COURSE DESCRIPTION CARD - SYLLABUS

Course name
Intelligent buildings and building automation [S1AiR1E>PO1-AwBI]

Course

Field of study
Automatic Control and Robotics

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
english

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Knows and understands to an advanced degree selected facts, objects and phenomena, as well as methods and theories pertaining to them that explain the complex relationships between them, understanding of the basic physical phenomena occurring in and around automation and robotics components and systems. He is able to obtain information from literature, databases and other sources; he has the skills of self-education to improve and update his professional competence.

Course objective

The aim of the course is to familiarize students with the current information systems used in control systems and management of technical equipment of buildings and intelligent buildings, to get acquainted with the current building automation controllers for the management of building facilities , to acquire the ability to program them using intelligent control algorithms

Course-related learning outcomes

Knowledge:
Knows and understands typical engineering technologies, principles and techniques of construction of simple automation and robotics systems; knows and understands the principles of selection of executive

systems, computational units and measurement and control elements and devices [K1_W20 (P6S_WG)].
Is familiar with the current status and latest development trends of the field of automation and robotics [K1_W21 (P6S_WG)].
Knows and understands the fundamental dilemmas of modern civilisation related to the development of automation and robotics [K1_W28 (P6S_WK)].
Skills:
Is able to plan, prepare and simulate the operation of simple automation and robotics systems [K1_U10 (P6S_UW)].
Is able to select the type and parameters of the measurement system, control unit and peripheral and communication modules for the selected application and integrate them in the form of the resulting measurement and control system [K1_U22 (P6S_UW)].
Is able to develop a solution to a simple engineering task and implement, test and run it in a selected programming environment on a PC for selected operating systems [K1_U26 (P6S_UW)].
Social competences:
Is aware of the importance and understands the non-technical aspects and consequences of engineering activities, including their impact on the environment and the related responsibility for decisions; is ready to care for the achievements and traditions of the profession [K1_K2 (P6S_KR)].
Is aware of the need to approach technical issues in a professional manner, to be meticulously familiar with the documentation and the environmental conditions in which the equipment and its components may function; is ready to adhere to the principles of professional ethics and to demand this from others, to respect the diversity of views and cultures [K1_K5 (P6S_KR)].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture
Lecture with multimedia presentation (including: drawings, photos, animations, sound, videos) supplemented by examples given on the blackboard. Initiating discussions during the lecture.
Laboratory.
Working in teams and team programming, performing tasks given by the instructor - practical exercises.

Programme content

Program content: Getting acquainted with the construction, principle of operation of basic building automation interfaces: wired : RS232/422/485 and wireless Z-Wave, ZigBee, Ocean Data. KNX, LCN, LonWorks, BACnet communication protocols. Building systems integration (BMS). HVAC smart building installations. Development of intelligent building. Energy-efficient construction.

Teaching methods

Lecture
Lecture with multimedia presentation (including: drawings, photos, animations, sound, videos) supplemented by examples given on the blackboard. Initiating discussions during the lecture.
Laboratory.
Working in teams and team programming, performing tasks given by the instructor - practical exercises.

Bibliography

Basic

1. Niezabitowska E. (pod redakcją) Budynek Inteligentny - potrzeby użytkownika a standard budynku Inteligentnego?, WPŚ, Gliwice, 2010
2. Mikulik J. Europejska Magistrala Instalacyjna?, Merten, Warszawa 2008
3. Mikulik J., red. Niezabitowska E., „Budynek inteligentny” t. II – „Podstawowe systemy bezpieczeństwa w budynkach inteligentnych” , Wydawnictwo Politechniki Śląskiej, Gliwice, 2005
4. Clements-Croome D., “Intelligent Buildings: design, management and operation”, Thomas Telford LTD, 2004
5. Shengwei Wang, Intelligent Buildings and Building Automation, Routledge 2009
6. John T. Wen, Sandipan Mishra Intelligent Building Control Systems, A Survey of Modern Building, Springer 2018

Additional

1. Mielczarek W. Lokalne interfejsy szeregowe w systemach cyfrowych?, BTC, Legionowo 2008.
2. Mikulik J., „Wybrane zagadnienia zapewnienia bezpieczeństwa i komfortu w budynkach”, Akademia Górniczo-Hutnicza w Krakowie, Kraków, 2008
3. Boroń W., „Bezpieczeństwo zdalnego dostępu do sieci sterowania LonWorks z wykorzystaniem Internetu; Bezpieczeństwo Systemów Komputerowych i Telekomunikacyjnych”, Praca zbiorowa, Wydawnictwo Sotel, Katowice, 1999

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,50