SYLLABUS

Name: ***Advanced inorganic chemistry (27-CHEn-S2R1-AInOrCh)***
Name in Polish: **Zaawansowana chemia nieorganiczna**
Name in English: ***Advanced inorganic chemistry***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition:

Default type of course examination report:

Examination

Language:

English

Short description:

Course objectives
1. Knowledge of structure and reactivity of metal complexes and organometallic compounds
2. Knowledge of synthetic methods of different chemical compounds
3. Application of physicochemical methods for determination of structure and reactivity of metal complexes and coordination compounds

Description:

Course content
Synthesis, characterization and applications of organometallic compounds. Metal complexes with M-H and M-CO bondings. Elementary steps in catalytic reactions. Mechanisms of catalytic reactions. Structure-reactivity correlation. Application of catalytic reactions in industrial processes.
Inorganic supramolecular chemistry. The role of coordination bonds in the formation of supramolecular assemblies, macrocyclic complexes, selective binding of cations and anions, self-organization of metal complexes. Supramolecular aspects in bioinorganic chemistry, optical and magnetic materials, molecular electronics, chemical sensors.
Theoretical background in inorganic physicochemistry. Molecular orbital theory and crystal field theory. Approach of strong and weak field. Diagrams of Orgel and Tanabe-Sugano. Elements of group theory. Spectroscopic and magnetic properties of complexes based on group theory. Absorption, emission and absorption spectra. Electronic absorption and emission spectroscopy and electron paramagnetic resonance spectroscopy and their application in coordination chemistry.
Inorganic-organic hybrid materials, metal-organic frameworks. The concept of a node and a linker in a coordination polymer. Classification of coordination polymers. Zeolites and their inorganic-organic analogues. Covalent organic frameworks. Isoreticular approach in the design of coordination polymers. Solvothermal synthesis and mechanochemistry. Topology and isomerism in coordination polymer frameworks. Theoretical and experimental description of porosity in solids. Dynamic coordination networks. Sorption and separation of gases and vapors in porous materials. Heat of adsorption. Porous materials in catalysis. Coordination polymers as drug delivery systems. Electroactive materials.
Laboratory
1. Synthesis of organometallic compounds, complexes with chelating ligands and polynuclear complexes
2. Synthesis in oxygen-free and water–free conditions
3. Examples of catalytic reactions
4. Characteristic of the obtained compounds using physicochemical methods.

Bibliography:

1. F. A. Cotton, G. Wilkinson, Advanced Inorganic Chemistry, IVth Ed., John Wiley & Sons, 1980
2. P.C. Chiusoli, P.M. Maitlis, Metal-Catalysis in Industrial Organic Processes, RSC Publishing, 2006
3. E.I. Solomon, A.B.P. Lever, Inorganic Electronic Structure and Spectroscopy, Wiley-Interscience, New York, 1999
4. R. J. Angelici, Synthesis and techniques in inorganic chemistry, Sounders Philadelphia 1977
5. D. F. Shriver and M. A. Drezdon, The manipulation of air-sensitive compounds, Wiley, New York 1986
6. G.L. Miessler, D.A. Tarr, Inorganic Chemistry, 4th Ed. Pearson Education Ltd, 2010.
7. L.R. MacGillivray, Metal-Organic Frameworks – Design and Application, John Wiley & Sons, 2010.

Learning outcomes:

Knowledge
Student:
• is able to correlate structure, properties and reactivity of different groups of inorganic and coordination compounds (K_W01)
• is aware of current research trends in coordination chemistry and catalysis (K_W06)
Skills
Student:

• can individually tackle a scientific problem based on a literature search and experimental results (K_U03)
• can present results of research and literature data (K_U05)

Assessment methods and assessment criteria:

lecture: written exam
seminar: monitoring of attendance and evaluation of student's work
laboratory classes: written report

missing attribute description in English

obligatory courses

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Specialisation Laboratory (90 hours)

Study groups details

missing study groups details

brak opisu typu zajęć w języku angielskim (45 hours)

Study groups details

missing study groups details

Specialization Lecture (60 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	17	2016/17-L	

SYLLABUS

Name: ***Advanced organic chemistry (27-CHEn-S2R1-AOrCh)***
Name in Polish: **Zaawansowana chemia organiczna**
Name in English: ***Advanced organic chemistry***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2017/18
Cordinator of course edition: dr Alicja Kluczyk
dr Bartosz Szyszko
prof. dr hab. Marcin Stępień

Default type of course examination report:

Examination

Language:

English

Short description:

Objectives
• Introduction to modern methods of organic synthesis
• acquisition of skills and knowledge related to organic synthesis and laboratory safety
• presentation of chemical and physicochemical methods of identification and determination of structure of organic compounds
• presentation of modern advanced laboratory methods used in organic synthesis
• acquiring skills necessary for safe and successful synthesis of organic compounds

Description:

Content
Contemporary organic synthesis
1. Role of organic synthesis in contemporary chemistry and chemical industry
2. Types of synthetic transformations
3. Oxidations and reductions in organic chemistry. Reagents and their applications
4. Methods of carbon-carbon bond formation. Aldol-type condensations, reactions with carbanions, coupling reactions (oxidative, reductive, and catalytic)
5. Synthesis of carbocycles
6. Synthesis of heterocyclic and macrocyclic systems
7. Strategy and planning in organic synthesis. Retrosynthetic analysis, synthons, umpolung
8. Analytical methods in organic synthesis. Publication standards.
Practical organic chemistry
1. Scientific information in the organic chemistry.
2. Safety in the organic chemistry laboratory.
3. How to conduct a lab book and a synthetic documentation?
4. Modern laboratory equipment.
5. Separation and purification of the reaction products.
6. High vacuum techniques – vacuum/inert gas line, Schlenk techniques, vacuum distillation.
7. Work in a controlled atmosphere.
8. Glove-box as a convenient tool for protecting substrates/products from decomposition.
9. Purification of reagents and solvents.
10. Chromatography as a powerful tool for identification and separation of products.
11. Special reaction techniques (photochemical and microwave synthesis, solid phase synthesis).
12. Visualisation of the experimental data.
Analytical methods in organic chemistry
1. NMR spectroscopy.
2. Mass spectrometry.
3. Other analytical methods useful in organic chemistry.
Laboratory
The laboratory course creates an opportunity to face all steps necessary in organic synthesis. It starts with a purification of reagents and solvents, required for further work, including a distillation in inert atmosphere. All prepared purified chemicals will be used for a microscale synthesis. Some experiments will require the use of moisture and oxygen-sensitive reagents. In this case high vacuum/inert gas Schlenk methodology will be applied. Multistep synthesis will be also conducted. The isolation and purification (crystallization, distillation and chromatography) of the final product will be an important part of the course.
Vacuum distillation will be used as a method of removal of high-boiling solvents and separation of mixtures (high vac and bulb-to bulb technique). Variety of chromatographic procedures will be also presented.

