

Detailed course description (SUBJECT CARD)

Course title: Chemistry
Course code:
Affiliation to a course group:
Course type: core / ~~field-specific~~/ general/ ~~specialty~~*
obligatory / ~~elective~~*
Field of study: Industrial and Engineering Chemistry
Level of study: first-cycle programme / ~~second-cycle programme~~*
Study profile: general academic / ~~practical~~*
Mode of study: full-time programme/ ~~part-time programme~~*
Specialty (specialisation): none
Year of study: I
Semester: II
Teaching modes and teaching hours:
lectures – 45;
seminars – 15;
Laboratory classes – 60.

Language/s of instruction: english

Number of ECTS credits (according to the study programme): 9

* – leave the appropriate option

1. Course objectives:

To introduce students with basic principles of inorganic chemistry and details on chemistry of s, p and d block elements.

2. Relating the field-specific learning outcomes to teaching modes, verification methods and assessment of student's learning outcomes:

symbol	assumed learning outcomes <i>a student who completed the course:</i>	teaching modes	verification methods and learning outcome assessment
Knowledge: a student knows and understands			
K1A_W07	Student has an ordered, theoretically founded, general knowledge in the field of inorganic, organic, physical, analytical and chemical engineering.	Lecture, seminars, laboratory classes	Exam, tests
K1A_W10	Student has knowledge of techniques and methods for characterizing and identifying chemical products.	Lecture, seminars, laboratory classes	Exam, tests
Skills: a student can			
K1A_U06	Student plans experiments, examines the course of processes and interprets the obtained results.	Laboratory classes	Reports/ tests
K1A_U15	Student predicts the reactivity of chemical compounds based on their construction, and estimates the thermal effects of chemical processes.	Lecture, laboratory classes	Exam/ tests
Social competences: a student is able to			
K1A_K01	Student understands the need to learn and improve their professional and personal competences.	Lecture	Exam

3. Study programme contents ensuring the learning outcomes (according to the study programme):

Knowledge: Basic knowledge in the field of inorganic chemistry: periodic table of the element and periodic properties. Structures of crystalline and coordination compounds, crystal field theory. Knowledge in the field of

chemistry of selected elements and inorganic compounds including chemical changes these compounds undergo.

Skills: Has the skill to conduct basic laboratory experiments based on procedures provided by the instructor and existing literature. Can analyze laboratory results and report them in a professional manner. Is able to discuss selected physico-chemical properties of s, p and d block elements. Can conduct basic calculations related to ionic equilibrium in aqueous solutions.

Competences: Understands the newest developments in chemistry.

4. Description of methods to determine the ECTS credits:

Type of activity	Number of hours / ECTS credits
Number of course hours regardless of a teaching mode	120/5
Student workload 1*	45/2
Student workload 2*	30/1
Student workload n*	30/1
Other**	
Total hours:	210/9
Number of ECTS credits allocated for a course	9

Description:

* – student workload, types of activities need to be provided, e.g. preparation for the course, interpretation of results, preparation of a course report, preparation for the examination, getting familiar with the literature, preparation of a project, presentation, written work, report, etc.

** – other e.g. additional course hours

5. Summary indicators:

- number of course hours and ECTS credits at the course with a direct participation of academic teachers or other persons teaching the course and students: 120/5
- number of course hours and ECTS credits at the course related to the scientific activity conducted at the Silesian University of Technology in a discipline or in disciplines to which a field of study is assigned- in the case of studies with a general academic profile: 210/9
- number of course hours and ECTS credits at the course shaping practical skills- in the case of practical studies: 0/0
- number of course hours conducted by academic teachers employed by the Silesian University of Technology as their primary workplace: 120

6. Persons conducting particular types of courses (name, surname, academic degree or degree in arts, title of professor, business e-mail address):

Dr hab. inż. Piotr Dydo, prof. PŚ, dr inż. Dorota Babilas

7. Detailed description of teaching modes:

1) lectures:

- detailed programme contents:

Periodicity, crystalline structure and structure of coordination compounds, ligand field theory.
Physicochemical properties of s, p and selected d block elements and their compounds.

- teaching methods, including distant learning:

Lectures are organized as digital presentations, lecture notes are distributed to the students throughout distant learning platform.

- form and criteria for successful semester completion, including retakes, as well as the conditions for admission to the examination:

A two-stage exam that include a test and oral part. To pass the exam one must obtain at least 50% of

the total points.

- course organisation and rules of participation in the course, with an indication whether a student 's attendance is obligatory

Lecture attendance is strongly recommended. Teaching hours: 2/week.

2) description of other teaching methods:

- seminars:

- o detailed programme contents:

Simple calculations of ionic equilibriums in aqueous systems. Water self-ionization and pH scale. Ionization of strong and weak electrolytes and mixtures.

- o teaching methods, including distant learning:

Materials are distributed to the students throughout distant learning platform.

- o form and criteria for successful semester completion, including retakes, as well as the conditions for admission to the examination:

Written test. To pass one must obtain at least 50% pts. from each test.

- o course organisation and rules of participation in the course, with an indication whether a student 's attendance is obligatory

Students are obliged to participate in seminar classes. Teaching hours: 2/week.

- Laboratory classes:

- o detailed programme contents:

Group solubility of chemical compounds, ionic equilibrium, pH scale, solubilization and precipitation, effect of common ion, buffer solutions, coordination compounds. Physicochemical properties of selected d-block elements and inorganic anions. Solubility and precipitation; Faraday's Laws; Chemical Kinetics; Types of chemical reactions; Acids, bases and salts; Buffer solutions.

- o teaching methods, including distant learning:

Materials are distributed to the students throughout distant learning platform.

- o form and criteria for successful semester completion, including retakes, as well as the conditions for admission to the examination:

Written tests, laboratory reports. To pass one must obtain at least 50% pts. from each test and report.

- o course organisation and rules of participation in the course, with an indication whether a student 's attendance is obligatory

Students are obliged to participate in laboratory classes. Teaching hours: 4/week.

8. Description of the method to determine the final grade (rules and criteria for evaluation, as well as a calculation method for the evaluation in the case of a course which includes more than one teaching mode, including all teaching modes and all examination and credit dates including retake examinations):

Final grade will be calculated as an average value of the exam, seminar and laboratory results.

9. Method and procedure for filling up arrears resulting from:

- student's absence from the course,

Every student is obliged to make up for any backlogs in the course at his own discretion.

- differences in study programmes for persons changing a field of study, changing university or resuming studies at

the Silesian University of Technology,

As for 1st semester course, no differences are envisioned.

10. Prerequisites and additional requirements, taking into account the course sequence:

Successfully passed Chemistry, sem I or other equivalent course.

11. Recommended sources and teaching aids:

Ralph H. Petrucci, General chemistry : Principles and modern applications, William S. Harwood, F. Geoffrey Herring, Prentice Hall, 2002.

General chemistry, John Blair Russell. - 2nd ed. - New York : McGraw-Hill, Inc, 1992.

Chemistry, R. Chang, McGRAW-HILL, INC.

Inorganic Chemistry , Catherine E. Housecroft, Alan G. Sharpe

Descriptive Inorganic, Coordination, and Solid State Chemistry, Glen E. Rodgers

12. Description of teacher's competences (e.g. publications, professional experience, certificates, trainings etc. related to the programme contents implemented as part of the course):

Lecturer has more than 10 year experience in teaching General and Inorganic Chemistry in the fields of Industrial and Engineering Chemistry, Chemistry, Chemical Technology and Chemical Engineering.

13. Other information:

none