



Valid as from the academic year 2016-2017

Inorganic Chemistry 2: Reactivity of Matter (O000087)

Course size (nominal values; actual values may depend on programme)

Credits 5.0 **Study time** 150 h **Contact hrs** 60.0 h

Course offerings and teaching methods in academic year 2016-2017

A (semester 2)	seminar: coached exercises	12.0 h
	practicum	12.0 h
	seminar	6.0 h
	lecture	30.0 h
B (semester 1)	lecture	30.0 h
	practicum	12.0 h
	seminar	6.0 h
	seminar: coached exercises	12.0 h

Lecturers in academic year 2016-2017

Verpoort, Francis WE06 lecturer-in-charge

Offered in the following programmes in 2016-2017

	crdts	offering
Bachelor of Science in Food Technology	5	A, B
Joint Section Bachelor of Science in Environmental Technology, Food Technology and Molecular Biotechnology	5	A, B
Bachelor of Science in Environmental Technology	5	A, B
Bachelor of Science in Molecular Biotechnology	5	A, B

Teaching languages

English

Keywords

Reaction speed, Chemical equilibrium, Chemical thermodynamics, Acids, Bases, Salts, Buffer, Redox, Biosphere, Chemical industry

Position of the course

To acquire a general overview of and the necessary insight in the basic concepts of the reactivity of matter which is needed as basic knowledge for the future bachelor in life sciences and bioscience engineering and as a prerequisite for more specialized and applied chemistry courses. To gain insight in the factors determining "why" and "how" chemical processes take place. As the emphasis is made on the thermodynamic driving forces for chemical changes, the course is well suited to attribute to the development of scientific skills such as analytical reasoning, ability to critical reflection and problem solving capability as future bachelor in life sciences and bioscience engineering.

Contents

1. Chemical kinetics: reaction order, reaction mechanism, catalysts
2. Chemical equilibrium: equilibrium condition, Le Châtelier's principle
3. Acids and Bases
4. Chemical thermodynamics: internal energy, enthalpy, entropy, Gibb's free energy, spontaneous processes, useful work of a chemical process
5. Applications of chemical equilibria in aqueous solutions: acids, bases, salts, pH, buffers, redox reactions.
6. Electrochemistry and its applications (batteries, electrolysis)

7. Elements and compounds in the biosphere; inorganic products in industry

Week 1 : The rate of reaction, the rate law

Week 2 : Reaction mechanisms

Week 3 : The concept of Equilibrium and the equilibrium constant

Week 4 : Factors that affect the equilibrium

Week 5 : The pH – a measure of acidity

Week 6 : Strong and weak acids and bases

Week 7 : Acid-base equilibria, titrations

Week 8 : common ion effect, buffer solutions Solubility equilibria

Week 9 : The three laws of thermodynamics ; enthalpy ; entropy

Week 10 : Gibbs free energy ; thermodynamics in living systems

Week 11 : Electrochemistry

Week 12 : Nonmetallic elements and their compounds

Initial competences

Competences acquired in Inorganic Chemistry 1: Structure of Matter.

Final competences

The student has acquired yield of a chemical process. As a future Bachelor in Food Technology, Environmental Technology or Molecular Biotechnology the student will have the necessary insight in the fundamental concepts governing the reactivity of matter. The student will have acquired insight in the driving forces for chemical reactions. The student is able to estimate the theoretical he has sufficient understanding of the chemical behaviour of a variety of products in aqueous medium. The student has started to master a scientific engineering attitude and must be able to analyse chemical problems and propose appropriate strategies for their solution.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum, seminar, seminar: coached exercises

Learning materials and price

"Chemistry" by Raymond Chang (Mc Graw-Hill)

References

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions, written examination with multiple choice questions

Examination methods in case of periodic evaluation during the second examination period

Examination methods in case of permanent evaluation

Job performance assessment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

The written exam holds 16 of the 20 points, divided in an open question part (theoretical questions and exercises) and a multiple choice part. The remaining 4 points go to the practicum report. To pass this course one has to obtain at least 9/20 on the integration of the practicum report and written exam.

One has to participate in the practicum to pass for this course.

Calculation of the examination mark

Written exam with multiple choice questions 40%

Written exam with open questions 40%

Performance (practical + attitude) 5%

Report (practical) 15%