Bibliography:

1. J.H. Fuhrhop, G. Li, "Organic Synthesis: Concepts and Methods", 3d ed. Wiley-VCH 2003.
2. L. Kurti, B. Czako, "Strategic Applications of Named Reactions in Organic Synthesis", Academic Press, 2005.
3. F.A. Carey, R.J. Sundberg, "Advanced Organic Chemistry", 4th ed. Parts A and B, Springer 2001.
4. M.B. Smith, J. March, "March's Advanced Organic Chemistry", 5th ed., Wiley-Interscience 2001. 5. John McMurry „Chemia organiczna” Wydawnictwo Naukowe PWN, Warszawa 2009
6. J. C. Gilbert, S.F. Martin, “Experimental Organic Chemistry. A Miniscale and Microscale Approach”. Thomson 2006
7. A. I. Vogel, A.R. Tatchell, B.S. Furnis, A.J. Hannaford , P.W.G. Smith “Vogel`s Textbook of practical organic chemistry”; Prentice Hall 1996.
8. J. K. Swadesh (Ed.) "HPLC. Practical and Industrial Applications". CRC Press 2001
9. J. W. Zubrick “The Organic Chem Lab Survival Manual” Wiley 2010
10. F. Serratosa, "Organic Chemistry in Action. The Design of Organic Synthesis", Elsevier 1990.
11. A. E. Derome, "Modern NMR Techniques for Chemistry Research" Pergamon, 1995
12. R. M. Silverstein, F. X. Webster, "Spectroscopic Identification of Organic Compounds" Wiley 2005

Learning outcomes:

Knowledge
Student
• is in possession of an extensive knowledge of organic chemistry and experimental methods used in synthetic laboratory, knows chemical concepts and theories and their influence on the development of sciences (K_W01; K_W03)
• is in possession of an extensive knowledge of recent developments in synthetic procedures and analytical methods and safety regulations concerning organic reagents (K_W06; K_W07)
• has knowledge of computational methods used in experimental design and data analysis (K_W02, K_W04)
• is in possession of an extensive knowledge of the scientific equipment in organic chemistry laboratory (K_W05)
Skills
Student
• is able to plan the synthesis, purification and analysis of organic compounds, to perform the experiments and assess the results (K_U01; K_U02)
• is able to search for information in professional literature, databases as well as other sources (K_U03)
• is able, in an advanced manner, to present research results and literature data in a written and oral form, both in Polish and English (K_U05)
• is able to determine the direction of further education and individual knowledge acquisition (K_U06)
Social competence
Student
• understand the need of continues education and constant improvement on professional competence, being able to organise the process of educating others (K_K01)
• is able to plan the experiments in cooperation with other students, following the safety procedures (K_K02)
• is able to set priorities conducive to the realization of a task appointed by himself or others right (K_K03)
• identifies and solves dilemmas connected with professional performance in the right way (K_K04)
• is able to prepare the reports according to scientific ethics, understands the need of systematic contact with scientific literature (K_K05)
• is aware of the responsibility bestowed on him for undertaken research, experiments or observations, understands the social aspect of practical application of the acquired expertise and responsibility which ensues (K_K06)

Assessment methods and assessment criteria:

lecture: written exam
seminar: midterm and final test
laboratory: written reports, assessment of laboratory work

missing attribute description in English

obligatory courses

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Specialisation Laboratory (75 hours)

Study groups details

Group number 1

Class instructors:

dr Bartosz Szyszko

brak opisu typu zajęć w języku angielskim (30 hours)

Study groups details

Group number 1

Class instructors:
dr hab. Ewa Dudziak
dr Natasza Sprutta
prof. dr hab. Piotr Stefanowicz, prof. UWr
dr hab. Agata Białońska

Specialization Lecture (90 hours)

Study groups details

Group number 1

Class instructors:
dr hab. Ewa Dudziak
dr Alicja Kluczyk
prof. dr hab. Piotr Stefanowicz, prof. UWr
prof. dr hab. Marcin Stępień
dr hab. Agata Białońska

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	17	2016/17	

SYLLABUS

Name: ***Analytical methods in heritage studies (27-CHEn-S2Zi-AnMHSW)***
Name in Polish: **Analityczne metody w badaniach dziedzictwa kulturowego**
Name in English:

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2020/21
Cordinator of course edition: dr Barbara Łydżba-Kopczyńska

Default type of course examination report:
Grading
Language:
English

Information on course edition:

Default type of course examination report:
Grading
Bibliography:
missing bibliography in English

Details of classes and study groups

Lecture (30 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	3	2019/20-Z	

SYLLABUS

Name: ***Applications of chemical materials (27-CHEn-S2Zi-ApChMat)***
Name in Polish: **Zastosowania materiałów chemicznych**
Name in English: ***Applications of chemical materials***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2017/18
Cordinator of course edition: prof. dr hab. Grażyna Bator

Default type of course examination report:

Examination

Language:

English

Short description:

Objectives
• Introduction to modern techniques for the solid state investigations
• Presentation of the luminescence materials applications
• Introduction to the growing up of ferroic materials and the dielectric and thermal methods applied for their investigations
• Advancement of the laboratory techniques
• Development of the report writing skills on the results obtained and on the scientific information research

Description:

