CONTENT

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ NMR1/00	**Course name:** 1D & 2D NMR Spectroscopy

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 3 **Per study period:** 28 / 42
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
1. Attendance at lectures and seminars (this also applies to the online form of teaching)
2. Activity at seminars (also applies to the online form of teaching) - theoretical preparation of students for all seminars is required
3. Elaboration of written assignments (20% of the total evaluation) according to the teacher's instructions.
4. Passing the final test (30% of the total evaluation).
5. Exam (written 25% and oral part 25%).

Learning outcomes:
The aim of the course is to get acquainted with 1D and 2D NMR methods and the application of the acquired knowledge in solving NMR problems.

Brief outline of the course:
1. Advanced 1D NMR methods
a) 13C NMR experiments – APT, DEPT
b) NOE experiments
c) Selective experiments
2. 2D NMR methods
a) Proton-proton correlation through coupling – COSY, TOCSY
b) Proton-proton correlation through space - NOESY
c) Proton-carbon correlation – HSQC/HMQC/HETCOR, HMBC, H2BC, EXSIDE
d) Carbon-carbon correlation - INADEQUATE

Recommended literature:
1. H. Friebolin: Basic One- and Two-Dimensional NMR Spectrocopy, 5. Ed., Wiley, 2010.
2. T. D. W. Claridge: High-Resolution NMR Techniques in Organic Chemistry, 5. Ed., Elsevier, 2016.
3. Atta-ur-Rahman, M. I. Choudhary: Solving Problems with NMR spectroscopy, Academic Press 1996.

Course language:
english

Notes:
Teaching is carried out in person or, if necessary, online using the MS Teams or BBB (BigBlueButton) tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 193

A	B	C	D	E	FX
40.41	25.39	23.83	8.81	1.55	0.0

Provides: doc. RNDr. Mária Vilková, PhD.

Date of last modification: 28.01.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/POP/15	**Course name:** Advanced Practical from Physical Chemistry

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 6 **Per study period:** 84
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Previous semstral experimental Works, presentation at departmental seminar with results of master degree and discussion.

Learning outcomes:
Master degree thesis, students will gain experience with writing of thesis.

Brief outline of the course:
Experimental laboratory work with selected problems of master degree thesis.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 26

abs	n
100.0	0.0

Provides: doc. RNDr. Andrea Straková Fedorková, PhD., prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Andrea Morovská Turoňová, PhD., RNDr. Ján Macko, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ROP/15	**Course name:** Class Project

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 6 **Per study period:** 84
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 2., 4.

Course level: II.

Prerequisities:

Conditions for course completion:
Experimental work in physical and organic chemistry laboratories, evaluation of results, discussion, results presentation, seminars and scientific meetings.

Learning outcomes:
Project work and presentation.

Brief outline of the course:
Experimental work in research field for master degree . Evaluation of results and verbal presentation and discussion about.

Recommended literature:
Recent journal references.
Chemical on-line databases.

Course language:
english

Notes:
Teaching is carried out in person or, if necessary, online using the MS Teams or BigBlueButton tools. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 68

abs	n
100.0	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Andrea Morovská Turoňová, PhD., doc. RNDr. Andrea Straková Fedorková, PhD., doc. RNDr. Ladislav Janovec, PhD., RNDr. Ján Elečko, PhD., RNDr. Jana Špaková Raschmanová, PhD., RNDr. Monika Tvrdoňová, PhD., RNDr. Mariana Budovská, PhD., univerzitná docentka, RNDr. Slávka Hamuľaková, PhD., univerzitná docentka, doc. RNDr. Mária Vilková, PhD., RNDr. Zuzana Kudličková, PhD., doc. RNDr. Miroslava Martinková, PhD., univerzitná profesorka

Date of last modification: 07.11.2022
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FKC1/03	**Course name:** Colloid Chemistry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Approved calculation exercises tests and an approved written examination
Examination For sucsesfull exam must be shown 51% of right results.

Learning outcomes:
To clarify basic physicochemical principles of colloid disperse systems (size of dispersed particles is from 1 nanometre to 1 micrometre) to understand several important problems of technology and nature. The students obtain primary information on colloid chemistry.

Brief outline of the course:
Classification and characterization of dispersed systems. Heterogeneity of colloidal systems. Optical properties of colloids. Theory of light scattering. Molecular-kinetic properties. Brownian motion, diffusion, osmosis, and sedimentation. Adsorption-basic concepts. Electrokinetic phenomena and their application. Structure, stability and coagulation of colloids. Rheology of dispersed systems. Gels. Aerosols. Solid dispersions, emulsions and foams. The theory is applied during laboratory and calculation exercises.

Recommended literature:
W.J. Moore: Physical Chemistry, Longman, London 1972
P.C. Hiemenz: Principles of Colloid and Surface Chemistry, M. Dekker, New York 1986
P.W. Atkins: Physical Chemistry, Oxford University Press, Oxford, New York 2002

Course language:

Notes:

Course assessment
Total number of assessed students: 39

A	B	C	D	E	FX
92.31	2.56	5.13	0.0	0.0	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KPPaPZ/KK/07	**Course name:** Communication and Cooperation

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Evaluation:
A condition for student evaluation is his active participation in the seminar. It is expected that the student will actively participate in the discussions and will express their positions and possible solutions.
The output for evaluation will be the development of a project in the form of a Power Point presentation or a video on a selected communication topic.

Learning outcomes:
The goal of the subject Communication, cooperation is the formation and development of students' language and communication skills through experiential activities.
The student can demonstrate an understanding of individual behavior in various communication contexts.
The student can describe, explain and evaluate communication techniques (cooperation, assertiveness, empathy, negotiation, persuasion) in practical contexts.
The student can apply these techniques in common communication schemes.

Brief outline of the course:
Communication
Communication theory
Non-verbal communication and its means
Verbal communication (basic components of communication, language means of communication) about active listening
Empathy
Short conversation and effective communication (principles and principles of effective communication)
Cooperation
About the basics of cooperation
About types, signs, types and factors of cooperation
Characteristics of the team (positions in the team)
Small social group (structure, development, characteristics of a small social group, position of the individual in the group)

About leadership (characteristics of the leader, management, leadership styles)

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 281

abs	n	z
98.22	1.78	0.0

Provides: Mgr. Ondrej Kalina, PhD., Mgr. Lucia Barbierik, PhD.

Date of last modification: 31.07.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FOCHP1/04	**Course name:** Corrosion and Surface Protection

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:
Continuous test.
Completion of practical exercises.
Exam, answering each question at least 50%.

Learning outcomes:
Study of chemical and electrochemical degradation processes of metallic materials, including specific forms of their corrosion. Gaining knowledge of the general conditions of protection of metals against corrosion.

Brief outline of the course:
Chemical corrosion of metals. Chemical and electrochemical degradation processes, specific forms of corrosion. Oxidic layers. Vanadic corrosion. Hydrogen corrosion. Chemical corrosion in nonelectrolytes. Electrochemical corrosion. Electrode potentials.
Thermodynamics and kinetics of electrochemical corrosion. Corrosion influence on the quality and properties of the materials. Contact corrosion. Soil corrosion. Surface protection. Electrochemical protection. Corrosion properties of the Cu, Al, Ti, Zn, Mg, Sn and Pb.
Ecological aspects of the corrosion and metal protection.

Recommended literature:
P. R. Roberge: Corrosion Basics, An Introduction, NACE International, 2006.
D. Jones: Principles and Prevention of Corrosion, 2nd edition, Upper Saddle River, New Jersey, Prentice Hall, 1996.

Course language:

Notes:
Teaching is carried out in person. If a distance form is required, the lectures will take place online, using the BigBlueButton tool (https://bbb.science.upjs.sk/). Other conditions will be specified by the teacher.

Course assessment
Total number of assessed students: 25

A	B	C	D	E	FX
84.0	12.0	0.0	4.0	0.0	0.0

Provides: RNDr. Andrea Morovská Turoňová, PhD., RNDr. Jana Shepa, PhD.

