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## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD105A/22	<b>Course title:</b> Biochemistry
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 / 1 <b>hours per semester:</b> 13 / 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 3	<b>Working load:</b> 75 hours
<b>Recommended semester/trimester:</b> 3.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competencies of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. During the semester, the student demonstrates his theoretical knowledge and practical skills in biochemistry necessary for graduating molecular biology. Subsequently, he demonstrates practical skills in the laboratory during selected analyzes of natural substances. Continuous assessment during the semester: - The student demonstrates practical skills in the chemical laboratory in the correct handling of laboratory equipment, he can get max. 10 points. - The student demonstrates theoretical knowledge, which will be verified by 2 ongoing tests in accordance with the content structure of the subject, for each of which he can receive max. 20 points. Final assessment: cumulative percentage gain from the interim assessment (50%) and the oral practical exam (50%). Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> The student can apply theoretical principles. He can apply the acquired knowledge and skills from the subject to graduate molecular biology. - knows and understands individual theoretical connections between chemical and biological scientific disciplines, - can apply practical abilities and skills when working with instruments, devices and materials in the laboratory on selected analyzes of natural substances, - can competently present acquired knowledge and skills in biochemistry and can apply them to biological subjects,	

- possesses professional competences and can organize and plan laboratory work, is able to work in a team.

**Course contents:**

1. Hierarchy of the organization of living organisms.
2. Types of molecules, substances and their bonds in the organism.
3. Stereochemistry. The principle of complementarity.
4. Forces acting between molecules.
5. Types of biochemical reactions. Metabolic pathways. Free energy in biochemical reactions. Macroergic compounds, macroergic binding.
6. Enzymes, characteristics, chemical composition, nomenclature. Enzyme catalysis. Coenzymes.
7. Lipids, definition, division, esterification, saponification, characterize: glycerides, waxes, complex lipids, isoprenoid lipids
8. Carbohydrates definition, classification, nomenclature. Characterize monosaccharides, oligosaccharides, polysaccharides, glycosides, vitamin C. Interchanges of carbohydrates.
9. Proteins, definition, nomenclature, structure, properties. Amino acids, peptides. Metabolic reactions of amino acids. Chemical bonds in the structure of a protein molecule.
10. Chemical composition and structure of nucleic acids. Structure, synthesis and function of DNA. Transfer of information. Carbohydrate metabolism.
11. Metabolism of lipids, proteins.
12. Citrate cycle / Krebs cycle /.

**Recommended or required literature:**

ŠKÁRKA, B., FERENČÍK, M., 1992. Biochémiá. Bratislava : Alfa , 1992, 848 s., ISBN 80-05-01076-1.

VODRÁŠKA, Z., 1996. Biochémiá. Academia, Praha, 1996, 191 s., ISBN 80-200-0600-1.

MIKUŠOVÁ, K., KOLLÁROVÁ, M., 2008. Princípy biochémié : v schémach a príkladoch. UK - Bratislava, 2008, 161 s., ISBN 978-80-223-2567-7.

DOSTÁL, J., PAULOVÁ, H., 2012. Biochemie : pro posluchače bakalářských oborů. Brno : Masarykova univerzita , 2012, 158 s., ISBN 978-80-210-5020-4.

BOUŠOVÁ, I., SZOTÁKOVÁ, B., DRŠATA, J., 2010. Praktická cvičení z biochemia. Praha, Karolinum, 2010, 67 s., ISBN 978-80-246-1744-2.

PEČ, P. a kol., 2000. Laboratorní cvičení z biochémié. Olomouc: Univerzita Palackého, 2000, 174 s., ISBN 80-244-0069-3.

KODÍČEK, M., 2004. Biochemické pojmy. VŠCHT, Praha, 2004, 171 s., ISBN 80-7080-551-X.

MUSIL, J., a kol., 1996. Biochemie v obrazech a schématech. Praha – Avicenum, 1996, 366 s.

**Language of instruction:**

English language.

**Notes:****Course evaluation:**

Assessed students in total: 26

A	B	C	D	E	FX
30.77	0.0	3.85	19.23	15.38	30.77

**Name of lecturer(s):** Ing. Dana Blahútová, PhD.

**Last modification:** 22.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:



## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD100S/22	<b>Course title:</b> Biology
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> <b>Recommended study range:</b> <b>hours weekly:</b> <b>hours per semester:</b> <b>Teaching method:</b> on-site	
<b>Credits:</b> 5	<b>Working load:</b> 125 hours
<b>Recommended semester/trimester:</b> 5., 6..	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> The state exam can be taken by a student who has fulfilled the obligations set by the accredited study program and the Study Regulations of the University of Ružomberok during the examination of the studies completed in the last year of study. The state exam has the character of a colloquium. Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> Objective of the course: To check in a colloquial way the student's knowledge, skills and competences necessary for the performance of functions in accordance with the profile of the graduate Teaching biology in combination with Bc. Learning outcomes: After completing the subject, the student will acquire the following knowledge, skills and competences: <ul style="list-style-type: none"> <li>- Has relevant knowledge about the functioning of living systems at the level of basic molecular components.</li> <li>- Has knowledge of cell biology and the functioning of multicellular structures - tissues and organs.</li> <li>- Orients himself in the zoological and botanical systems, while understanding the phylogenetic and kinship relationships between individual groups.</li> <li>- Understands the position of man in the system of organisms and knows how to characterize the structure of the body as well as its individual parts, while being aware of differences but also similarities with other groups of organisms.</li> <li>- He can connect knowledge from individual biological disciplines, thanks to which he is able to understand the basic principles of living systems and the connections between them.</li> <li>- He masters the basic forms and procedures of educational activity and can apply the acquired knowledge from individual areas of biology in the position of an auxiliary pedagogical worker or in the position of a leisure center worker.</li> <li>- He is able to present his knowledge and communicate with the public about current knowledge in the field of biology and the natural environment, thanks to which he is able to hold the position of professional or pedagogical worker of natural history museums, or state and public administration.</li> </ul>	

