STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Intelligent building**		Code **1010321371010306003**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **general academic**	Year /Semester **4 / 7**
Elective path/specialty **Electrical and Computer Systems in**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **15** Classes: **-** Laboratory: **-** Project/seminars: **30**		No. of credits **5**
Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **university-wide**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **5 100%** **5 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of electrical engineering, electronics and information technology, including building systems.
2	**Skills**	The ability to understand and interpret knowledge conveyed in the classroom. Ability to effectively self-education in a field related to the chosen field of study.
3	**Social competencies**	Is aware of the need to broaden their competence, willingness to work together as a team.

Assumptions and objectives of the course:

In-depth knowledge of the theoretical and practical problems associated with the construction of components, subassemblies and systems of modern buildings "smart".

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Describe the construction and operation of the basic elements and components of microprocessor and electrical equipment in buildings and prepare the selected system design methodology - [K_W08+]
2. Explain the operation of building energy systems, microprocessor and computer - [K_W10++, K_W14+]

Skills:

1. Apply the knowledge in the scope of electric and computer theories of arrangements in buildings in order to carry documentation out of performance of a task engineering - [K_U07+++, K_U12+]
2. Obtain information from the literature and the Internet, work individually, independently solve problems in the theory of analysis and design of systems and equipment in the construction industry - [K_U17++]

Social competencies:

1. Able to think and act in an entrepreneurial manner in the area of systems analysis and systems in buildings - [K_K04++]

Assessment methods of study outcomes

Lecture:
- assess the knowledge and skills listed on the completion of the writing.

Exercise Design:
- test and favoring knowledge necessary for the accomplishment of the problems in the area of design tasks,
- continuous evaluation for each course - rewarding gain skills they met the principles and methods,
- assessment of knowledge and skills related to the implementation of the project tasks.

Get extra points for the activity in the classroom, and in particular for:
- propose to discuss additional aspects of the subject,
- the effectiveness of the application of the knowledge gained during solving the given problem,
- subsequent to the improvement of teaching materials,
- developed aesthetic care tasks - in the self-study.

Course description

Applied methods of education:

Lecture: Historical Overview. International Standards of building automation. Ways to transfer information in intelligent buildings - EIB (European Installation Bus) / KNX, philosophy, components, operation, alternative ways to transfer information in intelligent buildings. The structure of the installation ? BMCS (Building Management and Control System). The economics of building installations. Lecture with multimedia presentation (including: drawings, photos) run in an interactive way with the formulation of questions to a group of students, theory presented in close association with practice.

Project: Implementation of the goals set design mockups on a real chosen system in the laboratory. Analysis / discussion of various methods (including nonconventional) problem solving, group work.

Update 2017: Methods and modes of monitoring and temperature control based on building automation; Z-Wave technology.

Basic bibliography:

1. Niezabitowska E.: Budynek inteligentny. Tom I: Potrzeby użytkownika a standard budynku inteligentnego, Wyd. Politechniki Śląskiej, Gliwice 2014.
2. Mikulik J.: Budynek inteligentny. Tom II: Podstawowe systemy bezpieczeństwa w budynkach inteligentnych, Wyd. Politechniki Śląskiej, Gliwice 2014.
3. Mikulik J.: Inteligentne budynki: Teoria i praktyka, Kraków: Oficyna Wydawnicza, 2010.
4. Nawrocki M.: "Europejska magistrala instalacyjna EIB".
5. 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
6. Horyński M., Majcher J.: Automatyka budynkowa jako element bezpieczeństwa, TTS TECHNIKA TRANSPORTU SZYNOWEGO, 2016, nr 12, s. 425-428
7. Głuchy D., Kurz D., Trzmiel G.: Energy consumption by the Teletask Building Management System, XV International Conference CPEE ? Computational Problems of Electrical Engineering, 9 ? 12 wrzesień 2014, Terchová - Vrátna dolina, Slovak Republic, pp. 41 ? 41
8. Horyński M.: Inteligentne instalacje budynkowe a sprawa polska, NAPĘDY I STEROWANIE - MIESIĘCZNIK NAUKOWO-TECHNICZNY, 2013, nr 12, s. 78-81
9. Horyński M., Styła S.: Intelligent control for HVAC devices in LCN system, TEKA KOMISJI MOTORYZACJI I ENERGETYKI ROLNICTWA PAN,2013, nr 1, vol. 13, s. 57-63

Additional bibliography:

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

Result of average student's workload

Activity	Time (working hours)

1. Participation in lecture classes	15
2. Participation in design classes	30
3. Participation in consultation concerning the lecture	12
4. Participation in consultation concerning the project	12
5. Preparation for the test/exam	24
6. Test/exam	4
7. Preparing the design description	30

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	127	5
Contact hours	73	3
Practical activities	72	3