Date of last modification: 24.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ ODPFC/01	**Course name:** Defence of Diploma Thesis

Course type, scope and the method:
Course type:
Recommended course-load (hours):
Per week: Per study period:
Course method: present

Number of ECTS credits: 16

Recommended semester/trimester of the course: 3., 4..

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 63

A	B	C	D	E	FX
87.3	6.35	3.17	1.59	1.59	0.0

Provides:

Date of last modification: 26.01.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FEM/03	**Course name:** Electroanalytical Methods

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:
Continuous evaluation of exercise preparation and accepted exercise protocols.
Active participation in exercises.
Passing the final examination in the form of a written test.

Learning outcomes:
Survey on principles, theoretical background and practical applications of modern electroanalytical methods.

Brief outline of the course:
Importance of electroanalytical methods for environmental control and protection, requirements of practice, electrochemical cells, electrode potential, mass transfer by convection, migration and diffusion, Cottrell equation, direct current voltametry and polarography (principle, theoretical backround, examples of practical application). TAST polarography and voltametry, staircase voltammetry, pulse techniques: normal pulse and differential pulse voltammetry and polarography, square - wave voltammetry and polarography, AC polarography and voltammetry, anodic stripping voltammetry, adsorptive (or accumulation) voltammetry (applications in clinical and environmental analysis), working electrodes in voltammetry: stationary mercury electrode, mercury film electrode, glassy carbon electrode, carbon paste electrode, metallic electrodes, rotating disk electrode, rotating ring-disk electrode, ultramicroelectrodes, chemically modified electrodes, potentiometry, principles of ion selective electrodes, glass electrodes, ISE with solid and liquid membranes, biocatalytic membrane electrodes, chronopotentiometry, potentiometric stripping analysis, electroanalytical detectors in flow systems, amperometric titrations, biamperometric and bipotentiometric titrations, potentiostatic and galvanostatic coulometry.

Recommended literature:
F. Scholtz: Electroanalytical Methods, Springer Verlag, Heidelberg 2002, ISBN 3-540-42449-3.
J. Wang: Analytical Electrochemistry, VCH Publ., New York 1994, 2000.
R. Kalvoda (Ed.): Electroanalytical Methods in Chemical and Environmental Analysis, Plenum Publ. Corp., New York 1987.
A. J. Bard, L. R. Faulkner: Electrochemical Methods, John Wiley and Sons, New York 1980.
T. Riley, A. Watson: Polarography and Other Voltametric Methods, John Wiley and Sons, Chichester 1987.

J. Wang: Stripping Analysis, VCH Publ. Inc., Deerfield Beach 1985.

Course language:

Notes:
Based on the current pandemic situation in Slovakia and in accordance with the conditions of the Faculty of Natural Sciences of UPJŠ in Košice, the education and examination can also be carried out in a distance form. The tutorial will be carried out in the form of online lectures and consultings in the BigBlueButton system. The written form of the exam takes place through the Google Forms app. Students prepare responses to the final written test. Test questions are randomly generated each time. The final oral exam is conducted through a webinar in BigBlueButton https://bbb.science.upjs.sk/b) system with online generation of random question numbers.

Course assessment
Total number of assessed students: 48

A	B	C	D	E	FX
66.67	20.83	10.42	2.08	0.0	0.0

Provides: doc. RNDr. Andrea Straková Fedorková, PhD.

Date of last modification: 18.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ FVE1/21/15	**Course name:** Electrochemical process theory

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Partial test and final course test. The student must complete the partial evaluation in the form of a written test and take part in the exercises. Written test. To get an A rating, it is necessary to get at least 90% of the total number of points, to get a B rating of 80% of the total score, to get a C rating of 70% of the total score, to score D at least 60% of the total score and to score E at least 50% of the total score.

Learning outcomes:
Students will gain detailed knowledge on basic theoretical aspects of electrochemical process.

Brief outline of the course:
Equilibria on charged interfaces, classification of of electrochemical potentials. Electric double layer, electrocapillary phenomena, electric double layer capacity, adsorption on electrode/solution interface. Structure of charged interface: The Helmholtz model, The Gouy-Chapman model, The Stern model. Processes in heterogennous electrochemical systems - basic concepts and definitions. Reversibility of electrode reactions. Polarization curves and informations provided by them (charge transfer coefficient, heterogeneous rate constant, exchange current density). Activation overpotential - equation of polarization curve, Butler - Volmer equation. Influence of transport processes on electrode kinetics (convection, diffusion, migration). Diffusion overpotential. Theory of electrolytic deposition. Crystallization and nucleation overpotential. Experimental methods for electrochemical kinetics (single pulse and multipulse potentiostatic methods, cyclic voltammetry with dc and dp scan, coulometry, chronopotentiometry). Spectroelectrochemistry and its applications. QCM. (Membrane electrochemistry and bioelectrochemistry - possibility to extend lectures.)

Recommended literature:
J.O´M. Bockris, A.K.N. Reddy: Modern Electrochemistry, Macdonald, London 2002 A.J. Bard, L.R. Faulkner: Electrochemical Methods, Fundamentals and Applications, John Wiley and Sons, New York 1980 J. Koryta, J. Dvořák, L. Kavan: Principles of Electrochemistry, John Wiley & Sons, New York 1993 E. Scholz (Ed.): Electroanalytical Methods, Guide to Experiments and Applications, Springer Vrlg., Berlin 2002 T. Engel, P. Reid: Physical Chemistry, Pearson Educat. Inc., San Francisco 2006

Course language:
Slovak language

Notes:
Based on the current pandemic situation in Slovakia and in accordance with the conditions of the Faculty of Natural Sciences of UPJŠ in Košice, the education and examination can also be carried out in a distance form. The tutorial will be carried out in the form of online lectures and consultings in the BigBlueButton system. The written form of the exam takes place through the Google Forms app. Students prepare responses to the final written test. Test questions are randomly generated each time. The final oral exam is conducted through a webinar in BigBlueButton https://bbb.science.upjs.sk/b) system with online generation of random question numbers.

Course assessment
Total number of assessed students: 26

A	B	C	D	E	FX
92.31	7.69	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Ján Macko, PhD., doc. RNDr. Andrea Straková Fedorková, PhD.

Date of last modification: 25.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ ELD1/03	**Course name:** Electrode Processes and Technology

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Completion of computational exercises.
Exam, answering each question at least 50%.

Learning outcomes:
Basic explanation of the various electrochemical processes and its application in practical technology.

Brief outline of the course:
Theory of the electrode processes. Electrolyser construction.
Electrolysis of H2O. Electrolysis of NaCl. Electrolytical deposition and refining of metal from aqueous solutions, non-aqueous solution, from melts. Electrolysis of Al. Electrolytic deposition of the metal coatings on the substrates. Electrolytic coating of varnish for car industry. Principles of corrosion and surface protection.

Recommended literature:
M. Schlesinger, M. Paunovic: Modern Electroplating, Fourth Edition, New York, 2000.
J. O´M. Bockris, A. K. N. Reddy, M. Gamboa–Aldeco: Modern Electrochemistry, Fundamentals of Electrodies Vol. 2A, Second Edition, New York, 2000.

Course language:

Notes:
The teaching takes place in person. If a distance form is required, the lectures will take place online, using the BigBlueButton tool (https://bbb.science.upjs.sk/). Other conditions will be specified by the teacher.

Course assessment
Total number of assessed students: 32

A	B	C	D	E	FX
78.13	15.63	3.13	0.0	0.0	3.13

Provides: RNDr. Andrea Morovská Turoňová, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Jana Shepa, PhD.

Date of last modification: 24.11.2021
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ EMST/05	**Course name:** Electrophoretic Methods

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Written control test. Written examination.

Learning outcomes:
Basic principles of electromigration techniques and their application in practise.