Content
• Description of the ferroic material properties (mainly ferroelectrics and ferroelastic)
• Introduction to the main experimental methods for the ferroic materials characteristics.
• Theoretical description related to the free energy of crystals – Landau-Ginzburg theory. Tensors in the crystal anisotropy description.
• Description of the nonlinear properties of the ferroelectric crystals.
• Electronic spectroscopy as a tool for the luminophore materials properties investigation: single crystals, powders, ceramics, Glass, layer systems.
• Absorption and emission spectra analysis.
• Experimental methods, e.g. time resolution spectroscopy and the luminescence decay time measurements.
• Practical application of luminophores

Bibliography:

1. H. S. Nalwa, and L. S. Rohwer (ed.), "Handbook of Luminescence, Display Materials and Devices".
2. J.F. Nye, “Physical Properties of Crystals: their representation by tensor and matrices”, Clarendon Press, 1985 (or Oxford University Press 1957).
3. C.H. L. Goodman, Physics of Dielectric Solids, 1980

Learning outcomes:

Knowledge
Student
• Knows the relationships between crystal structure and their macroscopic properties (K_W01)
• Can list and characterize the experimental methods used for the nanomaterials studies (K_W03)
• Can use theoretical models as applied for the description of the crystal free energy (K_W02)
• Can list and characterize the experimental methods used for the detection and the determination of the phase transition mechanisms in the solid state (K_W05)
• Can use the theoretical models for the dielectric response description in crystals
Skills
Student
• Classifies materials as regards to their physicochemical properties (K_U02)
• Practically uses the dielectric, optical and spectroscopic techniques for the identification and studies on phase transitions in the solid state (K_U05, K_U06)
• Is capable to analyze the dielectric, optical and spectroscopic results and on the basis of which conclude on the material properties (K_U02)
• Can individually use scientific literature and internet content in order to find information on materials and methods of their investigations (K_U03)
Social competence:
• Is able to teach about polymorphysm of the solid state, nanotechnology and the luminescence material applications (K_K02)
• In lectures prepared obeys the scientific reliability rules (K_K04)
• Can assess and review a presentation of the other seminar participants, can preliminary prepare the results for publication (K_K05)

Assessment methods and assessment criteria:

Exam (written) at the end of semester

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (30 hours)

Study groups details

Group number 1

Class instructors:

prof. dr hab. Grażyna Bator

prof. dr hab. Eugeniusz Zych

dr hab. Maciej Wojtaś

dr hab. Anna Piecha-Bisiorek

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2017/18-Z	

SYLLABUS

Name: ***Biological inorganic chemistry (27-CHEn-S2-BiInCh)***
Name in Polish: **Biologiczna chemia nieorganiczna**
Name in English: ***Biological inorganic chemistry***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2017/18
Cordinator of course edition: dr hab. Elżbieta Gumienna-Kontecka prof. UWr
dr inż. Sławomir Potocki

Default type of course examination report:

Examination

Language:

English

Short description:

Objectives:
• To understand the foundations and contemporary problems of biological inorganic chemistry and the roles of metal ions in biological systems.

Description:

Content:
1. Metals in biological processes. Essential and toxic metal ions.
2. Relations between chemical properties of metal ions, structure of their complexes and their biological functions.
3. Metalloproteins.
4. Metalloenzymes.
5. Metals in biology of nucleic acids.
6. Transport, storage and homeostasis of metal ions.
7. Sodium and potassium—channels and pumps.
8. Magnesium and calcium in biological systems.
9. Zinc: Lewis acid and gene regulator.
10. Iron: essential for almost all life.
11. Copper: coping with dioxygen.
12. Nickel and cobalt: evolutionary relics.
13. Manganese: water splitting, oxygen atom donor.
14. Molybdenum, tungsten, vanadium and chromium – chemistry and biochemistry.
15. Selected methods of analysis of metal ions complexes with bio-ligands.
16. Metals in medicine, introduction to chemistry of inorganic drugs.

Bibliography:

1. J.M. Berg, S. J. Lippard „Principles of bioinorganic chemistry”, Mill Valley, CA 1994.
2. R.R. Crichton, Biological Inorganic Chemistry, An introduction, 2008.

Learning outcomes:

Knowledge:
• Student is in possession of a knowledge of biological inorganic chemistry, knows and understands terminology and chemistry of metal ions complexes of biological importance (K_W01)
• Student understands the correlations between structures of complexes and their biological activity (K_W01; K_W03)
• Student knows concepts and theories of biological inorganic chemistry, and their influence on the development of sciences (K_W06)
Skills:
• Student based on gained knowledge is able to identify and analyze problems of inorganic chemistry of biological systems (K_U02; K_U04)
• Student is able to search for information in professional literature, databases as well as other sources (K_U03)
Social Competence
• Student understands the need of continues education and constant improvement on professional competence (K_K01)
• Student understands the need of systematic contact with scientific literature in the area of biologic inorganic chemistry in order to enlarge and gain up to date knowledge (K_K05)

Assessment methods and assessment criteria:

A written exam

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (30 hours)

Study groups details

Group number 1

Class instructors:

dr inż. Sławomir Potocki

dr Marek Łuczkowski

dr hab. Elżbieta Gumienna-Kontecka, prof. UWr

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	2017/18	

SYLLABUS

Name: ***Bioorganic chemistry (27-CH-S2EM-BioChem)***
Name in Polish: **Chemia bioorganiczna**
Name in English: ***Bioorganic chemistry***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition:

Default type of course examination report:

Examination

Language:

English

Short description:

Objectives
• To understand the foundations and contemporary problems of bioorganic chemistry.
• To develop the techniques of laboratory work (isolation and spectroscopic characterization of natural products, sequencing of peptides)

Description:

Content:
Lecture (one semester 15h in total):
I. Molecules of Life
1. Chemical bonds and shape of organic molecules
2. Nucleotides and nucleic acids
3. Amino acids, peptides and proteins
4. Carbohydrates and lipids
5. „Natural Products" – secondary metabolites
II. Biological Activity
1. Quantitative aspects of biological activity
2. Examples of molecular targets: receptors, ion channels and their ligands
3. Molecules interacting with nucleic acids
4. Enzyme inhibitors and molecules interacting with proteins involved in cellular adhesion
5. Designing of biologically active compounds
Laboratory (one semester, 15h,)
1. Isolation of natural products from biological sources.
2. Chemical and spectroscopic characterization of organic compounds.
3. Chromatographic methods: TLC, gel filtration, HPLC.
4. Peptide chemistry: synthesis and sequence analysis.

