

2024/2025. ACADEMIC YEAR	
PROGRAM OF STUDY (FOR STUDENTS OF 1ST YEAR)	
Full (Hun) name of the subject: Szervetlen kémia	
Program: Undivided program (pharmaceutical)	
Schedule: full-time	
Short name of the subject: Szervetlen kémia	
English name of the subject: Inorganic Chemistry	
German name of the subject: Anorganische Chemie	
Type of registration: <u>obligatory</u> /obligatory elective/elective/criteria requirement	
Neptun code of the subject: GYKGYK336E1A	
Responsible Department: Department of Pharmaceutical Chemistry	
Responsible tutor Prof. Dr. Balogh György Tibor Contact information: Department of Pharmaceutical Chemistry, Semmelweis University address: H-1092 Budapest, Hőgyes Endre u. 9. phone: +36-1-217-0891 <u>e-mail:</u> <u>balogh.gyorgy.tibor@semmelweis.hu</u>	Title, academic degree: director, professor, DSc
Name of the persons responsible for the teaching of the subject: Dr. György Tibor Balogh (theory) Dr. István Szalai (theory) Dr. Norbert Szoboszlai (theory, prac.) Dr. Edina Kiss (prac.) Dr. Krisztina Kovács (theory, prac.) Dr. Tamás Pála (theory, prac.) Dr. István Molnár (prac.) Dr. Arash Mirzahosseini (theory, prac.) Dr. Ádám Golcs (theory, prac.)	Title, academic degree: professor, DSc professor, DSc associate professor, PhD research assistant, PhD assistant professor, PhD assistant professor, PhD research assistant, PhD assistant professor, PhD assistant professor, PhD
Class per week: 2 hours lecture 2 hours practices	Credit point(s): 3 credits
Professional content, intent of acquirement and it's function in order to implement the goals of the program: The acquisition of fundamental knowledge in inorganic, bioinorganic, and environmental chemistry, as well as gaining an understanding of the physicochemical properties of inorganic compounds used in pharmaceuticals, the pharmaceutical industry, and medicine. Additionally, the course aims to introduce the theoretical aspects and practical applications of qualitative analytical chemistry methods, fostering an analytical mindset in determining the composition of substances.	
Short description of the subject: The method of characterizing elements and compounds in inorganic chemistry using the principles learned in general chemistry. The course focuses on understanding the most important properties of elements and inorganic compounds, with particular attention to their physiological effects and potential medicinal applications. It includes the theoretical presentation of qualitative analysis in chemistry and its practical application in determining laboratory samples. The characterization and classification of qualitative analytical chemical reactions are also covered. The course primarily builds on the principles taught in general chemistry.	
Course data	

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
2nd semester	28	28	--	--	56	Autumn semester* Spring semester Both semesters (* Please underline)	--
Program of semester**							
<p>Topics of theoretical classes (pro week):</p> <ol style="list-style-type: none"> 1. Introduction, presentation of requirements. Qualitative Analysis I. 2. Qualitative Analysis II. 3. Qualitative Analysis III. 4. Qualitative Analysis IV. 5. Qualitative Analysis V. 6. Introduction to Descriptive Inorganic Chemistry. General description of nonmetals. Occurrence, properties and binary compounds of hydrogen (covalent, ionic, metallic and complex hydrides). Production of hydrogen, hydrogen in industry. 7. Noble gases and their compounds. 6. General description of halogens, occurrence of the elements, chemical properties and preparation. Important compounds (halides, oxo acids, interhalogens). Pharmaceutical importance of halogen compounds. 8. General description of the oxygen group. Occurrence of the elements, chemical properties and preparation. Oxides, peroxides and superoxides. Chemical and pharmaceutical importance of sulfur, selenium, and their inorganic compounds. 9. General description of the nitrogen group. Occurrence of the elements, chemical properties and preparation. Important compounds and their pharmaceutical relevance. The role of inorganic phosphate in biology. 10. General description of the carbon group. Occurrence of the elements, chemical properties and preparation. Important compounds and their pharmaceutical relevance. Silicates, carbon and silicon compounds in comparison. Inorganic chemistry of boron. 11. General description of metals, preparation (metallurgy), alloys. Toxicity of metals. Description of alkali metals, important compounds and their biological activity / pharmaceutical importance. 10. Occurrence, chemical properties and important compounds of alkaline earth metals. Characterisation of the compounds of aluminum, boron 12. General description of transition metals (physical and chemical properties, common oxidation states) and important compounds in chemistry and pharmacy. The elements and compounds of zinc group. 13. Midterm 14. Structure of complex compounds, types of ligands, chelate complexes. Types of complex isomers. Magnetic and optical properties of complexes. Biomedical applications of complexes, description of host-guest complexes. 							