Brief outline of the course:
Principles and classification of electromigration techniques - Zone electrophoresis, The moving boundary method, Focusing methods, Capillary isotachophoresis (cITP), Micellar electrokinetic chromatography (MEKC).Capillary zone electrophoresis (CZE). Principle of separation in an electric field, the phenomena accompanying separation in an electric field - electroosmotic pressure, Joule heat, diffusion, gravity, adsorption, instrumentation, detection, qualitative and quantitative analysis, electrophoretic separation on a microchip. Electrophoresis of nucleic acid, Elektrophoresis of serum proteins

Recommended literature:
1.Handbook of Capillary Electrophoresis, 2nd Ed., CRC, Boca Raton, 1997
2.P.Boček:Basic course and Advanced course of Isotachophoresis,Institute of Analytical Chemistry, Czech Academy of Science, Brno, 1984

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 26

A	B	C	D	E	FX
46.15	53.85	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Katarína Reiffová, PhD.

Date of last modification: 25.01.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ EECH/03	**Course name:** Environmental Chemistry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:
Examination.

Learning outcomes:

Brief outline of the course:
The subject of environmental chemistry. Matter cycles on Earth. Geochemical cycles. Carbon, nitrogen, sulphur, phospohorous cycles. Metals and environment. Special cycles. Earth atmosphere composition, functions of atmosphere. Physical and chemical processes in atmosphere. Atmospheric photochemistry. Pollutants in atmosphere and greenhouse effect. Models of greenhouse effects. Principles of air quality control. Energetic Earth balance. Water environment and pollutants monitored. Classification of pollutants and ways of elimination. Waste water cleaning processes. Analytical methods in environmental chemistry, applications. Soil analysis, biogeochemical processes. Acid rain, metal ions in soil. Environmental analysis, strategy and concepts.

Recommended literature:
1. G. Schwedt: The Essential Guide to Environmental Chemistry, Wiley and Sons, London 2001
2. R.N. Reeve, J.D. Barnes: General Environmental Chemistry, Wiley, London 1994

Course language:

Notes:

Course assessment
Total number of assessed students: 119

A	B	C	D	E	FX	N	P
49.58	19.33	16.81	2.52	3.36	0.0	0.0	8.4

Provides: doc. RNDr. Andrea Straková Fedorková, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ SKACH1/06	**Course name:** Forensic and Clinical Analytical Chemistry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:
Elaboration and presentation of a seminar work with an assigned topic. Written examination.

Learning outcomes:
Application of analytical methods in criminology and forensic medicine.

Brief outline of the course:
Criminology section: basic principles and definition of subject. Basic criminalistic categories. Criminalistic track. Criminalistic technology. Criminalistic methods, resources, procedures and operations. Introduction to forensic chemistry. Chemical, physical and physicochemical methods of research tracks and material evidence. Dactyloscopy. Methods of individual identification of persons.
Toxicological part: definition, classification and role of toxicology. Separation methods used in toxicology. Definition of poison. Pharmacokinetics and metabolism. Absorption, distribution, metabolism and elimination. Nox accumulation in the body. Biotransformation of noxy, biotransformation reactions. Poisoning, overdose, toxic levels, nox interaction. General approaches to the treatment of acute poisoning. Laboratory diagnostics of poisoning, drug abuse, sample selection, detection limits and time detection window. Development trends in toxicology - current toxicological methods - advantages and limitations.

Recommended literature:
1.A. Mozayani, C.Noziglia: The Forensic Laboratory Handbook. Procedures and Practice, Springer, 2006
2.H.Duffus, H.G.J.Worth: Fundamental Toxicology, Springer, 2006
3.R.Bertholf, R.Winecker: Chromatographic Methods in Clinical Chemistry and Toxicology, Wiley. 2007

Course language:

Notes:

Course assessment
Total number of assessed students: 69

A	B	C	D	E	FX
60.87	26.09	13.04	0.0	0.0	0.0

Provides: doc. RNDr. Katarína Reiffová, PhD.

Date of last modification: 08.09.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FTE1/17/18	**Course name:** Fyzikálne technológie

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 18

A	B	C	D	E	FX
33.33	44.44	11.11	5.56	5.56	0.0

Provides: RNDr. Ján Macko, PhD., prof. RNDr. Andrej Oriňak, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ KCHMSI/22	**Course name:** Identification by mass spectrometry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:
The aim of the course is to explain to students the principles of quantum chemistry and molecular simulations and their use in computational models of atoms, molecules and larger systems, focusing on ab initio methods, DFT methods, semiempirical methods, molecular mechanics and dynamics and their basics and use in calculations of various system properties.

Recommended literature:
P. Slavíček, E. Muchová, D. Hollas, V. Svoboda, O. Svoboda, Kvantová chemie: První čtení, 2014
J. Pišút, L. Gomolčák, V. Černý, Úvod do kvantovej mechaniky, 2008
F. Jensen, Introduction to Computational Chemistry, 2000
D. C. Young, Computational Chemistry: A Practical Guide for Applying Techniques to Real-World Problems, 2001

Course language:

Notes:

Course assessment
Total number of assessed students: 5

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD., RNDr. Natália Podrojková, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ PS/22	**Course name:** Identification by mass spectrometry
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 2 **Per study period:** 28 / 28 **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: II.	
Prerequisities:	
Conditions for course completion: Absolvation of assignment in 6. and 12. week Oral Exam	
Learning outcomes: The result of the education of the subject are students familiar with the issues of advanced spectroscopic methods, primarily RAMANOV spectroscopy, UV / VIS spectroscopy, IR spectroscopy and NMR spectroscopy.	
Brief outline of the course: 1. Introduction to the issue 2. Techniques of spectrum measurement and interpretation 3. RAMAN spectroscopy 4. IR and FTIR spectroscopy 5. UV and VIS spectroscopy 6. Assignment 7. Photoelectron spectroscopy 8. NMR spectroscopy 9. Atomic spectroscopy 10. Optical sensors and biosensors 11. Use of spectroscopic methods in industrial practice 12. Assignment	
Recommended literature: V.Milata, P. Segľa, Spectral methods in chemistry, 2004 W. Parson, Modern optical spectroscopy, 2015 M. Bujakowski, Spectroscopis methods of analysis, 2012	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 6

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: RNDr. Ivana Šišoláková, PhD., univerzitná docentka, prof. RNDr. Renáta Oriňaková, DrSc.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ FUMCH1/03	**Course name:** Introduction to Material Chemistry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
1. Participation in seminars (also applies to the online form of teaching). Students are required to attend seminars. The relevant teacher who leads the seminar will justify the student's justified non-participation (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for substitute performance. In the case of a longer-term justified absence (for example due to incapacity for work), the relevant teacher will assign the student an alternative form of mastering the missed material.
2. Activity at seminars. The preparation of students and their activity in seminars is always assessed by the relevant teacher who leads the seminar, within his / her competence.
3. Elaboration and submission of a seminar paper on an assigned topic within the independent work at home and presentation of the most important conclusions of the seminar paper in the form of a PPT presentation. The seminar papers must be handed over to the relevant teacher who leads the seminars by the 12th week of the semester, and the presentation must take place no later than the 8th week of the semester. The seminar work and performance are evaluated by the relevant teacher. Submission of the seminar paper and its successful defense is a condition of admission to the oral exam.
4. The exam is usually carried out orally, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.
5. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:
To present the different types of functional materials, their atomic structure and mechanical properties.

Brief outline of the course:
Historical perspectives. Materials and human being. Participation of natural science in material engineering. Material revolutions. Classification of materials. Atomic structure and interatomic bonding. Amorphous and crystalline materials. Mechanics of materials. Imperfections in solids. Crystal lattice defects. Point defects. Line defects. Dislocations. Diffusion. Diffusion mechanisms. Deformations and failures, re-crystallization. Deformations. Plastic deformations. Solid solutions. Intermediary phases. Phases in ceramic systems. Phase transformations. Crystallization of metals.