- Practical skills acquired in exercises for individual subjects and knowledge of the basic principles of biological research can be applied in the field of research in the laboratory and in the field.					
<b>Course contents:</b> Updated theses for the colloquial exam are published on the faculty's website no later than the beginning of the summer semester in the given academic year					
<b>Recommended or required literature:</b> According to the literature of the compulsory subjects of the given study program					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 58					
A	B	C	D	E	FX
34.48	17.24	8.62	15.52	20.69	3.45
<b>Name of lecturer(s):</b>					
<b>Last modification:</b> 23.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD104A/22	<b>Course title:</b> Botany I
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 2 / 2 <b>hours per semester:</b> 26 / 26 <b>Teaching method:</b> on-site	
<b>Credits:</b> 5	<b>Working load:</b> 125 hours
<b>Recommended semester/trimester:</b> 3.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competences of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. Continuous assessment is based on the evaluation of the student's independent work, practical skills and knowledge of the student. During the semester, there will be two written tests at the exercises. A maximum of 10 points can be obtained for each test. During the semester, the student independently prepares and submits 4 assignments from practical exercises. He can get a maximum of 20 points for assignments. The final assessment consists of an oral exam. In order to participate in the exam, it is necessary to obtain at least 20 points from the checks and assignments. At the final oral exam, the student can get max. 60 points. The final evaluation will be based on the total number of points obtained from the examinations and the oral examination exams. A – 100%-94% B – 93%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> <ul style="list-style-type: none"> <li>- The student can define the basic functions of a plant organism in connection with the anatomy and morphology of plants.</li> <li>- The student knows practical and theoretical connections about the anatomy and morphology of the plant body.</li> <li>- He is able to analyze the primordial phylogenetic forms of plants with their developmental tendencies up to the present.</li> <li>- Develops skills in recognizing and determining individual tissues and systems of plants.</li> <li>- The student has the skills to use methods and procedures when working with a microscope and microscopic material during laboratory work.</li> <li>- The student is able to solve problems with material and laboratory equipment during laboratory exercises and practical teaching.</li> </ul>	
<b>Course contents:</b> <ol style="list-style-type: none"> <li>1. Introduction to general botany</li> <li>2. Principles of plant body organization.</li> <li>3. Plant cell.</li> </ol>	

4. Plant tissues
5. Classification of plant tissues.
6. Meristems
7. Root
8. Stem
9. Leaf
10. Flower
11. Introduction to palynology
12. Fruit
13. Seed

**Recommended or required literature:**

NOVÁK, J., SKALICKÝ, M. Botanika : cytologie, histologie, organologie a systematika. Powerprint , Praha. 2017. 344 s ISBN 978-80-7568-036-5

SEKERA, V., MÚDRY, P. Všeobecná botanika : (repetitórium). Typi Universitatis Tyrnaviensis Bratislava , Veda , 2005. 295 s. : ilustr. ISBN 80-89074-42-1

DOSTÁK, J. FUTÁK, J. NOVÁK F. A. Flóra Slovenska . I , Všeobecná časť. Vydavateľstvo Slovenskej akadémie vied Bratislava, 1966. 602 s.

BUBLINEC, E., DEMKO, J., MACKO, J. MACHAVA, J., Základy prírodného prostredia 1. časť : Pedológia Ružomberok, VERBUM - vydavateľstvo KU, 2018. - 191 s. ISBN 978-80-561-0530-6

SANIGA, M., BALANDA M. Vzťah medzi produkčnými charakteristikami biomasy a mŕtveho dreva vo vybraných vývojových štádiách pralesa npr hrončeký grúň. Acta facultatis forestalis Zvolen: 39.

HALAMOVÁ, M., SANIGA, M. 2006. Structure, production and regeneration processes in the oak primeval forest in the National Nature Reserve Boky. Folia oecol., 33: 13–26.