Bibliography:

1. Stryer, L. Biochemistry. 3d Ed. New York: W. H. Freeman and co. 1988.
2. Gareth, T Medicinal Chemistry: An Introduction 2nd Ed. John Wiley and Sons, 2007
3. Clayden, J. Organic Chemistry OUP Oxford 2001
4. J McMurry, T. Begley, The organic Chemistry of Biological Pathways Roberts and Company Publishers, Englewood Colorado 2005

Learning outcomes:

Knowledge
Student:
• Knows and understands stereochemistry of molecules of biological origin (sugars, nucleotides, lipids, amino acids, natural products) (K_W01)
• Understands the correlations between structures of chemical compounds and their biological activity (K_W01)
Skills
Student:
• Is able to classify biomolecules and describe their sterochemical properties (K_U02)
• Has basic laboratory skills including isolation and characterization compounds from biological sources. (K_U01)
• Writes research reports (K_U08)
Social Competence
• Student respecting laboratory safety rules (K_K05)

Assessment methods and assessment criteria:
Lecture: A oral exam Laboratory: The day-by-day assessment conducted by the instructor during the laboratory work and evaluation of written report on performed experiments

Information on course edition:

Default type of course examination report:
Examination
Bibliography:
missing bibliography in English

Details of classes and study groups

Lecture (15 hours)

Study groups details

missing study groups details

Lab (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	2013/14-L	

SYLLABUS

Name: ***Catalysis and Green Chemistry (27-CHEn-S2-CatGrChW)***
Name in Polish: **Kataliza i Zielona Chemia**
Name in English: ***Catalysis and Green Chemistry***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2020/21
Cordinator of course edition: dr Nurbey Gulia

Default type of course examination report:

Examination

Short description:

Course objectives
- Knowledge of the principles of green chemistry and their practical applications in the chemical laboratory and in modern technology;
- An introduction to students with the basic theory of catalysis for use in green chemistry;
- Assimilation of methods of catalytic processes, improvement of catalysts and technology processes leading to reduction of concentration of harmful substances, the introduction of new alternative technologies, catalysis for the production of organic fuels, catalysts for the purification of exhaust gases, the mechanisms of degradation of harmful substances to the environment in the presence of photocatalysts and catalysts for fuel cells;
- An introduction to students with practical laboratory exercises, showing the application of green chemistry and catalysis.

Description:

Course content
Lecture:
The classification of solvents due to their appropriability in chemical processes. The phenomenon of catalysis, classification of the catalytic processes, activity and selectivity of catalysts, homo-and heterogeneous catalysis - potential applications towards green chemistry. Examples of application of heterogeneous and enzymatic catalysis in environment-friendly processes. Classification of photocatalysts. Catalysis in the production of fuels and organic fuels. Catalysts for purification of exhaust gas. Characteristics and application of the supercritical fluids. Application of microwave and ultrasound energy in chemical processes. Ionic liquids-synthesis, properties and applications in green chemistry. The mechanisms of degradation of the harmful compounds to the environment in the presence of TiO2, photocatalytic processes applied to water purification. Catalysts for fuel cells. Photocatalysts for water oxidation. The use of renewable materials and biotechnological methods in chemical synthesis.
Exercise (labs):
- Application of ionic liquids in the extraction of cobalt(II) compounds.
- Thermochromism of copper(II) anionic complexes.
- Recycling of the aluminum waste.
- Efficiency tests of the various solar filters using UV-Vis spectroscopy.
- Synthesis and analysis of the antimicrobial agent - pyrithione zinc.
- Synthesis of chrome alum (chromium(III)-potassium sulfate).
- Photocatalytic decomposition of organic dyes using different heterogeneous photocatalysts. Test the rate and efficiency using UV-Vis spectroscopy.
-Synthesis and characterization of heterogeneous catalyst and use to synthesize fuel component - MTBE. Catalytic process and analysis of the products by using GC chromatography.

Bibliography:

1. A.S. Matlack, Introduction to green chemistry, CRC Press, 2010;
2.P.T. Anastas, J.C. Warner, Green Chemistry: Theory and Practice, Oxford University Press, 1998;
3.G.P. Chiusoli, P.M. Maitlis, Metal-catalysis in industrial organic processes, RSC Publishing, 2006;
4.G. Rothenberg, Catalysis. Concept and Green applications, Wiley-VCH, 2008.

Learning outcomes:

Knowledge
Student
• Knows the rules of green chemistry (K_W01, K_W06)
• Understands the role of catalysis in modern chemical processes (K_W01, K_W06)
• Classifies the solvents due to their usefulness in specific chemical processes (K_W01)
• Knows and understands the rules for the application of microwave and ultrasound energy in chemical processes (K_W05)
• Has knowledge of the basics of the catalysis in aspect of green chemistry. (K_W01)
Skills
Student

• Analyses the processes and chemical reactions for their compatibility with the principles of green chemistry (K_U01)
• Selects solvents and reaction conditions, in accordance with the principles of green chemistry (K_U01)
• Is able to obtain a heterogeneous catalyst/photocatalyst and test its activity (K_U01, K_U03)
• Can use the results of chromatographic and spectroscopic measurements in analysis of activity for obtained catalysts (K_U02)
Social competence
Student:
• Understands the need for a systematic review of the literature to broaden their knowledge in the field of green chemistry and catalysis (K_K01)
• Has the ability to organize team work in order to achieve the scheduled tasks; (K_K02)

Assessment methods and assessment criteria:

Lecture: Written exam, possible oral improvement of the notes.
Exercise (labs): a report on the exercise, proper execution of exercises according to the plan, reports containing theoretical part with short review of literature, descriptions of actions and analysis of the obtained results.

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	3	2017/18	

SYLLABUS

Name: ***Chemistry in action: ideas and applications (27-CHEn-S2Zi-ApChiAc)***
Name in Polish: **Chemia w działaniu: pomysły i zastosowania**
Name in English: ***Chemistry in action: ideas and applications***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2017/18
Cordinator of course edition: prof. dr hab. Jerzy Lisowski

Default type of course examination report:

Examination

Language:

English

Short description:

Course objectives
The lecture presents selected modern research trends in chemistry and illustrates the importance of creativity in the development of applications and technology. The lecture may be accompanied by the exercises in English communication – discussion and students own presentations.