Phase identification methods. Stress and strain. Structure of metallic and ceramic materials. Alloys. Steel. Light metals. Metallic glasses. Gold. Inorganic non-metallic materials. Ceramic construction materials. Ceramic tools. Bio-ceramics. Ceramics in cosmos. High-temperature superconductors. Glass. Building binders. Polymers. Essence of polymers. Thermoplastics. Reactoplastics. Polymer structure. Mechanical properties of polymers. Natural materials. Wood. Bones. Teeth. Conchs and shells. Tectrices.

Recommended literature:

W. D. Callister, Jr.: Fundamentals of Materials Science and Engineering, John Wiley & Sons, 2001.
Brian S. Mitchell: An Introduction to Materials Engineering and Science: For Chemical and Materials Engineers, John Wiley & Sons,
2004.

Course language:
Slovak language.

Notes:
Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 81

A	B	C	D	E	FX
90.12	8.64	0.0	0.0	0.0	1.23

Provides: prof. RNDr. Renáta Oriňaková, DrSc.

Date of last modification: 25.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FKK1/03	**Course name:** Kinetics and Catalysis

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
1. Participation in seminars (also applies to the online form of teaching) and laboratory practical exercises. Students are required to attend seminars and laboratory exercises. The relevant teacher who leads the seminar will justify the reasoned absence of the student (incapacity for work, family reasons, etc.) in a maximum of two seminars or laboratory exercises during the semester without the need for replacement. In the event of a longer-term reasoned absence (for example due to incapacity for work), the relevant teacher will provide the student with an alternative form of mastering the missed material;
2. Activity at seminars and laboratory practical exercises. The preparation of students and their regular monitoring is always assessed by the relevant teacher who conducts the seminar or laboratory exercise, within his/her competence.
3. The exam is observed in a regular oral form, resp. in case of restrictions of contact forms of the pedagogical process, the exam is performed by a suitable distance - electronic form.
4. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:
Students will gain detailed and particular knowledge on different types of reactions, homogeneous and heterogeneous catalysis.

Brief outline of the course:
Classification of chemical reactions. Reaction rates. Rate laws. Reaction order. Elementary reactions. Complicated reactions. Theory of chemical kinetics. Experimental methods of chemical kinetics. Complex reactions mechanism. Explosions. Photochemical reactions. Essence of adsorption, types of adsorption, adsorption isotherms. Essence of catalytic processes. Catalysis influenced phenomena. Homogeneous and heterogeneous catalysis. Enzymatic catalysis.

Recommended literature:
P. W. Atkins : Physical Chemistry,Oxford University Presss, Oxford 1986, 1990, 1994, 1998.
Richard I. Masel: Chemical Kinetics & Catalysis,Wiley-Interscience, 2001.
I. CHORKENDORFF, J. W. NIEMANTSVERDRIET: Fundamentals of Kinetics and Catalysis, CONCEPTS OF MODERN CATALYSIS AND KINETICS,
Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, 2003.

Course language:
Slovak language.

Notes:
Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool.
The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 51

A	B	C	D	E	FX	N	P
66.67	3.92	1.96	1.96	1.96	0.0	0.0	23.53

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. František Kaľavský

Date of last modification: 25.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ MMU/03	**Course name:** Macromolecular Chemistry
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 3 **Per study period:** 42 **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course:	
Course level: II.	
Prerequisities:	
Conditions for course completion: Elaboration of a project on a selected topic and its presentation. Exam, answering each question at least 50%.	
Learning outcomes: Acquire the knowledge of the methods of macromolecules synthesis and biosynthesis, the structure and properties of macromolecular systems. Understanding of thermodynamic and kinetic aspects of preparation of traditional and new polymers.	
Brief outline of the course: Fundamental aspects of chemical composition of polymers-monomers, shape and the relationship between structure and properties. Primary, secondary, tertiary and quaternary structures. Thermal transition. Chain polyreactions. Step polyreactions. Synthetic methods of functional polymers and their characterisation. Naturally occurring polymers, their properties. Degradation of polymers. Molecular mass distributions. Determination of molecular mass of macromolecules. Polymers and environment.	
Recommended literature: H.-G Elias: Macromolecules, Volume 1 (Structure and Properties); Volume 2 (Synthesis, Materials, and Technology), Plenum Press, New York 1984 W.J. Moore: Physical Chemistry, Longman, London 1972 P. Munk: Introduction to Macromolecular Science, John Wiley & Sons, New York 1989 P.W. Atkins: Physical Chemistry, Oxford University Press, Oxford, New York 2002	
Course language:	
Notes: The teaching takes place in person. If a distance form is required, the lectures will take place online, using the BigBlueButton tool (https://bbb.science.upjs.sk/). Other conditions will be specified by the teacher.	

Course assessment
Total number of assessed students: 28

A	B	C	D	E	FX
60.71	17.86	14.29	7.14	0.0	0.0

Provides: RNDr. Andrea Morovská Turoňová, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Radka Gorejová, PhD.

Date of last modification: 24.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ CHMT/05	**Course name:** Materials Chemistry
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 1 **Per study period:** 28 / 14 **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course:	
Course level: II.	
Prerequisities:	
Conditions for course completion: 1. Participation in seminars (also applies to the online form of teaching). Students are required to attend seminars. The relevant teacher who leads the seminar will justify the student's justified non-participation (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for substitute performance. In the case of a longer-term justified absence (for example due to incapacity for work), the relevant teacher will assign the student an alternative form of mastering the missed material. 2. Activity at seminars. The preparation of students and their activity in seminars is always assessed by the relevant teacher who leads the seminar, within his / her competence. 3. Elaboration and submission of a seminar paper on an assigned topic within the independent work at home and presentation of the most important conclusions of the seminar paper in the form of a PPT presentation. The seminar papers must be handed over to the relevant teacher who leads the seminars by the 12th week of the semester, and the presentation must take place no later than the 8th week of the semester. The seminar work and performance are evaluated by the relevant teacher. Submission of the seminar paper and its successful defense is a condition of admission to the oral exam. 4. The exam is usually carried out orally, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form. 5. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.	
Learning outcomes: Students will gain knowledge on new materials, methods of their fabrication and characterisation, their properties and applications.	
Brief outline of the course: Types and applications of materials. Synthesis, fabrication and processing of materials. Technical materials. Recent applications of technical materials. Principles of combined materials. Composites. Composites in history. Particulate composites. Filamentary composites. Nanomaterials. Semiconductors. Electric properties. Electronic and ionic conductivity. Biomaterials. Classification and function of biomaterials. Materials for third millenium. High-tech materials. Materials with intelligence and memory. Bionics and biomimetics. Materials and time. Ageing and	

fouling. Degradation processes in construction materials. Productional degradation. Operational degradation. Corrosion. Influence of hydrogen on metal properties. Selection of materials, requirements on materials. Principles of materials selection. Economic, environmental and societal issues in material chemistry. Investigation methods of the surface, structure and properties of materials.

Recommended literature:

W.D. Callister, Jr.: Fundamentals of Materials Science and Engineering, John Wiley & Sons, 2001.

L. Ptáček a kol.: Nauka o materiálu II., Akademické nakladatelství CERM, s.r.o., Brno 2002.

Course language:

Slovak language.

Notes:

Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment

Total number of assessed students: 32

A	B	C	D	E	FX	N	P
75.0	6.25	0.0	3.13	0.0	0.0	0.0	15.63

Provides: prof. RNDr. Renáta Oriňaková, DrSc.

Date of last modification: 25.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KF/FMPV/22	**Course name:** Methodology of Science 1

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 1 / 1 **Per study period:** 14 / 14
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:
Attendance: A student may have one unexcused absence in seminar at the most. Absence in more than one seminar must be reasoned and substituted by consultations. Conditions of continuous and final control: during the semester a student is continuously checked and assessed according to his/her activity. To be awarded the credits, a student must pass a test from knowledge obtained in the lectures and seminars. Results of the test will make up the final grade.