L BUGOŠOVÁ, M SANIGA. Structure, production, deadwood and regeneration processes in a beech primeval forest in the NNR Rožok, Slovakia Acta Facultatis Forestalis Zvolen Slovakia, 2011

**Language of instruction:**

Slovak, English

**Notes:**

**Course evaluation:**

Assessed students in total: 23

A	B	C	D	E	FX
26.09	26.09	4.35	17.39	13.04	13.04

**Name of lecturer(s):** Ing. Jozef Macko, PhD., doc. Ing. Miroslav Saniga, CSc.

**Last modification:** 23.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:  
doc. Ing. Miroslav Saniga, CSc.



## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD107A/22	<b>Course title:</b> Botany II
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 / 3 <b>hours per semester:</b> 13 / 39 <b>Teaching method:</b> on-site	
<b>Credits:</b> 5	<b>Working load:</b> 125 hours
<b>Recommended semester/trimester:</b> 4.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b> KBE/Bi-BD104A/22	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competences of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. Continuous assessment is based on the evaluation of the student's independent work, practical skills and knowledge of the student. During the semester, there will be two written tests at the exercises. A maximum of 10 points can be obtained for each test. During the semester, the student completes continuous field exercises. He can get a maximum of 20 points from the identification of species. The final assessment consists of an oral exam. In order to participate in the exam, it is necessary to get at least 20 points from the test and the ID card. At the final oral exam, the student can get max. 60 points. The final evaluation will be based on the total number of points obtained from the background checks and the oral exam. A – 100%-93% B – 92%-85% C –84%-77% D –76%-69% E –68%-60% Fx –59%- 0%	
<b>Learning outcomes of the course:</b> Objective of the subject: The aim of the subject is to provide basic theoretical knowledge and practical skills for teaching the biology subject at primary and secondary schools in the field of morphology, histology and organology of plants. Learning outcomes: - The student knows and understands theoretical knowledge about the hierarchical classification system of vascular plants, phylogenetic and morphological-ecological relationships (characters). - The student can analyze the main developmental branches of vascular plants and diagnostic features of selected representatives. - He is able to analyze the primordial phylogenetic forms of plants with their developmental tendencies up to the present. - Develops skills in recognizing and identifying individual types of plants. - Can apply practical abilities and skills when working with instruments, devices and materials in the field of research in the laboratory and in the field - Can competently present acquired knowledge and skills	
<b>Course contents:</b>	

Subject, content and significant personalities (history) of systematic botany and taxonomy  
 Approaches to biological classification  
 Botanical Nomenclature (Botanical Nomenclature Code)  
 The position of vascular plants in the phylogeny of organisms  
 spore and seed plants  
 Internal differentiation of the classification system of spore vascular plants,  
 Internal differentiation of the gymnosperm classification system (Pinophyta, Gymnospermae)  
 Internal differentiation of the classification system of angiosperms (Magnoliophyta, Angiospermae)

### Recommended or required literature:

#### Language of instruction:

BUBLINEC, E., DEMKO, J., MACKO, J. MACHAVA, J., Základy prírodného prostredia  
 1. časť : Pedológia Ružomberok, VERBUM - vydavateľstvo KU, 2018. - 191 s. ISBN  
 978-80-561-0530-6  
 DOSTÁL, J. ČERVENKA, M. 1992: Veľký kľúč na určovanie rastlín I. II. SPN, Bratislava.  
 DOSTÁK, J. FUTÁK, J. NOVÁK F. A. Flóra Slovenska . I , Všeobecná časť. Vydavateľstvo  
 Slovenskej akadémie vied Bratislava, 1966. 602 s.  
 HALAMOVÁ, M., SANIGA, M. 2006. Structure, production and regeneration processes in the  
 oak primeval forest in the National Nature Reserve Boky. Folia oecol., 33: 13–26.  
 MÁRTONFI, P. Systematika cievnatých rastlín. UPJŠ, Košice. 2007. 220 s. ISBN  
 978-80-7097-694-4  
 MORAVEC, J. Fytocenologie . Akademie věd České republiky , 1994. 403 s. ISBN  
 80-200-0128-X  
 SANIGA, M., BALANDA M. Vzťah medzi produkčnými charakteristikami biomasy a mŕtveho  
 dreva vo vybraných vývojových štádiách pralesa npr hrončecký grúň. Acta facultatis forestalis  
 Zvolen: 39.  
 SANIGA, M., 2000. Štruktúra, produkčné a regeneračné procesy tisa obyčajného v štátnej  
 prírodnej rezervácii Plavno. Forest Sci, 46, pp.76-90.

#### Notes:

#### Course evaluation:

Assessed students in total: 11

A	B	C	D	E	FX
36.36	0.0	0.0	18.18	18.18	27.27

**Name of lecturer(s):** Ing. Jozef Macko, PhD., doc. Ing. Miroslav Saniga, CSc.

**Last modification:** 23.08.2022

#### Supervisor(s):

Person responsible for the delivery, development and quality of the study programme:  
 doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD110B/22	<b>Course title:</b> Chapters from Chemistry
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 4.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competences of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. During the semester, the student demonstrates his theoretical knowledge of physical-analytical methods and practical skills in quantitative analyses. Continuous assessment during the semester: - The student demonstrates practical skills in laboratory exercises in quantitative analyzes of natural substances, he can get max. 10 points. - The student demonstrates theoretical knowledge, which will be verified by 2 intermediate tests in accordance with thematic units, for each of which he can receive max. 20 points. Final assessment: cumulative percentage gain from the interim assessment (50%) and the oral practical exam (50%). Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> After completing the subject, the student will acquire the following knowledge, skills and competences: - possesses basic knowledge and skills in the qualitative and quantitative analysis of natural substances, - knows and understands the principles of selected analytical methods according to the content structure, - can independently and competently carry out the analysis of natural substances.	
<b>Course contents:</b> 1.-2. Qualitative analysis.	

