other (specify) = 2 consultations**TOTAL: 50****Number of ECTS credits: 2****including in practical classes:** |
| **PREREQUISITES** | Basic knowledge of mathematics, physics and electrical engineering |
| **SUBJECT CONTENT****(**broken down into face-to-face and e-learning classes) | Content implemented in form 1. Issues of safe working with electrical equipment and machinery.
2. Basic electrical concepts. Physical values and methods of measurement.
3. Construction of relay automation systems. Electrical diagrams.
4. Control, input and output devices and systems - Micro800
5. The elementary requirements set out in the Machinery Directive.

Content delivered via e-learning:Not applicable. |
| **LITERATURE** **COMPULSORY** | 1. [Micro800 Programmable Controllers General Instructions Reference Manual](https://literature.rockwellautomation.com/idc/groups/literature/documents/rm/2080-rm001_-en-e.pdf)
2. [Micro830, Micro850, and Micro870 Programmable Controllers User Manual](https://literature.rockwellautomation.com/idc/groups/literature/documents/um/2080-um002_-en-e.pdf)
3. Krieser W.: Contact electrical control systems, 2nd edition, Helion S.A., 2023
 |
| **LITERATURE** **SUPPLEMENTARY** | 1. Gibilisco S.: Electronic and electrical schematics. A guide for beginners. Edition IV, Helion S.A., 2023
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| **TEACHING METHODS** | In direct form:Lecture, discussion, laboratory exercises |
| **LEARNING AIDS** | Connected Components Workbench v 21.03, Demonstration cases: Micro800 Training Box - PL\_KTC\_M800TB\_xx, Global Component Demo - PL\_KTC\_GLOBALCOMPONENT\_xx, Measuring Instruments |
| **PROJECT****(insofar as it is carried out in the course module)** | Within the framework of this subject students do not make a project, but they present for each laboratory lesson a report from the exercise in the form of a shortened record of the project documentation including the solution of the laboratory task. |
| **FORM AND CONDITIONS OF PASSING** | Examination: Theoretical test |

*\* W - lecture, ćw - exercise, lab - laboratory, pro - project, e-learning*