## STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | Code |
|---|---|
| **Intelligent management of energy-saving building** | **1010311441010328879** |

| Field of study | Profile of study (general academic, practical) | Year /Semester |
|---|---|---|
| **Power Engineering** | **(brak)** | **2 / 4** |

| Elective path/specialty | Subject offered in: | Course (compulsory, elective) |
|---|---|---|
| **-** | **Polish** | **obligatory** |

| Cycle of study: | Form of study (full-time, part-time) |
|---|---|
| **First-cycle studies** | **full-time** |

| No. of hours | | | | No. of credits |
|---|---|---|---|---|
| Lecture: **15** | Classes: **-** | Laboratory: **30** | Project/seminars: **-** | **3** |

| Status of the course in the study program (Basic, major, other) | (university-wide, from another field) |
|---|---|
| **(brak)** | **(brak)** |

| Education areas and fields of science and art | ECTS distribution (number and %**)** |
|---|---|
| **technical sciences** | **3   100%** |

### Responsible for subject / lecturer:

dr inż. Grzegorz Trzmiel
email: Grzegorz.Trzmiel@put.poznan.pl
tel. 616652693
Wydział Elektryczny
ul. Piotrowo 3A 60-965 Poznań

### Prerequisites  in terms of knowledge, skills and social competencies:

| 1 | **Knowledge** | Basic knowledge of electrical engineering, electronics and information technology, including building installations. |
|---|---|---|
| 2 | **Skills** | The ability to understand and interpret knowledge transmitted in the classroom. The ability to effectively self-education in a field related to the chosen field of study. |
| 3 | **Social competencies** | Awareness of the need to broaden their competence, their willingness to cooperate within the team. |

### Assumptions and objectives of the course:

Advanced knowledge of theoretical and practical problems associated with the construction components, subassemblies and systems for modern buildings "smart" and alarm systems in terms of energy efficiency.

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

### Knowledge:

1.  He has ordered and theoretically founded knowledge in the design of electrical equipment and systems including their impact on the environment. - [K_W10+, K_W18+]

2. Able to characterize the structure and principles of basic systems and equipment in buildings and prepare design methodology selected installations. - [K_W14+]

3. Knowledgeable about the impact of intelligent building management for energy saving. - [K_W18++]

### Skills:

1. Can apply the knowledge of electrical systems of cooperation and information in buildings with their other systems in order to prepare technical documentation.  - [K_U08++, K_U07+]

2.  Knows how to obtain information from the literature and the Internet, work individually and independently solve problems in the theory of analysis and design of systems and equipment in construction.  - [K_U08++]

3. Able to estimate capital and operating costs of different solutions for the acquisition and management of intelligent energy consumption.  - [K_U07++, K_U09+]

### Social competencies:

1. He can think and act in an entrepreneurial manner in the area of systems analysis and systems in buildings. - [K_K02+]

### Assessment  methods of study outcomes

Lecture:

- Assess the knowledge and skills shown on the written test.

Laboratories:

- Test and rewarding knowledge necessary for the accomplishment of the problems in the area of project tasks,

- Continuous assessment for each course - rewarding the increase in the ability to use principles and methods have met.

- Assess the knowledge and skills related to the implementation of the project tasks.

Get extra points for activity in the classroom, and in particular for:

- Proposing to discuss additional aspects of the subject,

- The effectiveness of applying knowledge when solving a given problem,

- Comments relating to the improvement of teaching materials,

- Developed aesthetic care tasks - as part of self-study.

## Course description

Lecture: Standards for electrical engineering, computer science, telecommunications and electromagnetic compatibility in building intelligent and alarm systems. Principles of design and control systems in intelligent buildings. Development trends to transmit information and control in intelligent buildings. Issues of alarm systems. Aspect of the energy efficiency of buildings intelligent.

Laboratory: Laboratory building and designing intelligent systems, including systems and equipment energy-saving building. Embodiments. Calculation of energy demand in intelligent buildings.

### Basic bibliography:

1. Niezabitowska E., Budynek Inteligentny, t. I-II, Potrzeby użytkownika a standard budynku inteligentnego, Wydawnictwo Politechniki Śląskiej, Gliwice, 2010.

2. Kamińska A., Muszyński L., Boruta Z., Radajewski R., Nowoczesne techniki w projektowaniu energooszczędnych instalacji budynkowych w systemie KNX, Wyd. Politechniki Poznańskiej, Poznań, 2011.

3. Nawrocki W., Sensory i systemy pomiarowe, Wydawnictwo Politechniki Poznańskiej, Poznań, 2006.

4. Niezabitowska E., Budynek Inteligentny, t. II, Podstawowe systemy bezpieczeństwa w budynkach inteligentnych, Wydawnictwo Politechniki Śląskiej, Gliwice, 2010.

5. Patykiewicz P., Nowoczesna instalacja elektryczna w inteligentnym budynku, COSiW SEP, Warszawa 2001.

6. Stanisławek R., Integracja systemów bezpieczeństwa w obiekcie, Systemy Alarmowe, 2002.

### Additional bibliography:

1. Petykiewicz P., Nowoczesna instalacja elektryczna w inteligentnym budynku, COSiW SEP, Warszawa, 2001.

2. Markiewicz H., Instalacje elektryczne, Wydawnictwo Naukowo-Techniczne, Warszawa, 2006.

3. Borkowski P. i inni, Podstawy integracji systemów zarządzania zasobami w obrębie obiektu, Wydawnictwo Naukowo-Techniczne Sp.z.o.o, Warszawa, 2009

4. Wang S., Intelligent Buildings and Building Automation, Spon Press, Nowy Jork, 2010

5. Zimny J., Odnawialne źródła energii w budownictwie niskoenergetycznym, Wydawnictwa Naukowo-Techniczne, Kraków-Warszawa, 2010

6. Pilich B, Engineering Smart Houses, Lyngby, 2004.

7. www.satel.pl

8. Internet.

## Result of average student's workload

| Activity | Time (working hours) |
|---|---|
| 1. participation in class lecture | 15 |
| 2. participation in laboratory classes | 30 |
| 3. consultation on the lecture | 5 |
| 4. consultation on the laboratory | 10 |
| 5. preparation for the final test of the lecture | 5 |
| 6. final test of the lecture | 2 |
| 7. preparation for laboratory exercises | 10 |
| 8. preparation of reports | 15 |

## Student's workload

| Source of workload | hours | ECTS |
|---|---|---|

| Total workload | 92 | 3 |
|---|---|---|
| Contact hours | 62 | 3 |
| Practical activities | 65 | 3 |