COURSE DESCRIPTION CARD - SYLLABUS

Course name
General chemistry [S1Bud1>CO]

Course

Field of study
Civil Engineering

Year/Semester
1/1

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
30

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr hab. inż. Agnieszka Ślosarczyk prof. PP
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Lecturers

Prerequisites

Knowledge: acquaintance of periodic table and the properties of basic chemical compounds (organic and inorganic). Acquaintance of basic physical phenomena and chemical processes. Skills: ability to write chemical reactions and do the basic stoichiometric calculations. Social competences: awareness of the necessity for constant updating and complementing one's knowledge and skills.

Course objective

To introduce the students to the basic knowledge of physicochemical processes occurring during the manufacture and use of building materials.

Course-related learning outcomes

Knowledge:
Are able to obtain information from literature, databases and other properly selected information sources; can integrate the obtained information, interpret and evaluate it, as well as draw conclusions, formulate, discuss and justify opinions.

Skills:

Have knowledge in the fields of mathematics, physics, chemistry, biology and other fields of sciencen suitable to formulate and solve problems concerning sustainable building engineering (civil engineering, environmental engineering and architecture).

Social competences:
Take responsibility for the accuracy and reliability of working results and their interpretation.
Understand the need of team work, are responsible for the safety of their own work and team's work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written examination on the date given at the beginning of the semester. A short oral answer at the beginning of the exercises. Colloquium at the end of the semester on the material for laboratory exercises.

Programme content

Lecture
Chemical reactions in the aquous environment. Types of chemical compounds and chemical processes occurring during the manufacture,
application and use of selected building materials. Chemical composition and structure of building materials as determinants of their physical-mechanical and functional properties. Chemistry of mineral binders. Structure and properties of metals used in
construction. Polymers as components of building plastics, obtaining and properties. Processes occurring during degradation of selected building materials.
Recycling of building materials.
Laboratory
Basics of qualitative chemical analysis. Basics of chemical
quantitative analysis. Chemical reaction kinetics. Corrosion of building
materials.

Course topics

Lecture
Chemical reactions in the aquous environment. Composite systems in the building industry; colloidal systems. Types of chemical compounds and chemical processes occurring during the manufacture, application and use of selected building materials. Chemical composition and structure of building materials as determinants of their physical-mechanical and functional properties. Chemistry of mineral binders. Hydraulic and air binders. Processes occurring during obtaining, binding and hardening of cement, lime, gypsum, silicate and magnesia binders. Structure and properties of metals used in construction. Polymers as components of building plastics, obtaining and properties. Processes occurring during degradation of selected building materials. Concrete corrosion. Corrosion of steel. Corrosion of plastics. Recycling of building materials.
Laboratory
Basics of qualitative chemical analysis. Identification analysis of selected cations. Basics of chemical quantitative analysis. Determination of sodium hydroxide concentration by alcacymetric titration. Salt hydrolysis and pH determination of aqueous solutions. Chemical reaction kinetics. Corrosion of building materials. Assessment of the degree of corrosion of cement stone and determination of the degree of concrete carbonization. Chemical corrosion of steel. Assessment of corrosion resistance of ordinary steel and coated steel.

Teaching methods

Informational lecture with elements of the case method, laboratory method (teamed experiments conducted by students), e-learning methods

Bibliography

Basic:
1. W. Skalmowski, Chemia materiałów budowlanych, Arkady 1997
2. L. Czarnecki, T. Broniewski, O. Henning, Chemia w budownictwie, Arkady, Warszawa 1996

Additional:
W. Kurdowski, Chemia cementu i betonu, PWN, Warszawa 2010

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	47	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	53	2,00