3.-6. Quantitative measurement analysis of selected natural substances,  
7-8 Extraction.  
9-10 Chromatography.  
11.-12. Spectrophotometry of natural dyes.

**Recommended or required literature:**

KUKAČKA, J., a kol. 2010. Bioanalytická chemie v příkladech a cvičeníh. Karolinum, Praha, 2010, 228 s., ISBN 978-80-246-1853-1.  
OPEKAR, F., a kol.: Základní analytická chemie pro studenty, pro něž analytická chemie není hlavním studijním oborem. Karolinum, Praha, 2010, 203 s., ISBN 978-80-24617756.  
LEHOTAY, J., 2009. Separačné metódy v analytickej chémii. STU, Bratislava, 2009, 233 s., ISBN 978-80-227-3036-5.  
SADECKÁ, J., NETRIOVÁ, J., 2008. Analytické metódy v klinickej chémii. STU, Bratislava, 2008, 270 s., ISBN 978-80-227-2821-8.  
ZELENSKÝ, I. a kol.2003. Seminár a cvičenie z analytickej chémie. UK, Bratislava, 2003, 98 s., ISBN 80-223-1783-7.  
KRÁLOVÁ, B., a kol., 2001. Bioanalytické metódy. VŠCHT, Praha, 2001, 254s., ISBN 80-7080-449-1.

**Language of instruction:**

English language.

**Notes:**

**Course evaluation:**

Assessed students in total: 4

A	B	C	D	E	FX
50.0	0.0	0.0	0.0	0.0	50.0

**Name of lecturer(s):** Ing. Dana Blahútová, PhD.

**Last modification:** 22.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:  
doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD103A/22	<b>Course title:</b> Choemistry for biology students
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 3 <b>hours per semester:</b> 39 <b>Teaching method:</b> on-site	
<b>Credits:</b> 4	<b>Working load:</b> 100 hours
<b>Recommended semester/trimester:</b> 2.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competencies of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. During the semester, the student demonstrates his theoretical knowledge of general, inorganic and organic chemistry. Subsequently, he demonstrates practical skills in laboratory work and problem solving. Continuous assessment during the semester: - The student demonstrates practical skills in the chemical laboratory in the correct handling of laboratory equipment, he can get max. 10 points. - The student demonstrates theoretical knowledge, which will be verified by 2 ongoing tests in accordance with the content structure of the subject, for each of which he can receive max. 20 points. Final assessment: cumulative percentage gain from the interim assessment (50%) and the written exam (50%). Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> After completing the subject, the student will acquire the following knowledge, skills and competences: - knows and understands the theoretical starting points about the objects of research in general, inorganic and organic chemistry, about the classification of reactions, about the kinetic and thermodynamic characterization of chemical reactions, about the chemical bonds of inorganic and organic substances, - controls the nomenclature system of inorganic and organic compounds, - knows and understands the systematic part of inorganic and organic chemistry for a selected group of substances,	

- can apply practical abilities and skills when working with instruments, devices and materials in the laboratory in the preparation of selected inorganic and organic compounds,
- can competently present the acquired knowledge and skills from the subject for the completion of other chemical subjects such as biochemistry, selected chapters from chemistry,
- possesses professional competences and can organize and plan laboratory work, is able to work in a team.

#### **Course contents:**

Basics of general and inorganic chemistry:

1. Subject of general and inorganic chemistry. General terms and laws in chemistry.
2. Group states of substances. Gases, Liquids, Solids.
3. Types of chemical reactions.
4. Basics of chemical thermodynamics. Chemical reaction kinetics.
5. Dispersion systems. Equilibrium of a chemical reaction.
6. Structure of the atom.
7. Chemical bond.
8. Introduction to the systematic part of inorganic chemistry: Hydrogen. Water. Alkaline metals, alkaline earth metals.
9. Chemistry of nitrogen and phosphorus as biogenic elements. Biological importance of nitrogen, phosphorus and their compounds.
10. Chemistry of carbon, the basic biogenic element. Silicon and its compounds. Glass and important silicates.
11. Chemistry of oxygen and sulfur as biogenic elements. Biological importance of oxygen, sulfur and their compounds.
12. Chemistry of halogens, biological importance of their compounds. Transition elements and biologically significant compounds.

Basics of organic chemistry:

1. Subject of organic chemistry.
2. System of nomenclature of organic substances.
3. Bonds in molecules of organic substances.
4. Basics of stereochemistry.
5. Classification of reactions of organic compounds.
6. Introduction to the systematic part of organic chemistry.
7. Saturated hydrocarbons,
8. Unsaturated hydrocarbons.
9. Aromatic hydrocarbons
10. Selected hydrocarbon derivatives.
11. Heterocyclic compounds.
12. Macromolecular substances.