Description:

Course content
The lecture encompasses selected examples related to many areas of chemistry: Smart contrast agents for medical imaging, molecular machines, sensors, molecular switches, nanotechnology and molecular computers, NO and Viagra story, enantioselective catalysts in pharmaceutical industry, artificial nucleases and antisense technology, optical, conducting and magnetic materials

Bibliography:

The literature for the exam is dependent on the topic of master thesis of each individual student and is related to applications of given field of chemistry

Learning outcomes:

Knowledge
• Student understands the role of creativity in developing new technologies, knows research trends in various areas of chemistry related to applications (K_W06)
• Student is able to link the basic knowledge of inorganic, organic, analytical chemistry, biochemistry and physicochemical methods with development of new technologies and products (K_W01)
Skills
• Can analyse the chemical literature in the selected fields in order to follow the progress of high-tech technologies for particular fields of studies, (K_U03)

Assessment methods and assessment criteria:

Oral exam – questions will pertain to the field of chemistry related to the topic of master thesis of each individual student

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (45 hours)

Study groups details

Group number 1

Class instructors:

prof. dr hab. Jerzy Lisowski

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	3	2017/18-Z	

SYLLABUS

Name: ***Combinatorial chemistry (27-CHEn-S2Zi-ComChW)***
Name in Polish: **Chemia kombinatoryczna**
Name in English:

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2020/21
Cordinator of course edition: dr Alicja Kluczyk

Default type of course examination report:

examination or credit

Language:

English

Short description:

Objectives
• Providing students with knowledge of combinatorial chemistry
• Presentation of modern methods of design and synthesis of bioactive compounds
• Presentation of applications of combinatorial chemistry in medicinal, analytical and organic chemistry, and certain aspects of inorganic chemistry

Description:

Course content
Lecture: Combinatorial chemistry. Combinatorial libraries. Natural libraries: immune response, proteins, antibiotics, polyketides, phage systems and viruses. Synthetic and virtual libraries.
Combinatorial biosynthesis. General and focused libraries, library design, deconvolution. Chemical diversity, Synthetic and analytical procedures, screening protocols, HTPS. Application of combinatorial libraries in biological and organic chemistry as well as in analytical chemistry and material science.
Development of inhibitors and catalysts. Bioinformatics and data mining.
Laboratory: Classical organic synthesis, solid phase chemistry and polymer-assisted solution synthesis. Design of a library, synthesis, analysis, prediction of physicochemical and biological properties. Evaluation of synthetic methods. Applications of solid phase synthesis: biopolymers and natural products, combinatorial libraries, analytical applications.

Bibliography:

1. K. Burgess, "Solid-phase organic synthesis", Wiley 2000.
2. G. Fassina, S. Miertus (eds) Combinatorial chemistry and technologies : methods and applications, Boca Raton: CRC/Taylor & Francis, 2005.
3. L.A. Thompson, J.A. Ellman, "Synthesis and Applications of Small Molecule Libraries", Chem. Rev., 555, 96, 1996.
4. "ACS Combinatorial Chemistry" (Journal of American Chemical Society).

Learning outcomes:

Knowledge
Student
• is in possession of an extensive knowledge of main concepts of combinatorial chemistry and diversity of organic compounds (K_W01)
• is in possession of extensive knowledge (K_W03)
• has knowledge of the procedures used in search for bioactive compounds, novel materials and reagents for particular fields of studies of experimental methods applicable in the field of combinatorial chemistry (K_W06)
Skills
Student
• is able to plan the design, synthesis and analysis of combinatorial libraries (K_U01)
• is able to search for information in professional literature, databases as well as other sources (K_U03)
• is able, in an advanced manner, to present research results and literature data in a written form (K_U06)
Social competence
Student
• understands the need of systematic contact with scientific literature to extend and integrate the acquired information with knowledge of chemistry (K_K05)
• is able to plan and conduct the experiments in cooperation with other students, following the safety procedures (K_K02)

Assessment methods and assessment criteria:

Lecture: semester paper, written test

Information on course edition:

Default type of course examination report:

examination or credit

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2017/18-Z	

SYLLABUS

Name: ***Communication, speech freedom and other human rights and freedoms in democratic society (27-CHEn-S2R2-CSFOH)***

Name in Polish: **Komunikacja, wolność słowa oraz inne prawa i wolności człowieka w demokratycznym społeczeństwie**

Name in English: ***Communication, speech freedom and other human rights and freedoms in democratic society***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition: dr Łukasz Żukowski

Default type of course examination report:

Grading

Language:

English

Short description:

Course objectives
Completing the course student should:
• Have a general knowledge of functioning democracy and the role of information, speech freedom, knowledge based economy and human rights and freedoms
• Indicate the basic legal acts that regulate activity of media.
• Be able to find necessary legal information
• Know the rights and obligations of creator and user of intellectual property
• Know in which situations apply for a legal aid.
• Understand the issue of copyright.
• Understand the principles of legal responsibility.
• Understand the matter of copyright protection.
• Be able to participate in a short discussion concerning democracy, speech freedom, knowledge based economy and human rights and freedoms in English

Description:

Course content
1. Meaning and nature of law and democracy.
2. Sources of law in the Constitution of RP.
3. Legal system
4. Media in international regulations
5. Specific responsibilities of media.
6. Advertising Law
7. The issue and limits of freedom of expression
8. Rights and obligations of journalists
9. Law on Competition in activity of media.
10. The issue and protection of copyright and related rights.
13. Digital media law
14. Right for privacy.