Learning outcomes:
The course is aimed at getting familiar with the basic issues of methodology and philosophy of science. Significant part will be devoted to presenting the main concepts of the philosophy of science in the 20th century and this aim will be achieved by reading the source and interpretive texts.

Brief outline of the course:
• Falsificationism and critical realism by K. R. Popper.
• Development and critique of the Popper's concept.
• Understanding the science development in the work by T. S. Kuhn.
• Methodology of scientific research programmes of I. Lakatos.
• Methodological anarchism of P. Feyerabend.
• W.V.O. Quine – the issue of relation between theory and empiricism.

Recommended literature:
BILASOVÁ, V. – ANDREANSKÝ, E.: Epistemológia a metodológia vedy. Prešov: FF PU 2007.
FAJKUS, B.: Filosofie a metodologie vědy. Praha: Academia 2005.
BEDNÁRIKOVÁ, M. Úvod do metodológie vied. Trnavská univerzita: Trnava 2013.
DÉMUTH, A. Filozofické aspekty dejín vedy. Trnavská univerzita: Trnava 2013.
FEYERABEND, P.: Proti metodě. Prel. J. Fiala. Praha: Aurora 2001.
KUHN, T. S.: Štruktúra vedeckých revolúcií. Prel. Ľ. Valentová. Bratislava 1982.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 6

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: prof. PhDr. Eugen Andreanský, PhD.

Date of last modification: 01.02.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ MCV1/03	**Course name:** Methods of Chemical Research

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
In each of the two compulsory intermediate tests from the lecture, the student should reach at least half of the maximum number of assigned points.
Elaboration of seminar work.
Final examination

Learning outcomes:
To make students known with the physicochemical parameters´means of measurement, evaluation, and interpretation for the study of the process, i.e. the rate of reaction, mechanism, intermediates and final products in both homogeneous and heterogeneous systems.

Brief outline of the course:
Overview of basic principles of the determination of physicochemical quantities (dissociation constant, activity coefficient, solubility product, stability constant of complex, diffusion coefficient). Calorimetry and its utilisation. Experimental methods in kinetics. The Butler-Volmer equation. Survey of selected key topics in colloid chemistry. Adsorption-BET equation. Determination of molecular mass of macromolecules. A discussion of topics selected from active research fields.

Recommended literature:
W.J. Moore: Physical Chemistry, Longman Group Limited, London 1972
H. H. Willard et al.: Instrumental Methods of Analysis, Wadsworth, Belmont 1988
J. Koryta, J. Dvořák, L. Kavan: Principles of Electrochemistry, John Wiley & Sons, New York 1993
P.W. Atkins: Physical Chemistry, Oxford University Press, Oxford, New York 2002
D. Kladeková: Supportive Textbooks in Course: Methods of Chemical Research, The ESF project no. SOP HR 2005/NP1-051 11230100466, Košice 2008

Course language:

Notes:
Based on the current pandemic situation in Slovakia and in accordance with the conditions of the Faculty of Natural Sciences of UPJŠ in Košice, the education and examination can also be carried out in a distance form. The tutorial will be carried out in the form of online lectures and

consultings in the BigBlueButton system. The written form of the exam takes place through the Google Forms app. Students prepare responses to the final written test. Test questions are randomly generated each time. The final oral exam is conducted through a webinar in BigBlueButton https://bbb.science.upjs.sk/b) system with online generation of random question numbers.

Course assessment

Total number of assessed students: 50

A	B	C	D	E	FX	N	P
50.0	28.0	2.0	4.0	0.0	0.0	0.0	16.0

Provides: doc. RNDr. Andrea Straková Fedorková, PhD.

Date of last modification: 18.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ MHC1/09	**Course name:** Methods of mass spectrometry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Seminar work. Exam. Assesessment of student´s performance in seminars and homeworks. Examination. Oral examination. Sampling of real sample. Sucsesfull exam is by 51% of right answer.

Learning outcomes:

Brief outline of the course:
Popis metódy hmotnostnej spektrometrie, princípy a usporiadanie. Zloženie hmotnostého spektra, fragmentačné schémy, molekulový ión. Rozlíšenie v MS. Matricou asistované ionizačné procesy v MS. Laserová desorpčná MS. Hmotnostná spektrometria sekundárnych iónov. Tandemová MS a kombinácia chromatografie s MS. MS v miniatrurizovaných systémoch. MS pri reálnom tlaku a senzory v hmotnostnej spektrometrii.

Recommended literature:
J.C. Vickerman: Surface Analysis, Wiley abd Sons, Chichester, New York, Weinheim, Brisbane, Singapore, Toronto 2002

Course language:

Notes:

Course assessment
Total number of assessed students: 39

A	B	C	D	E	FX
69.23	17.95	7.69	2.56	2.56	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FMP1/03	**Course name:** Modelling of Physicochemical Processes

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2., 4.

Course level: II.

Prerequisities:

Conditions for course completion:
1. Participation in seminars (also applies to the online form of teaching). Students are required to attend seminars. The relevant teacher who leads the seminar will justify the student's justified non-participation (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for substitute performance. In the case of a longer-term justified absence (for example due to incapacity for work), the relevant teacher will assign the student an alternative form of mastering the missed material.
2. Activity at seminars. The preparation of students and their activity in seminars is always assessed by the relevant teacher who leads the seminar, within his / her competence.
3. Elaboration and submission of a seminar paper on an assigned topic within the independent work at home and presentation of the most important conclusions of the seminar paper in the form of a PPT presentation. The seminar papers must be handed over to the relevant teacher who leads the seminars by the 12th week of the semester, and the presentation must take place no later than the 8th week of the semester. The seminar work and performance are evaluated by the relevant teacher. Submission of the seminar paper and its successful defense is a condition of admission to the oral exam.
4. The exam is usually carried out orally, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.
5. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:
Students will gain knowledge on general principles of modelling and common examples of mathematic models of basic physicochemical processes.

Brief outline of the course:
Modelling and processes control. General principles of modelling. Examples of mathematical models of processes dynamics. Dynamic properties of processes. Dynamic characteristics of processes. Computational models.

Recommended literature:
William L. Luyben: Process Modeling, Simulation, and Control for Chemical Engineers (2nd edition), McGraw-Hill College, 1990.

Richard G. Rice, Duong D. Do, D. Do Duong: Applied Mathematics and Modeling for Chemical Engineers, John Wiley & Sons Inc, 1995.

Course language:
Slovak language.

Notes:
Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool.
The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 36

A	B	C	D	E	FX	N	P
66.67	0.0	2.78	0.0	0.0	0.0	0.0	30.56

Provides: prof. RNDr. Renáta Oriňaková, DrSc.

Date of last modification: 25.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ NATE/12	**Course name:** Nanotechology II

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:
The exam is carried out in the form of a written test, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.
To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:
To provide the students with basic knowledge of inovative nanotechnology, nanoproducts, nanomaterials and processes. In connection on Nanotechnology the students will obtain advanced knowledges forced on appliocation in energy production and storage, nanocatalysis and microfluidistic.

Brief outline of the course:
Types of nanostructures. Nanomaterials and their application: nanoliquids, metallic nanomaterials, carbon nanomaterials, inorganic nanomaterials, composite nanomaterals, nanomaterals for electronics, biomedical nanomaterials. Nanotechnology today and in the future. Health hazards of nanotechnology.

Recommended literature:

Course language:
Slovak language.

Notes:
Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool.
The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 21

A	B	C	D	E	FX
80.95	19.05	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., doc. RNDr. Andrea Straková Fedorková, PhD.
Date of last modification: 25.07.2022
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KF/ FILA/22	**Course name:** Philosophical Antropology
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. PhDr. Kristína Bosáková, PhD.
Date of last modification: 01.02.2022
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/FFCH/03	**Course name:** Physical Chemistry

Course type, scope and the method:
Course type:
Recommended course-load (hours):
Per week: Per study period:
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 3., 4..

Course level: II.

