COURSE DESCRIPTION CARD - SYLLABUS

Course name
Intelligent building [S1Eltech1>F-BI]

Course

Field of study
Electrical Engineering

Year/Semester
4/7

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of electrical engineering, electronics, computer science, automation and control, including in building installations. The ability to understand and interpret knowledge provided in class. The ability to effectively self-study in a field related to the chosen field of study. The awareness of the need to expand their competences, readiness to cooperate within a team.

Course objective

Understanding the theoretical and practical problems associated with the construction of elements, sub-assemblies and systems of modern intelligent buildings and the technologies of information transmission used in them. Presentation of the latest solutions in the field of building automation, the possibilities of their application to reduce the exploatation costs of building as well as resource and media management.

Course-related learning outcomes

Knowledge:
1. Has knowledge of the life cycle, principle of operation, design and operation of building automation devices.
2. Knows the technical possibilities of ICT systems and their engineering applications.

3. Knows the structure and operation of electronic devices as well as analog and digital sensors used in building automation systems.

Skills:
1. Is able to develop project documentation for intelligent building installation, based on applicable standards and technical documentation of system components.
2. Is able to assess, compare and evaluate available technical solutions in the field of building automation, due to various utility and economic criteria.
3. Is able to work with technical documentation (eg. datasheets) in order to assess and select appropriate elements for the given project task.

Social competences:
1. Is able to work individually and in a team as well as think and act in an entrepreneurial manner in the field of building engineering and automation.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Knowledge acquired during the lecture is verified by passing the lecture lasting about 45-60 minutes, consisting of test and open questions, variously scored. Passing threshold: 50% of points. The issues on the basis of which questions are prepared will be successively indicated in classes.
Skills acquired as part of the laboratory are verified on the basis of: grades for carrying out design tasks of selected building automation control issues and descriptions of completed exercises. In addition, the following are taken into account for the final evaluation of the laboratories: rewarding the knowledge necessary to implement the problems posed in a given area of laboratory tasks, activity during each class, assessment of knowledge and skills related to the implementation of the exercise task.
In addition, students can get extra points for activity during classes, especially for: offering to discuss additional aspects of an issue, the effectiveness of applying the acquired knowledge when solving a given problem, the ability to cooperate within a team that practically performs a specific task in a laboratory, and aesthetic care of developed tasks.

Programme content

Lecture:
International building automation standards. Methods of sending information in intelligent buildings - EIB (European Installation Bus) / KNX, operating philosophy, components, commissioning, alternative ways of sending information in intelligent buildings. Installation structure - BMCS (Building Management and Control System). Economics of building installations. Methods and modes of temperature control and control based on building automation; Z-Wave technology.
Laboratories:
Acquaintance with selected building automation systems (wired and wireless), control of various elements and installations in the building, such as: lighting, motors, multimedia, HVAC and alarm systems. Support of analog and digital sensors, automation actuators. Implementation of integration of various systems and visualization of system work.

Teaching methods

Lecture: multimedia presentations (including drawings, photos, diagrams), theory presented in close connection with practice. Utilizing students "knowledge of other subjects, initiating discussions, asking questions to increase students" activity and independence.
Laboratories: Implementation of the set project tasks on mock-ups of the actual selected system in the laboratory. Analysis / discussion of various methods (including unconventional) to solve the problem; work in groups.

Bibliography

Basic
1. Niezabitowska E.: Budynek inteligentny. Tom I: Potrzeby użytkownika a standard budynku inteligentnego, Wyd. Politechniki Śląskiej, Gliwice 2010.
2. Mikulik J.: Budynek inteligentny. Tom II: Podstawowe systemy bezpieczeństwa w budynkach

inteligentnych, Wyd. Politechniki Śląskiej, Gliwice 2005.
3. Mikulik J.: Inteligentne budynki: Teoria i praktyka, Kraków: Oficyna Wydawnicza, 2010.
4. Duszczyk K., Dubrawski A., Dubrawski A., Pawlik M., Szafrański M.: Inteligentny budynek: poradnik projektanta, instalatora i użytkownika, Warszawa: PWN, 2019.
Additional
1. Borkowski P.: Podstawy integracji systemów zarządzania w obrębie obiektu, WNT, 2009.
2. http://www.knx.org
3. http://www.emiter.net
4. http://www.smartech.com.pl
5. Prace dyplomowe IEiEP.
6. Czasopismo ‘Inteligentny budynek’.
7. Horyński M., Pietrzyk W.: Współpraca komponentów inteligentnego budynków sterowaniu oświetleniem, TEKA KOMISJI MOTORYZACJI I ENERGETYKI ROLNICTWA PAN, 2011, vol. 11, s. 135-142
8. Dybowski P., Kurz D.: The analysis of the possibilities to control temperature in a building using the TELETASK system automation, Przegląd Elektrotechniczny, 94/4, 2018, Warszawa, Polska, pp. 180 – 186.
9. Kurz D.: Porównanie systemów automatyki budynkowej dla domu jednorodzinnego, Poznan University of Technology Academic Journals. Electrical Engineering, vol. 92, 2017, Poznań, Polska, str. 365 – 373.
10. Internet: specjalistyczna literatura tematu, karty katalogowe, normy.

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	2,00