Bibliography:

1. Media law and ethics, R.L. Moore, D.Murray, New York, London 2008
2. Law of the European Convention on Human Rights, D. J. Harris, M. O'Boyle, C. Warbrick, E. Bates, Oxford 2009
3. Impact of European Integration on the Law and Constitutional System in Poland, B. Banaszak, Warszawa 2009

Learning outcomes:

Knowledge
student possesses an extensive knowledge of man as a creator of culture, deepened in relation to selected areas of human activity (K_W11)

Assessment methods and assessment criteria:

Attendance, oral activity, written/computer presentation.

missing attribute description in English

obligatory courses

Information on course edition:

Default type of course examination report:
Grading
Bibliography:
missing bibliography in English

Details of classes and study groups

Lecture (30 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	5	2017/18-L	

SYLLABUS

Name: ***Computer design and modelling of new materials (27-CH-S2EM-ComDM)***
Name in Polish: **Komputerowe projektowanie i modelowanie nowych materiałów**
Name in English: ***Computer design and modelling of new materials***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition:

Default type of course examination report:

Examination

Language:

English

Short description:

Course objectives
Knowledge of advanced molecular modelling methods, ability of application presented metod for modelling new materials

Description:

Course content
The Born-Oppenheimer approximation and potential energy surface (PES). Energy minimization and related methods for exploring the PES – determination stable structures, transition state structures and reaction pathways. Genetic algorithms. Quantum chemical topology methods for analysis of the chemical bond nature: Atoms in Molecules (AIM) and Electron Localization Function (ELF). Calculations of excited states – CI and DTDFT. Molecular dynamics simulation methods – classical and ab initio. Dissipative particle dynamics. Monte Carlo simulation methods. Modelling of solid state. Protein structure prediction and modeling of protein folding. Molecular docking. Quantitative structure – activity relationship.

Bibliography:

1. I.N. Levine, "Quantum chemistry", 7th ed., Pearson Education, 2014.
2. F. Jensen, "Introduction to computational chemistry", IInd ed., Wiley, New York, 2009.
3. C.J. Cramer, "Essentials of computational chemistry. Theories and models", Wiley, 2004.
4. L. Piela, "Idee chemii kwantowej", 2. wydanie, PWN, Warszawa, 2011.
5. D. Marx, J. Hutter, „ Ab initio molecular dynamics. Basic theory and advanced methods“, Cambridge University Press, 2009.

Learning outcomes:

Knowledge
Student
• Is possession of knowledge in the scope of molecular modelling and methods of molecular modelling. (K_W03, K_W04)
• Is in possession of general knowledge of current development directions in molecular modelling methods.(K_W06)
Skills
• Is able to use molecular modelling methods in study of molecular properties of systems. (K_U01)
• Is able to asses results of theoretical computations in critical way. (K_U02)
• Is able to present results of molecular modelling in a written and oral form in English. (K_U05)

Assessment methods and assessment criteria:

Lecture: exam (written, possibility to correct the mark on oral exam)
Laboratory: permanent evaluation, final report.

missing attribute description in English
elective courses

Information on course edition:

Default type of course examination report:
Examination
Bibliography:
missing bibliography in English

Details of classes and study groups

Lecture (30 hours)

Study groups details

missing study groups details

Lab (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	6	2013/14-L	

Chemistry (CH-K-S2)

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	3	2018/19-Z	

SYLLABUS

Name: ***Entrepreneurship and IP protection (27-CHEn-S2R2-EnIP)***
Name in Polish: **Przedsiębiorczość i ochrona własności intelektualnej**
Name in English: ***Entrepreneurship and IP protection***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition: prof. dr hab. Sławomir Szafert

Default type of course examination report:

Grading

Language:

English

Short description:

Course objectives:
1. To acquaint students with successive stages of an introduction of new technologies to the market
2. To acquaint students with different ways of IP protection

Description:

Course content
1. Introduction to a global high technology market
2. Assessment of individual business skills
3. Selection of a new business idea from a high technology area
4. Market evaluation of a new idea/technology
5. Study of market competitiveness
6. Possible methods of IP assessment and protection
7. Raising capital for innovative activity/business
8. Learn successive stages on an introduction of a technology to the market
9. Registration and introduction of a new entity into the market

Bibliography:

1. Dan Senor, Saul Singer, Start-op Nation, New York, 2008
2. ACS Webinars

Learning outcomes:

Knowledge:
Student knows the basic concepts and principles of intelectual property protection and copyright law and uses patent information (K_W08, K_W09)
Student knows the basic principles of creating and developing forms of individual entrepreneurship using knowledge of chemistry (K_W10)
Skills:
Students can learn independently (K_U04)
Social competences:
Student can think and act in an entrepreneurial way (K_K06, K_K07)

Assessment methods and assessment criteria:

Writing a business plan for someone's OWN innovative idea

missing attribute description in English

obligatory courses

Information on course edition:

Default type of course examination report:

Grading

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2017/18-L	

SYLLABUS

Name: ***Forensic chemistry (27-CHEn-S2-ForChW)***
Name in Polish: **Chemia kryminalistyczna**
Name in English: ***Forensic chemistry***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Winter semester 2020/21
Cordinator of course edition: dr hab. Mariola Kuczer
dr Alicja Kluczyk

Default type of course examination report:

Examination

Language:

English

Short description:

Course objectives
• Providing students with knowledge of forensic chemistry, and differences between regular analytical chemistry and analytical methods for forensic purposes
• Developing skills related to selection of proper research method for the forensic problem
• Training in searching and applying scientific information to forensic tasks, analysis of results and preparation of reports
• Practice in application of laboratory methods and advanced analytical procedures to solving forensic problems.

Description:

Course content
Lecture: Forensic chemistry: history and methods. Analytical methods in forensic chemistry. Material evidence and biological traces. Toxic substances and their methabolism. Detection and identification of psychoacitive substances. Fingerprints, blood traces, analysis of hair and fibers. GSR and arson analysis. Forensic analysis of documents.
Seminar: Discussion of forensic cases and suitability of method selection
Laboratory: Analysis of forensic samples. Reporting results and discussing quality of data.