Laboratory exercises:

1. Principles of work safety in a chemical laboratory.
2. Practicing the chemical nomenclature of inorganic compounds
3. Practicing the chemical nomenclature of organic compounds
4. Basic chemical calculations
5. Selected operations and procedures in the chemical laboratory
6. Preparation, dilution of solutions.
7. Measurement of weight, volume of liquids, density, pH.
8. Precipitation, filtration, decantation and washing of precipitates.
9. Drying, burning and annealing.
10. Distillation, extraction, sublimation, chromatography.

11. Preparation of selected inorganic compounds.

12. Preparation of selected organic compounds.

**Recommended or required literature:**

ROSICKÝ, J., 1994. Anorganická chemie pro biology . II , systematická část. Praha : Karolinum, 1994, 187 s., ISBN 80-7066-943-8.

ŠIMA, J., a kol., 2009. Anorganická chemia. STU Bratislava, 2009, 480 s., ISBN 978-80-227-3087-7.

MELICHERČÍKOVÁ a kol., 2019. Anorganická a bioanorganická chemia pre učiteľov. Ružomberok : Verbum , 2019, 300 s., ISBN 978-80-561-0664-8.

SIROTA, A., ADAMKOVIČ, E., 2002. Názvoslovie anorganických látok. Metodické centrum, Bratislava, 2002, 107 s., ISBN 80-8052-152-2.

GÄRTNER, H. a kol., 2013. Kompendium chemie: vzorce, pravidla a princípy, úlohy a jejich řešení, periodická soustava prvků, výkladový slovník, Euromedia Group, 2013, 542 s., ISBN 978-80-242-3993-4.

KAMENÍČEK, J. a kol.: Praktická cvičení z anorganické chemie. Olomouc: Univerzita Palackého, 2001, 65 s., ISBN 80-244-0246-7.

KURUCZ, J., BELLOVÁ, R., 2005. Laboratorné cvičenia zo všeobecnej a anorganickej chémie, KU Ružomberok, 2005, 72 s., ISBN 80-8084-021-0.

DURDIÁK, J., LUKÁČOVÁ-CHOMISTEKOVÁ, Z., TOMČÍK, P., 2018. Organická chemia pre pedagogické fakulty. Ružomberok : Verbum , 2018, 295 s., ISBN 978-80-561-0556-6.

HEGER, J., DEVINSKÝ, F., 2010. Názvoslovie organických zlúčenín. MPC Bratislava, 2010, 259 s., ISBN 978-80-223-2822-7.

PACÁK, J., 2007. Jak porozumět organické chemii, Kalifornium Praha, 2007, 305 s., ISBN 978-80-246-1354-3.

PACÁK, J., 2009. Reakce organických sloučenin, Karolinum Praha, 2009, 179 s., ISBN 978-80-246-1652-0.

DURDIÁK, J., VOJTKO, J., 2013. Základy makromolekulovej chémie. Verbum Ružomberok, 2013, 100 s., ISBN 978-80-561-0029-5.

HRADIL, P., 2007. Moderní metody organické syntézy v reakčních schématech. Univerzita Palackého, Olomouc, 2007, 393 s., ISBN 978-80-244-1657-1.

DURDIÁK, J., Bellová, R., Glončák, P., 2005. Laboratórna technika : skriptá - učebné texty . (Časť 1.). Ružomberok : Katolícka univerzita , 2005, 73 s., ISBN 80-8084-023-7.

**Language of instruction:**

English language.

**Notes:**

**Course evaluation:**

Assessed students in total: 21

A	B	C	D	E	FX
4.76	4.76	14.29	14.29	14.29	47.62

**Name of lecturer(s):** Ing. Dana Blahútová, PhD.

**Last modification:** 22.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:  
doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD112B/22	<b>Course title:</b> Comparative Anatomy of Vertebrates
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 2 <b>hours per semester:</b> 26 <b>Teaching method:</b> on-site	
<b>Credits:</b> 2	<b>Working load:</b> 50 hours
<b>Recommended semester/trimester:</b> 5.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> During the semester, students complete several partial tests and tasks aimed at continuous assessment of understanding of the subject matter in order to ensure smooth continuity of the subject matter and self-evaluation of the student. Part of the evaluation is the development of a short seminar work focused on the specific structures of the selected groups. At the end of the semester, they also take a final exit written test. The evaluation will depend on the quality of the seminar work (30%) and the final test (70%). Subject assessment: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> The main aim of the course is a phylogenetic comparison of individual vertebrate body structures and the impact of their evolutionary changes on the structure of the human body After completing the course Comparative anatomy of Vertebrates , the student will acquire the following knowledge, skills and competencies: The student acquires the detailed anatomical composition of individual systems with regard to the developmental tendencies of vertebrates from the lowest aquatic to higher mammals. The student practically recognises the structures of the individual systems covered and is able to determine group membership and phylogenetically relationships on the basis of differences or similarities of individual structures. The student can apply the acquired knowledge to human anatomy in the context of health protection	
<b>Course contents:</b> Syllabus/Indicative Content: 1. Model organisms of vertebrate anatomy 2. Integumentary system of vertebrates, specific skin derivatives 3. Support system of vertebrates, bones of desmogenic and chondrogenic ossification of the skull	