Prerequisities: ÚCHV/CHPO/22 and ÚCHV/FVE1/21

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 6

A	B	C	D	E	FX
83.33	16.67	0.0	0.0	0.0	0.0

Provides:

Date of last modification: 24.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/FYCH/01	**Course name:** Physical Chemistry

Course type, scope and the method:
Course type:
Recommended course-load (hours):
Per week: Per study period:
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 3., 4..

Course level: II.

Prerequisities: ÚCHV/FCHIII/06 and ÚCHV/FVE1/21/15

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 26

A	B	C	D	E	FX
80.77	3.85	7.69	3.85	3.85	0.0

Provides:

Date of last modification: 03.05.2015

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ CHPO/22	**Course name:** Physical Chemistry III

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:
Assesessment of student´s performance in seminars and homeworks.
Oral Examination. The exam is carried out in the form of a oral examination, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.
To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:
To educate students in advanced theory and applications of physical chemistry and physicochemical methods in accord with present-day knowledge.

Brief outline of the course:
Theory of surface formation.Molecular structure and propertiies of molecules in solid and liquid state. Constitution, configuration and conformation. Mechanical, electrical, magnetical and optical properties of molecules. Forces on a surface. Surface energy, contact angle, surface wetting, calculation of surface energy from contact angle, Dynamics of the processes at surface, izoterms, Langmuir, Freundlich izotem. Termodynamics at a surfaces. Electrical processes at surfaces. Plasmon resonance theory, surface plasmon, surafces of nanoobjects.. Effect of surface morfology on catalytic prosess, catalysis, effect on plasmon resonance. Nanofluidic systems and nanodevices.

Recommended literature:
T. Engel, P. Reid: Physical Chemistry, Pearson Educat. Inc., San Francisco 2006
P.W. Atkins : Physical Chemistry, Oxford University Press, Oxford 1998
W.R. Fawcett: Liquids, Solutions and Interfaces, Oxford University Press, Inc., New York 2004.
M. Hesse, H. Meier, B. Zeeh: Spectroscopic Methods in Organic Chemistry. Thieme, 1997.
Peter C. Schmidt: Methods in Physical Chemistry, Wiley-VCH Verlag GmbH and Co., 2012.
Recent scientific references.

Course language:

Notes:

Course assessment
Total number of assessed students: 1

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/FTII/03	**Course name:** Pokročilý kurz chromatografie

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 3 **Per study period:** 42
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To inform the students with principles of physical separation and processes on surface . Results of education are knowledges which are obtained by students (separation methods, procesess on surface....).

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 8

A	B	C	D	E	FX	N	P
87.5	0.0	0.0	0.0	0.0	0.0	0.0	12.5

Provides: prof. RNDr. Andrej Oriňak, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ PBACH1/03	**Course name:** Practical in Bioanalytical Chemistry

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 3 **Per study period:** 42
Course method: present

Number of ECTS credits: 3

Recommended semester/trimester of the course: 2., 4.

Course level: II.

Prerequisities:

Conditions for course completion:
Assessment

Learning outcomes:
Application of theoretical knowledge to bioanalytical laboratory practise

Brief outline of the course:
Analytical chemistry in laboratory medicine, basic analysis of biological systems, the nature and processing of biological samples, enzymes in bioanalysis, immunochemical methods, radioimunoanalytical methods (RIA), electrophoretic methods, analytical significance of nucleic acid, selected separation methods for the analysis of biomolecules.

Recommended literature:
1. Mikkelsen S.R, Cortón E.: Bioanalytical Chemistry, Wiley, 2004
2. Wilson I.: Bioanalytical Separations 4, (Handbook of Analytical Separations), Elsevier, 2003
3. Suelter C.H.,Kricka L.J.: Methods of Biochemical Analysis, Vol.37, Bioanalytical Instrumentation, Wiley, 1994
4. Rodriguez-Diaz R., Wehr T., Tuck S.: Analytical Techniques for Biopharmaceutical Development, Marcell Dekker, 2005

Course language:
Slovak

Notes:
The course is implemented by full-time or, if necessary, distance method using the MS Teams or BBB or a combined method. The form of teaching is specified by the teacher at the beginning of the semester and updated continuously

Course assessment
Total number of assessed students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Katarína Reiffová, PhD.

Date of last modification: 25.01.2022
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ AVZ1/02	**Course name:** Sampling of Analytical Samples

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Oral examination. Sampling of real sample. Sucsesfull exam is by 40% of right answer.

Learning outcomes:

Brief outline of the course:
Sample, characterisation. Sampling and norms effecting sampling process. Quantity, number of samples. Sampling techniques. Sampling laboratory equipment. Sampling techniques. Sample pre-concentration. Sample storing and conservation. Matrix simplifying, specific analysis. Chromatographic sample pre-treatment.

Recommended literature:
O. Stoeppler: Sampling and Sample Preparation Practical Guide for Analytical Chemists. Academic Press, London, 2002.
E. P. Popek: Sampling and Analysis of Environmental Chemical Pollutants. Elsevier Science, San Diego, 2003.

Course language:

Notes:

Course assessment
Total number of assessed students: 204

A	B	C	D	E	FX
60.78	20.59	13.73	3.92	0.98	0.0

Provides: prof. RNDr. Andrej Oriňak, PhD., RNDr. Ján Macko, PhD.

Date of last modification: 24.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ ÚTVŠ/CM/13	**Course name:** Seaside Aerobic Exercise

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Completion: passed
Condition for successful course completion:
- active participation in line with the study rule of procedure and course guidelines
- effective performance of all tasks- aerobics, water exercise, yoga, Pilates and others

Learning outcomes:
Content standard:
The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature.
Performance standard:
Upon completion of the course students are able to meet the performance standard and:
- perform basic aerobics steps and basics of health exercises,
- conduct verbal and non-verbal communication with clients during exercise,
- organise and manage the process of physical recreation in leisure time

Brief outline of the course:
Brief outline of the course:
1. Basic aerobics – low impact aerobics, high impact aerobics, basic steps and cuing
2. Basics of aqua fitness
3. Basics of Pilates
4. Health exercises
5. Bodyweight exercises
6. Swimming
7. Relaxing yoga exercises
8. Power yoga
9. Yoga relaxation
10. Final assessment

Students can engage in different sport activities offered by the sea resort – swimming, rafting, volleyball, football, table tennis, tennis and other water sports in particular.

Recommended literature:
1. BUZKOVÁ, K. 2006. Fitness jóga. Praha: Grada. 167 s.

2. ČECHOVSKÁ, I., MILEROVÁ, H., NOVOTNÁ, V. Aqua-fitness. Praha: Grada. 136 s.
3. EVANS, M ., HUDSON, J., TUCKER, P. 2001. Umění harmonie: meditace, jóga, tai-či, strečink. 192 s.
4. JARKOVSKÁ, H., JARKOVSKÁ, M. 2005. Posilováni s vlastním tělem 417 krát jinak. Praha: Grada. 209 s.
5. KOVAŘÍKOVÁ, K. 2017. Aerobik a fitness. Karolium, 130 s.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 54

abs	n
11.11	88.89

Provides: Mgr. Agata Dorota Horbacz, PhD.

Date of last modification: 29.03.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KF/ FIVYC/22	**Course name:** Selected Topics in Philosophy of Education (General Introduction)
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 1 / 1 **Per study period:** 14 / 14 **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment

Total number of assessed students: 2

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: PhDr. Dušan Hruška, PhD.
Date of last modification: 27.04.2022
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/SEP1/15	**Course name:** Semestral Project 1

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 6 **Per study period:** 84
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
Notification any thesis adversed by choosen department. Semester experimental work with master degree thesis.

Learning outcomes:
Semester scientific thesis.

Brief outline of the course:
Experimental work in research field for master degree . Evaluation of results and verbal presentation and discussion about.

Recommended literature:
Recent journal references.

