

Code	I.6.
Course Title (English)	Chemistry
Course Title (Polish)	Chemia
Credits	6 ECTS

*Language of instruction*    **English, Polish**

*Compulsory for Profile:*    Computer Modelling and Simulation (CMS), Intelligent Energy (IE), Biotechnology for Environmental Protection (BI), Business and Technology (BT)

*Type of studies*                BSc studies

*Unit running the programme*        Department of Chemistry, Water and Wastewater Technology

*Course coordinator and academic teachers*    **B. Karwowska PhD**  
B. Karwowska Ph.D

*Form of classes and number of hours*

Semester	Lec.	Tut.	Lab.	Proj.	Sem.	Credit points
I	30	30	-	-	-	6

*Learning outcomes*                Understanding “the language” of chemistry – chemical formulas, names of compounds and reactions equations. Knowledge of the structure of compounds and its influence on chemical and physical properties. Understanding processes important for environment or environmental engineering. Prediction, planning and application of chemical processes in pollution neutralization.

*Prerequisites*                        Basic knowledge of chemistry, mathematics and physics.

*Course description*                LECTURE  
Terminology and fundamental principles in chemistry. Matter constitution. States of matter – gases, liquids, solids. Atomic structure. Periodic system - Mendeleev’s table. Properties of elements. Chemical compounds: types and their molecular structure. Chemical bonds. Intermolecular bonds. Solutions. Types of chemical reactions. Fundamentals of inorganic, organic, analytical and physical chemistry. Receiving, structure and properties of inorganic, organic and complex compounds. Aliphatic and aromatic hydrocarbons, alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, esters, amines, heterocyclic compounds and halocarbons.

Structure and properties of dyes, carbohydrates, amino-acids, peptides, proteins and nucleic acids. Structure, properties and application of plastics. Basic chemical thermodynamics, thermochemistry. Elementary thermodynamics of irreversible processes. Fundamentals of chemical kinetics. Osmosis. Phase boundary phenomena. Adsorption. Electrochemistry – electrode potential, cells, electrolysis. Fundamentals of molecular spectroscopy. Mass and heat transfer. Mixture separation. Fundamentals of chemical technology.

TUTORIALS:

see lecture content

LABORATORY

Not applicable

PROJECT

Not applicable

SEMINAR

Not applicable

*Form of assessment*

After the semester students pass a written exam which covers the whole lectured material as well as knowledge required on tutorials.

Knowledge of tutorials is additionally checked in thematic tests.

- Basic reference materials* F.A. Cotton, G. Wilkinson, P.L. Gaus: "Basic Inorganic Chemistry", 3<sup>rd</sup> ed., J. Wiley & Sons. Inc. 1995
- B. Douglas, D. McDaniel, J. Alexander: "Concepts and Models of Inorganic Chemistry", 3<sup>rd</sup> ed., J. Wiley & Sons. Inc. 1994
- J. McMurry: "Organic Chemistry", 5<sup>th</sup> ed. Brooks/Cole Publishing Co., Pacific Grove, California 2000
- P.W. Atkins: "Physical Chemistry", 6<sup>th</sup> or 7<sup>th</sup> edition, Oxford University Press, 1988, 2001
- R.J. Sime: "Physical Chemistry : Methods, Techniques and Experiments", Saunders College Publishing, 1990.
- C.N. Sawyer, P.L. McCarthy, G.F. Parkin,: "Chemistry for Environmental Engineering and Science" 5<sup>th</sup> ed. McGraw-Hill, International Edition 2003.

*Other reference materials*

e-mail of the course coordinator and academic teachers	bkarwowska@is.pcz.czest.pl
Average student workload (teaching hours + individ )	4 hours of teaching hours + 4 hours of individual work per week
Remarks:	
<i>Updated on:</i>	<i>04.04.2012</i>