4. Support system of vertebrates, axial skeleton
5. Support system of vertebrates, skeleton of limbs and their adaptation to environmental conditions
6. Respiratory system of vertebrates, adaptations to aquatic and terrestrial environments
7. Circulatory system of vertebrates, adaptations to the environment and thermoregulation
8. Digestive system of vertebrates, adaptations to the way of nutrition
9. Excretory system, adaptations to aquatic and terrestrial environments
10. Reproductive system, adaptations to aquatic and terrestrial environments
11. Regulatory systems of vertebrates
12. Sensory system of vertebrates, basic reflexes
13. Nervous system of vertebrates, level of development and intelligence

**Recommended or required literature:**

Gaisler, J., Zima, J., 2007. Zoologie obratlovců. Academia, Praha.

Kardong, K. V. 2006. Vertebrates. Comparative anatomy, function, evolution. McGraw-Hill, New York

Iuliis, D., Pullera D. 2006. The dissection of Vertebrates. A laboratory manual. Elsevier, Oxford

Liem, K., Bemis, W., Walker, W., Grande, L. 2000. Functional anatomy of the Vertebrates. 3th edition. Belmont: Thomson

Balážová, M., Baláž, M. 2018 Príručka k určovaniu stavovcov Slovenska: učebný materiál na cvičenia zo zoológie pre pedagogické fakulty. Ružomberok: Verbum - vydavateľstvo Katolíckej univerzity v Ružomberku

**Language of instruction:**

**Notes:**

**Course evaluation:**

Assessed students in total: 0

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

**Name of lecturer(s):** RNDr. Mária Balážová, PhD.

**Last modification:** 24.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:

doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD112A/22	<b>Course title:</b> Didactics
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 6.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Assessment of the degree of the acquired knowledge, skills and competences is on the basis of theoretical and practical examinations during the course. Over the duration of this course, the student demonstrates his theoretical knowledge of didactics such as content, forms, methods and procedures of educational activity. Continuous assessment during the semester: - Active participation in seminars (maximum 10 points) - The student prepares and presents seminar papers on a specific topic in accordance with the subject outline (maximum 40 points). The final assessment of the subject is in the form of a written exam with a total percentage gain of 50% and a verification of practical skills from an ongoing assessment with a gain of 50%. Course assessment: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> The aim of the subject is to provide the terminological basis and practical skills in the didactics necessary for pedagogical practice in primary and secondary schools. After completing the course Didactics, the student will acquire the following knowledge, skills and competencies: Student knows the terminology of didactics: content, forms, methods and procedures of educational activity. Student is able to implement acquired didactic knowledge and skills for pedagogical practice. Student is capable of critical thinking, is creative and is characterized by flexibility in thinking (adaptability, flexibility, improvisation skills) for pedagogical practice.	
<b>Course contents:</b> Syllabus/Indicative Content:	

1. Didactics as a scientific discipline.
2. The teaching process as a dynamic system.
3. The teacher's personality and the student's personality.
4. Content of education. Education and training. Types of education.
5. Basic school documents.
6. Goals of the teaching process, Taxonomies.
7. Didactic principles.
8. Methods of the teaching process. Classification of teaching methods and their characteristics.
9. Organizational forms of the teaching process.
10. Learning aids and didactic technique.
11. Examination and assessment of pupils.
12. Preparation for teaching.

#### **Recommended or required literature:**

Odporúčaná literatúra:

TUREK, I., 2014. Didaktika. Iura Editor Bratislava 3. preprac. a dopl. vyd., 2014, 618 s. ISBN 978-80-8168-004-5.

PETLÁK, E., 2016. Všeobecná didaktika. Bratislava : Iris 3. vyd., 2016, 322 s., ISBN 978-80-8153-064-7.

ZORMANOVÁ, L., 2014. Obecná didaktika : pro studium a praxi. Praha : Grada , 2014, 239 s., ISBN 978-80-247-4590-9.

DROŠČÁK, M., 2015. Úvod do všeobecnej didaktiky pre študentov učiteľstva. Trnava : Univerzita sv. Cyrila a Metoda, Filozofická fakulta, 2015, 121 s., ISBN 978-80-8105-655-0.

ČAPEK, R., 2015. Moderní didaktika : lexikon výukových a hodnoticích metod. Praha : Grada , 2015, 604 s., ISBN 978-80-247-3450-7.

Časopis DIDAKTIKA, ISSN 1338-2845

Človek a príroda. In: Inovovaný ŠVP (Štátny vzdelávací program) pre 2. stupeň ZŠ.

[https://www.statpedu.sk/files/articles/dokumenty/inovovany-statny-vzdelavaci-program/biologia\\_nsv\\_2014.pdf](https://www.statpedu.sk/files/articles/dokumenty/inovovany-statny-vzdelavaci-program/biologia_nsv_2014.pdf)

Človek a príroda. In: Inovovaný ŠVP (Štátny vzdelávací program) pre gymnáziá s osemročným vzdelávacím programom.