Bibliography:

1. S. Bell. Forensic Chemistry. Prentice Hall, Upper Saddle River, New Jersey 2006.
2. Th. Kubic, N. Petraco. Forensic Science Laboratory Manual and Workbook. Taylor & Francis Boca Raton, London, New York, Singapore 2005.
3. P. White, Crime scene to court: essentials of forensic science. The Royal Society of Chemistry 1998.
4. R. Saferstein, Criminalistics. An Introduction to Forensic Science. Seventh Edition. Prentice Hall New Jersey 2001

Learning outcomes:

Knowledge
Student:
• possesses extended knowledge of chemistry, knows chemical concepts and theories, and their importance in the development of science (K_W01)
• is in possession of extended knowledge of experimental and numerical methods used in forensic chemistry (K_W03)
• knows the occupational safety rules sufficiently enough to be able to work as an independent researcher or analyst (K_W07)
• possesses basic knowledge of legal and ethical regulations related to science and education (K_W08)
Skills
Student:
• is able to plan and perform the syntheses and physicochemical studies of chemical compounds and to analyse the obtained results (K_U01)
• is able to critically evaluate the results of experiments, observations and theoretical calculations, and assess the experimental errors (K_U02)
• is able to find required information in scientific literature, databases and other sources (K_U03)
• is able, in an advanced manner, to present research results and literature data in a written and oral form (K_U05)
Social competence
Student:
• understands the need for continuous education and professional development, is able to organize the education of others (K_K01)
• understands the need to systematically follow the professional literature to broaden the knowledge (K_K05)
• can cooperate within a group (work in a team), assuming various roles (K_K02)

Assessment methods and assessment criteria:

Lecture: written exam (test and open questions)

Seminar: regular presentation and discussion of forensic chemistry problems
Laboratory: Analysis of samples, evaluation of data, written report

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (10 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	1	2016/17-Z	

SYLLABUS

Name: ***Master Research Project (27-CHEn-S2-MRPro)***
Name in Polish: **Pracownia magisterska**
Name in English: ***Master Research Project***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Academic year 2020/21
Cordinator of course edition:

Default type of course examination report:

Grading

Language:

English

Short description:

Course objectives
preparation of the diploma thesis

Bibliography:

Books and publications necessary to write a diploma thesis

Learning outcomes:

Knowledge
Student
• has in-depth knowledge of the subject matter of the diploma thesis. (K_W01, K_W03, K_W05)
• has knowledge about the principles of safe work in the laboratory (K_W07)
Skills
Student
• can independently perform experimental research related to the implementation of the diploma thesis and analyze results (K_U01, K_U02)
• independently acquires the knowledge necessary to carry out the diploma thesis. (K_U03)
• is able to prepare a diploma thesis based on own results or source data. (K_U05, K_U06)
• can prepare a multimedia presentation of their own results. (K_U05, K_U06)
Social competence
Student
• understands the need for continuous acquisition of current knowledge on a given topic (K_K01, K_K05)
• is able to accomplish the entrusted task (K_K03)

Assessment methods and assessment criteria:

Assessment of the diploma thesis by the supervisor and the reviewer.
Multimedia presentation of the results of the diploma thesis.

Information on course edition:

Default type of course examination report:

Grading

Bibliography:

missing bibliography in English

Details of classes and study groups

Thesis Lab

Study groups details

Group number 1

Class instructors:

prof. dr hab. Anna Trzeciak

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	33	2018/19	

Exchange programme – undergraduate studies (WYMIANA-S1)

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	25	2018/19	

SYLLABUS

Name: ***Molecular magnetism (27-CH-S2EM-MolMag)***
Name in Polish:
Name in English: ***Molecular magnetism***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition:

Default type of course examination report:

Examination

Language:

English

Short description:

Course objectives
The aim of course is to get acquainted with magnetic phenomena in chemistry, biology from both experimental and theoretical perspectives

Description:

Course content
Theory of molecular magnetism: definitions and units, magnetization and magnetic susceptibility, diamagnetic and paramagnetic susceptibilities, classification of magnets, fundamental equations in molecular magnetism , Van Vleck formula, temperature- independent paramagnetism, the Curie Law. Intermolecular interactions. The role of electronic and crystal structures in magnetic properties. High- and low-spin complexes. Zero – Field Splitting Effect. New molecular materials: ferro- and ferrimagnetic chain compounds, single molecular magnets (SMM), single chain magnets (SCM). Relaxation process. Magnetic long – range ordering in molecular compounds: design of molecular-based magnets. Magnetic compounds in biological system. Living organism in a strong and weak magnetic fields. Method of magnetic measurements.

Bibliography:

1. A. F. Orchard, Magnetochemistry, Oxford University Press, 2007
2. O. Kahn, Molecular Magnetism, VCH, New York, 1993.
3. P. Day, Molecules into Materials, Worrld Scientific Publishing Co. Pte. Ltd.,London, 2007
4. D. Gatteschi, O. Kahn, J.S. Miller, F. Palacio, Magnetic molecular materials, Kluwer Acad. Publ. 1989.

Learning outcomes:

Knowledge:
Student:
- know the physical basics of molecular magnetism and solid phase and the types of behaviors in magnetic field (K_W01)
- know the basic parameters determining the type and nature of the magnetic material (K_W01)
- can indicate and describe the characteristics of magnetic materials and their application in industry, technology (K_W06)
- extends knowledge of the scope of magnetochemistry to structural and analytical researches (K_W03)
- knows the structural and geometrical factors determining the strength and type of magnetic interactions (K_W03)
- know the concept of magnetic long-range order and magnetic superexchange (K_W01)
- know the computing technology applied to experimental magnetic data conversion (K_W04)
- know the modern techniques of magnetic measurements(K_W05)

Skills:
Student:
- can match the conditions enabling the maximum use of magnetic measurement methods for chemical research (K_U01)
- can prepare the sample for measurement in the Gouy and SQUID method (K_U01)
- know how to analyze the measured values of magnetization in order to determine the characteristic parameters of magnetochemistry (K_U02)
- can find necessary information required for the correct interpretation of the experimental results in the literature and databases (K_U03)
- carry out own interpretation of results obtained and draw structural applications can correlate the results obtained with the crystal structure and literature data (K_U03)
- can indicate the use of physic-chemical parameters of magnets in modern industrial technologies: high-temperature superconductors, magnets, sensors and molecular switches. (K_U02)
- can draw conclusions of their own research and present. Able to develop and present the results of research, writing and oral. (K_U04; K_U05)

Social competence:
- Student acquires experience in independent and responsible research work; understand the need for continuous training and upgrading professional competence. Can achieve a goal of the task (K_K03)

Assessment methods and assessment criteria:

lecture:

- monitoring attendance and progress on the course subject matter,
- written exam or
- oral, individual presentation on selected issues
laboratory:
- monitoring attendance on the course
- making a magnetic measurement using Gouy and SQUID method.
- writing a class report

