



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Construction services [N1Bud1>TWOB]

### Course

Field of study

Civil Engineering

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

### Number of hours

Lecture

20

Laboratory classes

10

Other (e.g. online)

0

Tutorials

0

Projects/seminars

10

### Number of credit points

4,00

### Coordinators

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### Lecturers

### Prerequisites

Knowledge: She/He has basic knowledge of mathematics, physics, building physics and the basics of construction, useful for formulating and solving simple tasks related to installations in the building. Skills: She/He has ability to prepare and read technical drawings. Basic computer programs support: cad, excel, word Social competencies She/He has wareness of the need to constantly update and supplement building knowledge and engineering skills

### Course objective

Obtaining theoretically founded knowledge by students on the basic issues related to the technical equipment of buildings

### Course-related learning outcomes

Knowledge:

1. The student is able to read and interpret technical drawings

2. The student is able to prepare a design concept, select the basic elements of installations and make an energy performance of the building together with the designed installations
3. The student is able to formulate the requirements and technical assumptions resulting from the technological conditions necessary for the design, building and modernization as well as the operation of buildings and their technical equipment and is able to exploit the installations

#### Skills:

1. The student has an orderly, theoretically founded general knowledge concerning the basic issues related to the technical equipment of buildings
2. The student has elementary knowledge of designing sanitary system
3. The student has an organized knowledge of development trends in the area of building installations -
4. The student knows the basic solutions of sanitary systems in buildings and their components -
5. The student knows the construction law related to sanitary installations, the requirements of thermal protection of buildings and can make energy assessment of installation systems
6. The student knows the basic calculation methods, design techniques, tools and materials used in solving simple engineering tasks related to the design of building installations
7. The student knows the structure and properties of typical electrical installations
8. The student has basic knowledge related to: determining the design heating load, design radiators and hydraulic calculations
9. The student has an additional knowledge of building energy certification

#### Social competences:

1. The student understands the need for teamwork in solving theoretical and practical problems -
2. The student is informed of the importance and understands the non-technical effects of engineering activities, including the impact on the environment
3. The student knows the need to systematically deepen and expand their competences. He/she can estimate the impact of modification of building structures on the course of thermal phenomena

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Written final test - four open questions Rating: Skala: 50- 59% – 3.0 60- 69% – 3.5 70- 79% – 4.0 80- 89% – 4.5 90-100% – 5.0

The final grade for the lecture is increased by half the grade in the case of at least 4.5 grade from the project  
Project: Evaluation based on the design of selected installations for a small building and oral answer

Laboratories: Familiarizing students with elements of technical equipment of buildings, eg heat pumps, etc. Pass - written, threshold 50%.

### Programme content

Lecture: Building thermal protection requirements Calculations of the thermal transmittance Method of calculation of the design heat load Tasks and classification of heating systems. Types of radiators (convection and radial), their location and choice method. Hydraulic calculations of the central heating system Characteristics of materials used in installations Hot water preparing Tasks and classification of ventilation systems. Calculation of the amount of ventilation air. Ventilation in residential buildings Types of air conditioning. Operation and construction of air conditioners. The rule of operation of the refrigerating circuit

Tasks and classification of water installations. Calculation of the water demand in the installation. Choice of pipe diameters. Materials used. The required pressure in the water supply. Systems for increasing water pressure in the installation Internal fire installations Basic solutions of sewage installations and their components. Calculation of the amount of domestic and rainwater sewage. Selection of diameters and slopes. Drainage of rainwater from the property Gas installation solutions and its components. Types of low voltage electrical installations. Wires and electrical installation equipment. Rules for connecting buildings to the electricity networks. Electrical junction box and their equipment. Protection against electric shock in low voltage electrical installations. Modern electrical installations - building automation systems.

Electrical installations – legal status

Basic information on electrical installations and electrical equipment used in buildings.

## Course topics

Lecture:

Z  
Z  
Z

Legal and standardization acts related to the design and implementation of low-voltage electrical installations.

Electrical installation equipment used in low-voltage electrical installations.

Principles for the implementation of low-voltage electrical installations.

## Teaching methods

Informative lecture with seminar elements, lecture with multimedia presentation

Project- use of professional literature, standards, Acts

Laboratory - practical methods.

## Bibliography

Basic:

1. Koczyk H. (red): Ogrzewnictwo praktyczne - II wydanie uzupełnione projektowanie, montaż, certyfikacja energetyczna, eksploatacja. Systherm Serwis Poznań 2009.
2. Koczyk H., Antoniewicz B.: Nowoczesne wyposażenie techniczne domu jednorodzinnego Instalacje sanitarne i grzewcze. Państwowe Wydawnictwo Rolnicze i Leśne. 2004.
3. Sroczan E.: Nowoczesne wyposażenie techniczne domu jednorodzinnego Instalacje elektryczne. Państwowe Wydawnictwo Rolnicze i Leśne. 2004
4. Chudzicki J., Sosnowski S.: Instalacje kanalizacyjne. Projektowanie, wykonanie, eksploatacja. Wydawnictwo Seidel Przywecki Sp. z o.o. Warszawa 2009.
5. Bąkowski K.: Sieci i instalacje gazowe. WNT Warszawa 2002.
6. Chudzicki J., Sosnowski S.: Instalacje wodociągowe. Projektowanie, wykonanie, eksploatacja. Wydawnictwo Seidel Przywecki Sp. z o.o. Warszawa 2009.
7. Markiewicz H.: Instalacje elektryczne, Wydawnictwo Naukowe PWN. Warszawa 2018.

Additional:

1. Klemm P. (red.): Budownictwo ogólne tom II. Wydawnictwo Arkady 2005
2. Mizielińska K., Olszak J.: Gazowe i olejowe źródła ciepła małej mocy. Oficyna Wydawnicza Politechniki Warszawskiej. Warszawa 2005 r
3. Recknagel, Schramek, Sprenger, Honmann: Kompendium wiedzy OGRZEWNICTWO, KLIMATYZACJA, CIEPŁA WODA, CHŁODNICTWO 08/09 OMNI SCALA, Wrocław, 2008

## Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	40	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,50