[https://www.statpedu.sk/files/articles/dokumenty/inovovany-statny-vzdelavaci-program/biologia\\_g\\_8\\_r.pdf](https://www.statpedu.sk/files/articles/dokumenty/inovovany-statny-vzdelavaci-program/biologia_g_8_r.pdf)

Človek a príroda. In: Inovovaný ŠVP (Štátny vzdelávací program) pre gymnáziá so štvorročným a päťročným vzdelávacím programom.

[https://www.statpedu.sk/files/articles/dokumenty/inovovany-statny-vzdelavaci-program/biologia\\_g\\_4\\_5\\_r.pdf](https://www.statpedu.sk/files/articles/dokumenty/inovovany-statny-vzdelavaci-program/biologia_g_4_5_r.pdf)

ISCED 3A –Vyššie sekundárne vzdelávanie.. Bratislava: Štátny pedagogický ústav. 21 s.

[https://www.statpedu.sk/files/articles/dokumenty/statny-vzdelavaci-program/biologia\\_isced3.pdf](https://www.statpedu.sk/files/articles/dokumenty/statny-vzdelavaci-program/biologia_isced3.pdf)

ISCED 2-Nižšie sekundárne vzdelávanie. Bratislava: Štátny pedagogický ústav. 24 s

[https://www.statpedu.sk/files/articles/dokumenty/statny-vzdelavaci-program/biologia\\_isced2.pdf](https://www.statpedu.sk/files/articles/dokumenty/statny-vzdelavaci-program/biologia_isced2.pdf)

#### **Language of instruction:**

#### **Notes:**

#### **Course evaluation:**

Assessed students in total: 4

A	B	C	D	E	FX
25.0	50.0	0.0	0.0	0.0	25.0

<b>Name of lecturer(s):</b> RNDr. Mária Balážová, PhD.
<b>Last modification:</b> 30.08.2022
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok					
<b>Faculty:</b> Faculty of Education					
<b>Course code:</b> KBE/Bi-BD100A/22		<b>Course title:</b> General biology			
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 / 2 <b>hours per semester:</b> 13 / 26 <b>Teaching method:</b> on-site					
<b>Credits:</b> 4		<b>Working load:</b> 100 hours			
<b>Recommended semester/trimester:</b> 1.					
<b>Level of study:</b> I.					
<b>Prerequisites:</b>					
<b>Requirements for passing the course:</b>					
<b>Learning outcomes of the course:</b>					
<b>Course contents:</b>					
<b>Recommended or required literature:</b>					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 36					
A	B	C	D	E	FX
33.33	27.78	2.78	13.89	8.33	13.89
<b>Name of lecturer(s):</b> RNDr. Mária Balážová, PhD., Prof. RNDr. Peter Kubatka, PhD., MVDr. Gabriela Hrkľová, PhD.					
<b>Last modification:</b> 22.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD109B/22	<b>Course title:</b> Genetics Tasks
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 4.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Assessment of acquired knowledge, skills and competencies of the student is carried out on the basis of theoretical and practical examinations during the course. Required is active participation in classes and partial tests from examples. Final assessment presents percentage of points obtained in the midterm tests during the course. Course assessment: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0% The aim of the subject is to provide basic theoretical knowledge and practical skills for the provision of teaching within the subject of biology from the field of genetics at primary and secondary schools.	
<b>Learning outcomes of the course:</b> After completing the course Exercises in genetics, the student will acquire the following knowledge, skills and competencies: -The student is able to independently solve examples from selected chapters in genetics. - The student can apply his theoretical knowledge in specific cases. - Can analyze and synthesize basic genetic laws of inheritance of sex-linked traits, genomic mutations, gene interactions, gene linkage, inheritance of quantitative traits, population genetics - Understands the use of genetics in practice.	
<b>Course contents:</b> Syllabus/Indicative Content: 1. Solving examples from selected topics of molecular biology. 2. Replication 3. Transcription. 4. Translation. 5. Inheritance of qualitative traits. 6. Mono- to polyhybrid.	

7. Gene interactions.
8. Family trees - autosomal inheritance.
9. Pedigrees – inheritance of sex-linked traits.
10. Genomic mutations.
11. Balanced and unbalanced translocations.
12. Binding of genes. Gene maps.
13. Population genetics.

**Recommended or required literature:**

Odporúčaná literatúra:

ČELLÁROVÁ E., BRUŇÁKOVÁ K., SAXOVÁ P., SEIDLOVÁ A. Príklady zo všeobecnej genetiky. PF. UPJŠ, Košice. 2001. SBN 80-7097-460-5

GRIFFITHS AJF., WESSLER SR., CARROLL SB., DOEBLEY J. Introduction to Genetic Analysis. WH Freeman, New York. 2012. 802s. ISBN 978-1-4292-7634-4

