



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Visualization of industrial processes

Course

Field of study

Automatic Control and Robotics

Area of study (specialization)

Automation and robotics systems

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

12

Tutorials

Laboratory classes

12

Projects/seminars

Other (e.g. online)

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

dr inż. Piotr Sauer

email: piotr.Sauer@put.poznan.pl

phone: 61 665 2117

Faculty of Control, Robotics and Electrical
Engineering

ul. Piotrowo 3a, 60-965 Poznań

Responsible for the course/lecturer:



Prerequisites

The student starting this subject should have a basic knowledge of automation. He should also have the ability to solve basic problems in automation and programming of PLC controllers as well as the ability to obtain information from specified sources. He should also understand the need to broaden his competences and be ready to cooperate within a team. In addition, in terms of social competences, students must present attitudes such as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, and respect for other people.

Course objective

To provide students with basic knowledge of IT systems necessary for the design of automation systems and the visualization of industrial processes. To acquaint students with different tools for visualization of industrial processes. Developing skills to solve design problems related to automation systems. Developing students' teamwork skills.

Course-related learning outcomes

Knowledge

1. has specialist knowledge of distributed automation systems and network techniques, [K2_W3]
2. has knowledge of development trends and the most important achievements in the field of visualization of automation systems, [K2_W12]
3. has knowledge to understand the economic and social aspects of engineering activities and the possibilities of their application in practice, [K2_W14]

Skills

1. is able to notice non-technical aspects when designing visualization of industrial processes, [K2_U14]
2. can assess the suitability of new technologies used to monitor automation systems, [K2_U16]
3. is able to identify elements and control systems, design visualization taking into account non-technical aspects, [K2_U21]
4. is able to critically evaluate and select methods and tools for solving tasks in the field of visualization of production processes, [K2_U22]

Social competences

1. is aware of the responsibility for own work and willingness to comply with the principles of teamwork and taking responsibility for jointly implemented tasks, [K2_K3]
2. is aware of the need for a professional approach to technical issues, [K2_K4]
3. can think and act in a creative way, [K2_K5]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is verified by the colloquium carried out at the last lecture. The



test consists of 10-12 questions. Passing threshold: 50% of points. Final issues on the basis of which questions are prepared will be sent to students by e-mail.

Skills acquired as part of the laboratory classes are verified on the basis of the completed visualization process of the industrial process, including logging, alerting and drawing trends. The pass threshold covers 50% of the points obtained from the project evaluation (application and documentation evaluation).

Programme content

The lecture program includes the following topics:

1. Introduction: discussion of concepts in the field of automation and process control techniques, general requirements for automation and process control devices.
2. Modeling of automation systems: mathematical description of continuous automatic control systems.
3. Introduction to production process visualization systems on the example of Wonderware software: discussion of SCADA / HMI systems, discussion of the construction and functionality of the Wonderware platform and its integration with applications enabling production management.
4. InTouch as an environment enabling the design of visualizations of industrial processes: discussion of the WindowMaker design environment and variables used in the design of visualizations; integration of the HMI InTouch application and the ArchestrA environment (stand-alone applications, managed, published); managing InTouch applications (creating new applications, importing existing applications, exporting and publishing); using ArchestrA symbols (creating and managing symbols, using the ArchestrA Symbol Editor tool, configuring element and symbol properties).
5. Alarming: basic information about alarms and events, alarm configuration, displaying current and historical alarms, acknowledgment of alarms, analysis of alarm distribution for individual variables, servicing of the alarm database.
6. Security of complex automation systems: discussion of various security levels, such as client station security, Application server security, historical data storage security, communication security with the PLC controller.
7. Communication with external applications and PLCs, DDE protocol, SuitLink, discussion of the OPC server, configuration of communication interfaces enabling connection with a given PLC, definition of variables used for communication with variables of a controller or external application (eg Excel).
8. Comparison of InTouch environment with mapp View visualization technology.

Laboratory classes are conducted in the form of 2-hour exercises, held in a laboratory room, preceded by a 2-hour instructional session at the beginning of the semester (introduction to the InTouch application and mapp View). Exercises are carried out by 2-person teams.



The program of laboratory classes covers the following issues (individual issues are implemented simultaneously by all groups):

1. First steps in the InTouch application: setting up a new application, managing ArchestrA symbols, creating new symbols, creating scripts.
2. A practical introduction to mapp View visualization technology
3. Simulation of the operation of a simple industrial process model: designing a visualization application of a given industrial facility and simulation of its work.

Teaching methods

1. Lecture: multimedia presentation
2. Laboratory classes: solving tasks, practical exercises, discussion, teamwork

Bibliography

Basic

1. Kloust H., Wybrane parametry urządzeń do automatyzacji, Biblioteka COSiW SEP, Warszawa, 2002
2. Williams R., Handbook of SCADA systems, Elsevier Advanced Technology, 1st edition, 2001

Additional

1. Technical documentation of the InTouch application
2. Documentation of the mapp View visualization technology

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	24	1,0
Student's own work (literature studies, preparation for tests, project preparation) ¹	26	1,0

¹ delete or add other activities as appropriate