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (15 hours)

Study groups details

missing study groups details

Lab (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	2013/14-L	

SYLLABUS

Name: ***Molecular modelling (27-CHEn-S2R1-MoModW)***
Name in Polish: **Modelowanie molekularne**
Name in English: ***Molecular modelling***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition:

Default type of course examination report:

Examination

Language:

English

Short description:

Course objectives
Knowledge of fundamental molecular modelling methods, ability of application presented metod for molecular systems

Description:

Course content
Molecular mechanics methods, presentation of different force fields. Theoretical backgrounds of quantum chemical methods: the Hartree-Fock method, semiempirical methods, ab initio SCF methods, basis functions, electron correlation methods (MPn, CI and CC), theory functional methods. Methods of optimization of geometrical structures of chemical systems (stationary points of the potential energy surface, localization of transition states). Modelling of chemical reactions.
Modelling of structures and properties of molecular systems in gas phase and in solvents (supermolecular model and continuum models of environment). Theory of molecular interactions – interpretation on base of perturbation theory and supermolecular approach. Hybrid methods (QM/MM and ONIOM methods). Application of quantum chemical methods in molecular spectroscopy. Monte Carlo methods – fundamentals and application to chemical systems. Molecular dynamics methods (classical and ab initio) – fundamentals and application to chemical systems.

Bibliography:

1. I.N. Levine, "Quantum chemistry", 7th ed., Pearson Education, 2014.
2. F. Jensen, "Introduction to computational chemistry", IInd ed., Wiley, New York, 2009.
3. C.J. Cramer, "Essentials of computational chemistry. Theories and models", Wiley, 2004.
4. L. Piela, "Idee chemii kwantowej", 2. wydanie, PWN, Warszawa, 2011.
5. D. Marx, J. Hutter, „ Ab initio molecular dynamics. Basic theory and advanced methods“, Cambridge University Press, 2009.

Learning outcomes:

Knowledge
Student
• Is possession of knowledge in the scope of molecular modelling and methods of molecular modelling. (K_W03, K_W04)
• Is in possession of general knowledge of current development directions in molecular modelling methods.(K_W06)
Skills
Student
• Is able to use molecular modelling methods in study of molecular properties of systems. (K_U01)
• Is able to asses results of theoretical computations in critical way.(K_U02)
• Is able to present results of molecular modelling in a written and oral form in English. (K_U05)

Assessment methods and assessment criteria:

Lecture: exam (written, possibility to correct the mark on oral exam)
Laboratory: permanent evaluation, final report.
Seminar: individual presentation.

missing attribute description in English

obligatory courses

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (20 hours)

Study groups details

missing study groups details

Compuler Lab (30 hours)

Study groups details

missing study groups details

Seminar (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	11	2017/18-L	

SYLLABUS

Name: ***MSc Seminar (27-CHEn-S2R2-MScsem)***
Name in Polish: **Seminarium magisterskie**
Name in English: ***MSc Seminar***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition:

Default type of course examination report:

Grading

Short description:

Objectives
Presentation and discussion of results of experimental examinations carried out in order to write a thesis.

Description:

Content
Issues of chemistry approved by the Council of the Faculty of Chemistry as topics of diploma theses

Bibliography:

Books and publications necessary to write a diploma thesis

Learning outcomes:

Knowledge
• student possesses extended knowledge in the scope of chosen specialty of chemistry (K_W01)
Skills
• student is able to develop and present problems in the field of chemistry (K_U02, K_U03,K_U05)

Assessment methods and assessment criteria:

individual presentation

missing attribute description in English

obligatory courses

Information on course edition:

Default type of course examination report:

Grading

Bibliography:

missing bibliography in English

Details of classes and study groups

Master Degree Seminar (30 hours)

Study groups details

Group number 1

Class instructors:

prof. dr hab. Cyryl Latos-Grażyński

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	6	2017/18	

SYLLABUS

Name: ***Protein chemistry (27-CH-S2EM-ProChem)***
Name in Polish: **Chemia białek**
Name in English: ***Protein chemistry***

Information on course:

Course offered by department: Faculty of Chemistry
Course for department: Faculty of Chemistry
Term: Summer semester 2020/21
Cordinator of course edition:

Default type of course examination report:

Examination

Language:

English

Short description:

Objectives:
Knowledge of peptide and protein chemistry, with emphasis on peptide synthesis and chemical modification of proteins.

Description:

Content:
Lecture (one semester 15h in total):
1. Chemical properties of amino acids.
2. Protein structures
3. Synthesis of peptides and peptidomimetics.
4. Protein purification and characterization.
5. Chemical and enzymatic modifications of proteins.
Laboratory (one semester, 15h,)
Implementation of methods presented in the lecture. For protein isolation and analysis.

Bibliography:

1. Sewald, N., Jakubke, H.B., Peptides: Chemistry and Biology. Wiley-VCH Verlag GmbH & Co. KGaA 2002
2. Lubdbad, R. Techniques in protein modification, CRC Press, Boca Raton-Ann Arbor-London-Tokyo 1995.
3. Dennison, C. A guide to protein isolation, Kluwer Academic Publishers, New York, Boston, London, Moscow 2002

Learning outcomes:

Knowledge
Student:
- Knows and understands chemical properties od amino acids, peptides and proteins (K_W01)
- Understands basic methods (isolation, synthesis purification and analysis) used in peptide and protein chemistry (K_W03)
Skills
Student:
- Is able to propose a method of synthesis and purification of peptides, based on their sequence (K_U02)
- Has basic laboratory skills including isolation, purification and characterization of peptides and proteins. (K_U01)
- Writes research reports (K_U05)
Social Competence
- a responsibility for accurate experimental work and critical data interpretation (K_K04)
- student respecting laboratory safety rules (K_K06)

Assessment methods and assessment criteria:

Lecture: A oral exam
Laboratory: The day-by-day assessment conducted by the instructor during the laboratory work and evaluation of written report on performed experiments

Information on course edition:

Default type of course examination report:

Examination

Bibliography:

missing bibliography in English

Details of classes and study groups

Lecture (15 hours)

Study groups details

missing study groups details

Lab (15 hours)

Study groups details

missing study groups details

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	2013/14-L	