(*faculty stamp*)

COURSE DESCRIPTION

1. Course title: COMPUTER CONTROLLED SYSTEMS	**2. Course code**
3. Validity of course description: 2012/2013	
4. Level of studies: 1st cycle of higher education	
5. Mode of studies: intramural studies	
6. Field of study AUTOMATICS AND ROBOTICS	(FACULTY SYMBOL) RAU
7. Profile of studies: All-academic	
8. Programme: M-A	
9. Semester: 2	
10. Faculty teaching the course: Institute of Automatic Control, RAu1	
11. Course instructor: Ryszard Jakuszewski, PhD Eng.	
12. Course classification: selective subjects	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: Computer Graphics, Computer Programming, Computer Networks, Operating Systems, Measurement Systems, Databases. It is assumed that the student knowns the basics of computer science. This lecture is suitable for students of all technical branches, which are interested in easy-to-use industrial automation software.	
16. Course objectives: This course is designed primarily for students wanting to create advanced control and process monitoring systems. The students should obtain knowledge of theoretical fundamentals and of practical methods used in modern SCADA systems and industrial automation software.	

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Knowledge and comprehension of the new technologies used in industry process control.	SP	WM	KW_25, K_U22
2.	Knowledge and comprehension of principles for control systems designing using programmable controllers and SCADA systems.	SP	WM	KW_25, K_U22
3.	Knowledge and comprehension of new technologies applied in SCADA systems.	SP	WM	KW_25, K_U22
4.	Skills in creation of applications in Proficy HMI/SCADA – iFIX of GE Fanuc firm.	CL, PS	L	KW_25, K_U22
5.	Skills in creation of recipes and reports using SCADA system and data bases.	CL, PS	L	KW_25, K_U22
6.	Ability to use internet technologies and skills in secure network systems implemented in industry.	CL, PS	L	KW_25, K_U22
7.	Understanding of the necessity for life-long learning, ability to inspire and organize the learning process of other people	CL	L	
8	Ability to cooperate and work in a team taking on different roles.	OS	L	K_K03

18. Teaching modes and hours

Lecture / BA /MA Seminar / Class / Project / Laboratory: 15 / 0 / 0 / 0 / 30

19. Syllabus description:

Lecture:

Lecture

The world's leading industrial automation software solutions, providing process visualization, data acquisition and supervisory control of plant floor operations are discussed and trained during laboratory classes. This solutions give students the power to precisely monitor and control every aspect of manufacturing industry processes, as well as equipment and resources, resulting in faster response to production issues, less waste, improved quality, faster time-to-market with new products and increased profitability.

The specialists who have acquired skills in SCADA systems are looked for in job market all over the world.

The course teaches basic SCADA and HMI topics like: graphic design, data archiving, process database management, driver configuration, reporting, alarm strategies and security.

The course is intended to provide the student a base level of proficiency using some of the American software solutions and more advanced features. VBA scripting is covered primarily as a tool for automating tasks for the operator. The student will also become familiar with some of the tools and concepts available for optimizing and troubleshooting such software.

Basic topics:

- Introduction to Computer Graphics
- Process Database - Development and Management
- Advanced Graphical Objects - Signal Generators
- Picture System Management
- Trending and Archiving of Data
- Industrial Databases (Proficy Historian)
- Implementing Shortcut Keys
- Tag Group Technology
- Scheduling Tasks
- Multilevel Security System
- Communication with PLC Controllers
- Alarming – Defining, Acknowledgement, Viewing and Printing
- Network Solutions – Controlling In Computer Networks
- Visual Basic for Applications in Industry Environment
- Configuring SCDA Systems

More advanced topics:

- Troubleshooting of SCADA Systems
- Windows and SCADA Security
- Recipes In Beer Production
- VisiconX Objects
- Alarm and Event Archiving In Relational Databases
- Electronic Signatures
- Using ActiveX
- Understanding Database Dynamos
- OPC Servers and Clients In SCADA systems
- Introduction to ADO DB and ODBC
- Using SQL Database Tags
- Reporting
- LAN and Auto-Failover Redundancy
- Using Terminal Servers

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Laboratory Topics

1. Animation of graphical objects; Development and management of industrial databases.
2. Signal generators; Tools and methods of picture development.
3. Presenting archived data on charts.
4. Shortcut keys and Tag group techonology.
5. Multilevel security system. Alarams – defining, management, acknowledgement, viewing and printing.
6. Communication with PLC Controllers, ADO DB and ODBC.

20. Examination: no

21. Primary sources:

1. Technical documentations for SCADA systems.
2. R.Jakuszewski, "*Podstawy Programowania Systemów SCADA – Proficy HMI/SCADA iFIX 5.0 PL*", Wydawnictwo Pracowni Komputerowej Jacka Skalmierskiego, Gliwice 2010.
3. Manuals of manufacturers (electronic).

22. Secondary sources:

1. R.Jakuszewski, "*Zagadnienia Zaawansowane Programowania Systemów SCADA – Proficy HMI/SCADA iFIX 5.0 PL*", Wydawnictwo Pracowni Komputerowej Jacka Skalmierskiego, Gliwice 2010.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	15/5
2	Classes	0/0
3	Laboratory	30/10
4	Project	0/0
5	BA/ MA Seminar	0/0
6	Other	10/0
	Total number of hours	55/15

24. Total hours:70

25. Number of ECTS credits: 2

26. Number of ECTS credits allocated for contact hours: 1

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1

26. Comments:

Approved:

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(date, Instructor's signature) (*date , the Director of the Faculty Unit signature)*