Course language:
english

Notes:
Teaching is carried out in person or, if necessary, online using the MS Teams or BigBlueButton tools. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 72

abs	n
98.61	1.39

Provides: prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Andrea Morovská Turoňová, PhD., doc. RNDr. Andrea Straková Fedorková, PhD., doc. RNDr. Miroslava Martinková, PhD., univerzitná profesorka, RNDr. Ján Elečko, PhD., RNDr. Mariana Budovská, PhD., univerzitná docentka, doc. RNDr. Ladislav Janovec, PhD., RNDr. Slávka Hamuľaková, PhD., univerzitná docentka, RNDr. Monika Tvrdoňová, PhD., RNDr. Jana Špaková Raschmanová, PhD., doc. RNDr. Mária Vilková, PhD., RNDr. Zuzana Kudličková, PhD.

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/SEP2/15	**Course name:** Semestral Project 2

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 6 **Per study period:** 84
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Notification any thesis adversed by choosen department. Semester experimental work with master degree thesis.

Learning outcomes:
Semester scientific thesis.

Brief outline of the course:
Experimental work in research field for master degree . Evaluation of results and verbal presentation and discussion about.

Recommended literature:
Recent journal references.
Chemical on-line databases.

Course language:
english

Notes:
Teaching is carried out in person or, if necessary, online using the MS Teams or BigBlueButton tools. The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 69

abs	n
100.0	0.0

Provides: doc. RNDr. Andrea Straková Fedorková, PhD., RNDr. Mariana Budovská, PhD., univerzitná docentka, RNDr. Ján Elečko, PhD., RNDr. Slávka Hamuľaková, PhD., univerzitná docentka, doc. RNDr. Ladislav Janovec, PhD., RNDr. Zuzana Kudličková, PhD., doc. RNDr. Miroslava Martinková, PhD., univerzitná profesorka, RNDr. Andrea Morovská Turoňová, PhD., prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Monika Tvrdoňová, PhD., doc. RNDr. Mária Vilková, PhD., RNDr. Jana Špaková Raschmanová, PhD.

Date of last modification: 07.11.2022
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ SDP/03	**Course name:** Seminar to Diploma Thesis

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Active participation in all seminars. In case of non-participation in a maximum of two seminars for serious reasons (e.g. illness), fulfillment of alternative criteria assigned by the teacher. After completing the course, the teacher will give an evaluation based on the activity and results of the student.

Learning outcomes:
After completing the course, the student is able to work independently in writing a thesis with an emphasis on accurate expression and adherence to ethical principles.

Brief outline of the course:
General principles of thesis writing, formal requirements of diploma thesis, plagiarism as a negative phenomenon. Processing of experimental results in the form of tables, figures and graphs. Method of citing literature, preparation for the defense of the diploma thesis.

Recommended literature:
As recommended by the teacher.

Course language:
Slovak, English

Notes:

Course assessment
Total number of assessed students: 393

A	B	C	D	E	FX
96.18	1.78	1.02	0.25	0.25	0.51

Provides: doc. RNDr. Andrea Straková Fedorková, PhD., prof. RNDr. Mária Kožurková, CSc., doc. RNDr. Ján Imrich, CSc., prof. RNDr. Katarina Györyová, DrSc., prof. RNDr. Juraj Černák, DrSc., prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Jozef Gonda, DrSc., doc. Ing. Viera Vojteková, PhD., doc. RNDr. Katarína Reiffová, PhD., doc. RNDr. Taťána Gondová, CSc., doc. RNDr. Mária Reháková, CSc., doc. RNDr. Miroslava Martinková, PhD., univerzitná profesorka, prof. RNDr. Zuzana Vargová, Ph.D., prof. RNDr. Vladimír Zeleňák, DrSc., doc. RNDr. Ivan

Potočňák, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Dušan Koščík, CSc., RNDr. Andrea Morovská Turoňová, PhD., RNDr. Slávka Hamuľaková, PhD., univerzitná docentka, doc. RNDr. Ladislav Janovec, PhD., RNDr. Zuzana Kudličková, PhD., prof. Mgr. Vasiľ Andruch, DSc., prof. Dr. Yaroslav Bazeľ, DrSc., doc. RNDr. Miroslav Almáši, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka, RNDr. Rastislav Serbin, PhD.
Date of last modification: 25.01.2022
Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ VSE1a/04	**Course name:** Special Seminar

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:
Actual problems of physical and analytical chemistry which are connected with the solution of the students theses.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 58

A	B	C	D	E	FX
91.38	3.45	1.72	1.72	1.72	0.0

Provides: prof. Dr. Yaroslav Bazeľ, DrSc., doc. RNDr. Katarína Reiffová, PhD., doc. RNDr. Taťána Gondová, CSc., doc. Ing. Viera Vojteková, PhD., prof. Mgr. Vasiľ Andruch, DSc., doc. RNDr. Andrea Straková Fedorková, PhD., prof. RNDr. Andrej Oriňak, PhD., prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Andrea Morovská Turoňová, PhD., RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ VSE1b/04	**Course name:** Special Seminar

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:
Actual problems of physical and analytical chemistry which are connected with the solution of the students theses.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 59

A	B	C	D	E	FX
93.22	1.69	3.39	1.69	0.0	0.0

Provides: prof. Dr. Yaroslav Bazeľ, DrSc., doc. RNDr. Andrea Straková Fedorková, PhD., prof. RNDr. Andrej Oriňak, PhD., doc. Ing. Viera Vojteková, PhD., doc. RNDr. Katarína Reiffová, PhD., prof. RNDr. Renáta Oriňaková, DrSc., doc. RNDr. Taťána Gondová, CSc., prof. Mgr. Vasiľ Andruch, DSc., RNDr. Andrea Morovská Turoňová, PhD., RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka

Date of last modification: 07.11.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ VSE1c/00	**Course name:** Special Seminar

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:
Actual problems of physical chemistry which are connected with the solution of the students theses.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 17

A	B	C	D	E	FX
94.12	0.0	5.88	0.0	0.0	0.0

Provides: doc. RNDr. Andrea Straková Fedorková, PhD., prof. RNDr. Andrej Oriňak, PhD., prof. Dr. Yaroslav Bazeľ, DrSc., prof. RNDr. Renáta Oriňaková, DrSc., doc. RNDr. Katarína Reiffová, PhD., prof. Mgr. Vasiľ Andruch, DSc., RNDr. Andrea Morovská Turoňová, PhD.

Date of last modification: 28.10.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/VSE1d/00	**Course name:** Special Seminar

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To provide the students with the application of methods to chemical problems, mainly in physical chemistry.

Brief outline of the course:
Actual problems of physical chemistry which are connected with the solution of the students theses .

Recommended literature:
Research articles and reprints.

Course language:

Notes:

Course assessment
Total number of assessed students: 17

A	B	C	D	E	FX
88.24	5.88	0.0	0.0	5.88	0.0

Provides: doc. RNDr. Andrea Straková Fedorková, PhD., prof. RNDr. Andrej Oriňak, PhD., prof. Dr. Yaroslav Bazeľ, DrSc., prof. RNDr. Renáta Oriňaková, DrSc., doc. RNDr. Katarína Reiffová, PhD., prof. Mgr. Vasiľ Andruch, DSc., RNDr. Andrea Morovská Turoňová, PhD., RNDr. Rastislav Serbin, PhD., RNDr. Jana Šandrejová, PhD., univerzitná docentka

Date of last modification: 10.09.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVa/11	**Course name:** Sports Activities I.

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Min. 80% of active participation in classes.

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 15193

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
86.05	0.07	0.0	0.0	0.0	0.05	8.69	5.15

Provides: Mgr. Patrik Berta, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Marcel Čurgali, Mgr. Alena Buková, PhD., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVb/11	**Course name:** Sports Activities II.

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:
active participation in classes - min. 80%.

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 13318

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
84.37	0.51	0.02	0.0	0.0	0.05	10.78	4.28

Provides: Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Marcel Čurgali, Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVc/11	**Course name:** Sports Activities III.