Topics of practical classes (pro week):

1-2. week

Occupational safety training;
General rules of work in the laboratory
Group I of cations 1.

3-4. week

Group I of cations 2.
Reactions of arsenic (III)
Individual simple unknown (cations of Groups I-II)

5-6. week

Reactions of Group III of cations
Practice with complex unknown (ions of Groups I-III)
Individual simple unknown (cations of Groups I-III)

7-8. week

Reactions of Group IV-V of cations;
Individual complex unknown (ions of Groups I-V)

9-10. week

Reactions of Group I-II of anions;
Individual simple unknown (anions of Groups I-II)

11-12. week

Reactions of Group III-IV of anions;
Individual simple unknown (anions of Groups I-IV)

13-14. week

Individual complex unknown in powder/solution form.

Other subjects (both compulsory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

The teaching of the "Inorganic Chemistry" course serves as a foundation for the "Analytical Chemistry I and II" courses. There is no thematic overlap between these subjects.

The course of Calculation Problems in General and Inorganic Chemistry focuses on the calculation examples presented within the framework of the General Chemistry and Inorganic Chemistry courses, along with their theoretical background.

Schedule of consultations: at the request of students

Course requirements**Prerequisites:**

General Chemistry

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Students must be present at minimum of 75% of the total number of laboratory practices scheduled during the semester (i.e. a maximum of 2 absences is allowed). Timeliness is mandatory. Arriving more than 15 minutes late will be considered equivalent to absence from the laboratory practice. Arriving up to 15 minutes late to a practice will be considered "late" and 2 late practices amount to an absence.

A make up ("supplementary lab") to complete the measurements labs missed will be provided during the semester; and at the end of the semester for justified cases.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

To assess theoretical knowledge, a total of five short quizzes will be administered at the beginning of the lab sessions, along with one comprehensive mid-term exam during the lecture period. These will be scheduled in advance with the students. A total of 150 points can be earned. To assess practical skills, students will identify unknowns containing inorganic ions at the end of the lab sessions.

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

During the theoretical assessments mentioned above, students must earn at least 60 out of the 150 available points to obtain a course signature.

In the practical work, at least 50% of the assigned unknowns must be correctly identified to receive the signature.

Number and type of projects students have to perform independently during the semester and their deadlines:

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Type of the semester-end examination: signature*/practical grade*/ comprehensive examination*/final/end-term examination*

* Please underline

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

The semester ends with a colloquium, which consists of two topics drawn from two different topic list (qualitative analysis and descriptive inorganic chemistry) and a calculation problem.

- The topic list for the oral exam will be published by the education-research organizational unit on the MOODLE interface until the beginning of the due diligence period.

In order to pass the exam, a sufficient level must be achieved in each part.

The student can be exempted from the topic containing the calculation problem and the qualitative analysis if he performs adequately during the theoretical assessments during the semester.

Form of the semester-end examination: written*/oral*/combined examination/practical examination/the assessment of completing project work (according to STUDY AND EXAMINATION REGULATIONS 30.§)* (*Please underline*)

The possibility and conditions for offering grades:

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A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, **with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:**

lecture notes

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

yes*/no*/on and individual assesment basis* (*Please underline*)

The course description was prepared by:

Dr. György Tibor Balogh, Dr. Tamás Pála

**** A tantárgy tematikáját oly módon kell meghatározni, hogy az lehetővé tegye más intézményben a kreditelismerési döntéshozatalt, tartalmazza a megszerzendő ismeretek, elsajátítandó alkalmazási (rész)kézségek, (rész)kompetenciák és attitűdök leírását, reflektálva a szak képzési és kimeneti követelményeire.**