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I., II.

Prerequisities:

Conditions for course completion:
min. 80% of active participation in classes

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 9100

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
88.37	0.07	0.01	0.0	0.0	0.02	4.46	7.07

Provides: Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVd/11	**Course name:** Sports Activities IV.

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I., II.

Prerequisities:

Conditions for course completion:
min. 80% of active participation in classes

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 5671

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.81	0.28	0.04	0.0	0.0	0.0	7.97	8.9

Provides: Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ LKSp/13	**Course name:** Summer Course-Rafting of TISA River

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Completion: passed
Condition for successful course completion:
- active participation in line with the study rule of procedure and course guidelines
- effective performance of all tasks: carrying a canoe, entering and exiting a canoe, righting a canoe, paddling

Learning outcomes:
Content standard:
The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature.
Performance standard:
Upon completion of the course students are able to meet the performance standard and:
- implement the acquired knowledge in different situations and practice,
- implement basic skills to manipulate a canoe on a waterway,
- determine the right spot for camping,
- prepare a suitable material and equipment for camping.

Brief outline of the course:
Brief outline of the course:
1. Assessment of difficulty of waterways
2. Safety rules for rafting
3. Setting up a crew
4. Practical skills training using an empty canoe
5. Canoe lifting and carrying
6. Putting the canoe in the water without a shore contact
7. Getting in the canoe
8. Exiting the canoe
9. Taking the canoe out of the water
10. Steering
a) The pry stroke (on fast waterways)
b) The draw stroke

11. Capsizing
12. Commands

Recommended literature:
1. JUNGER, J. et al. Turistika a športy v prírode. Prešov: FHPV PU v Prešove. 2002. ISBN 8080680973.
Internetové zdroje:
1. STEJSKAL, T. Vodná turistika. Prešov: PU v Prešove. 1999.
Dostupné na: https://ulozto.sk/tamhle/UkyxQ2lYF8qh/name/Nahrane-7-5-2021-v-14-46-39#!ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2ukBRLjnGqSomICMmOyZN==

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 209

abs	n
37.32	62.68

Provides: Mgr. Dávid Kaško, PhD.

Date of last modification: 29.03.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚCHV/ FTEP1/03	**Course name:** Theory of electrochemical processes

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
1. Participation in seminars (also applies to the online form of teaching) and laboratory exercises. Students are required to attend seminars and laboratory exercises. The relevant teacher who leads the seminar or practical exercise will justify the student's justified non-participation (incapacity for work, family reasons, etc.) in a maximum of two seminars during the semester without the need for substitute performance. In the case of a longer-term justified absence (for example due to incapacity for work), the relevant teacher will assign the student an alternative form of mastering the missed material.
2. Activity at seminars and practical exercises. The preparation of students and their activity in seminars and exercises is always assessed by the relevant teacher who conducts the seminar or exercise, within his / her competence.
3. The exam is carried out in the form of a written test, resp. in case of restrictions of contact forms of the pedagogical process, the exam will be performed in a suitable distance - electronic form.
4. To successfully master the subject, it is necessary to prove mastery of the required curriculum at least 51%.

Learning outcomes:
To provide the students with knowledge on the basic theoretical principles, kinetics and mechanism of electrode and electrochemical processes and with selected experimental methods.

Brief outline of the course:
Fundamentals of electrochemical thermodynamics. Electrochemical potential and equilibrium at the electrode/solution interface. Electric double layer - fundamental models of the double layer structure. Adsorption phenomena at the electrode/solution interface. Fundamentals of electrochemical kinetics. Polarization curves and informations provided by them (charge transfer coefficient, heterogeneous rate constant). Influence of transport processes on electrode kinetics (convection, diffusion, migration). Reversibility of electrode reactions. Influence of the double layer structure on kinetics of electrode processes. Theory of electrolytic deposition.
Experimental methods for electrochemical kinetics (single pulse and multipulse potentiostatic methods, cyclic voltammetry with dc and dp scan, coulometry, chronopotentiometry). Spectroelectrochemistry. QCM

Recommended literature:

J.O´M. Bockris, A.K.N. Reddy: Modern Electrochemistry, Macdonald, London 2002
A.J. Bard, L.R. Faulkner: Electrochemical Methods, Fundamentals and Applications, John Wiley and Sons, New York 1980
J. Koryta, J. Dvořák, L. Kavan: Principles of Electrochemistry, John Wiley & Sons, New York 1993
E. Scholz (Ed.): Electroanalytical Methods, Guide to Experiments and Applications, Springer Vrlg., Berlin 2002
T. Engel, P. Reid: Physical Chemistry, Pearson Educat. Inc., San Francisco 2006

Course language:
Slovak language.

Notes:
Teaching is carried out in person or, if necessary, remotely using the bbb or MS Teams tool.
The form of teaching is specified by the teacher at the beginning of the semester, updated continuously.

Course assessment
Total number of assessed students: 39

A	B	C	D	E	FX
74.36	15.38	5.13	0.0	5.13	0.0

Provides: prof. RNDr. Renáta Oriňaková, DrSc., RNDr. Ján Macko, PhD., RNDr. Ivana Šišoláková, PhD., univerzitná docentka

Date of last modification: 12.11.2021

Approved: prof. RNDr. Andrej Oriňak, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚCHV/ ATV1/04	**Course name:** Water Pretreatment

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 6

Recommended semester/trimester of the course:

Course level: II.

Prerequisities:

Conditions for course completion:
Active participation in laboratory exercises and seminars; successful completion of the final test. Elaboration of 2 written assignments (or project), which will be one of the conditions for participation in the exam. Written test (50%) and oral examination (50%) during the examination period.
Participation in excursions to the municipal wastewater treatment plant and drinking water treatment plant.
Note: Detailed conditions are updated annually within the repository for digital support materials (LMS UPJŠ).

Learning outcomes:
The student acquires knowledge of the methods of water pretreatment.

Brief outline of the course:
Classification of technological processes of water treatment according to phase processes, nature of the process, quality of treated water. Selection of resources for the supply of the population. Requirements for the treatment process. Water purification. Coagulation. Influence of various factors on coagulation. Water disinfection. Water fluoridation. Water softening methods. Water demineralization. Methods for removing Fe and Mn. Drinking water treatment plant. Scheme. Brief characteristics of individual stages of adjustment. Technological schemes and equipment.
Composition and properties of wastewater. Wastewater classification. Classification of industrial wastewaters. Stages of industrial wastewater treatment. Municipal wastewater treatment plant. Scheme. Technological process of wastewater treatment. Brief characteristics of individual stages. Technological schemes and equipment.

Recommended literature:
1. Žáček, L. Chemické a technologické procesy úpravy vody, Praha: SNTL, 1981. 270 s.
2. Tölgyessy J. a kol. Chémia, biológia a toxikológia vody a ovzdušia. Bratislava, VEDA, 1984.
3. Kalavská D., Holoubek I. Analýza vôd. Bratislava, Alfa, 1989. 262 s.
4. Handbook of Water and Wastewater Treatment Technologies. Ed. By Nicholas P Cheremisinoff, Butterworth Heinemann, 2001. 576 p.
5. Principles of Water Quality Control, Ed. by Thy Tebbutt, Butterworth Heinemann, 1997. 288 p.

6. Water Technology. Ed. by N. F. Gray, Butterworth Heinemann, 2005. 600 p.

Course language:
Slovak

Notes:
The course is implemented by full-time or, if necessary, distance method using the MS Teams or BBB or a combined method. The form of teaching is specified by the teacher at the beginning of the semester and updated continuously.

Course assessment
Total number of assessed students: 186

A	B	C	D	E	FX
37.1	17.2	17.74	16.67	11.29	0.0

Provides: prof. Mgr. Vasiľ Andruch, DSc., Serhii Zaruba, PhD.

Date of last modification: 22.07.2022

Approved: prof. RNDr. Andrej Oriňak, PhD.