**Language of instruction:**

**Notes:**

**Course evaluation:**

Assessed students in total: 8

A	B	C	D	E	FX
50.0	25.0	12.5	12.5	0.0	0.0

**Name of lecturer(s):** Prof. RNDr. Peter Kubatka, PhD., RNDr. Mária Balážová, PhD.

**Last modification:** 30.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:

doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD111B/22	<b>Course title:</b> Geobotany
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 2 <b>hours per semester:</b> 26 <b>Teaching method:</b> on-site	
<b>Credits:</b> 2	<b>Working load:</b> 50 hours
<b>Recommended semester/trimester:</b> 5.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competences of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. Continuous assessment is based on the evaluation of the student's independent work, practical skills and knowledge of the student. During the semester, there will be two written tests at the exercises. A maximum of 10 points can be obtained for each test. During the semester, the student independently prepares and submits 4 assignments from practical exercises. He can get a maximum of 20 points for assignments. The final assessment consists of an oral exam. In order to participate in the exam, it is necessary to obtain at least 20 points from the checks and assignments. At the final oral exam, the student can get max. 60 points. The final evaluation will be based on the total number of points obtained from the examinations and the oral examination exams A – 100%-93%, B – 92%-85% ,C – 84%-77%, D – 76%-69%, E – 68%-60%, Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> Objective of the subject: The aim of the subject is to provide basic theoretical knowledge and practical skills for teaching the biology subject at primary and secondary schools in the field of morphology, histology and organology of plants. Learning outcomes: - The student can define the basic tasks and functions of phytocenology - The student knows how to use methodological procedures in phytocenology - Is able to describe and analyze individual classification units of vegetation - Develops skills in recognizing and identifying individual types of plants. - The student has the skills to use methods and procedures when working with a microscope and microscopic material during laboratory work.	
<b>Course contents:</b> Introduction to geobotany. Principles of phytocenology. Analysis of plant communities.	



Description of plant communities. Synthetic processing of phytocenological data. Syntaxonomy of vegetation. Chorological aspects of vegetation. Basic syntaxons of forest plant communities of Slovakia. Basic syntaxons of non-forest plant communities in Slovakia.					
<b>Recommended or required literature:</b> BUBLINEC, E., DEMKO, J., MACKO, J. MACHAVA, J., Základy prírodného prostredia 1. časť : Pedológia Ružomberok, VERBUM - vydavateľstvo KU, 2018. - 191 s. ISBN 978-80-561-0530-6 BUBLINEC, E., MACHAVA, J., JANČEKOVÁ, M., DEMKO, J., MACKO, J., BLAHÚTOVÁ, D. Chemizmus zrážok a jeho dynamika v Liptovskej kotline. Ružomberok, Verbum - vydavateľstvo KU, 2014, 156 s. ISBN 978-80-561-0192-6. HALAMOVÁ, M., SANIGA, M. 2006. Structure, production and regeneration processes in the oak primeval forest in the National Nature Reserve Boky. Folia oecol., 33: 13–26. HÁBEROVÁ, I., HÁJEK, M., HRIVNÁK, R., JAROLÍMEK, I., OŤAHELOVÁ, H., ŠOLTÉS, R., ZALIBEROVÁ, M., VALACHOVIČ, M. Rastlinné spoločenstvá Slovenska 3 Vegetácia mokradí. Veda. Bratislava. 2001. 434 s. ISBN 80-224-0688-0 JAROLÍNEK, I., YALIBEROVÁ, M., MUCINA, L., MOCHANSKÝ S. Rastlinné spoločenstvá Slovenska 2, Synantropná vegetácia. Veda , Bratislava. 1997. 416 s. ISBN 80-224-0522-1 MORAVEC, J. Fytocenologie. Akademie věd České republiky. Praha. 1994. 403 s. ISBN 80-200-0128-X KLIMENT, J., VLACHOVIČ, M., BERNÁTOVÁ, D., DÚBRAVCOVÁ, Z., JAROLÍMEK, I., PETRÍK, A., ŠIBÍK, J., UHLÍŘOVÁ, J., VALACHOVIČ, M. Rastlinné spoločenstvá Slovenska 4 , Vysokohorská Veda. Bratislava. 2007. ISBN 978-80-224-0951-3 SANIGA, M., 2000. Štruktúra, produkčné a regeneračné procesy tisa obyčajného v štátnej prírodnej rezervácii Plavno. Forest Sci, 46, pp.76-90.					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 0					
A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0
<b>Name of lecturer(s):</b> Ing. Jozef Macko, PhD.					
<b>Last modification:</b> 23.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok					
<b>Faculty:</b> Faculty of Education					
<b>Course code:</b> KBE/Bi-BD101B/22		<b>Course title:</b> Histology			
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site					
<b>Credits:</b> 1		<b>Working load:</b> 25 hours			
<b>Recommended semester/trimester:</b> 1.					
<b>Level of study:</b> I.					
<b>Prerequisites:</b>					
<b>Requirements for passing the course:</b>					
<b>Learning outcomes of the course:</b>					
<b>Course contents:</b>					
<b>Recommended or required literature:</b>					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 22					
A	B	C	D	E	FX
50.0	4.55	9.09	9.09	9.09	18.18
<b>Name of lecturer(s):</b> Prof. RNDr. Peter Kubatka, PhD.					
<b>Last modification:</b> 26.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD109A/22	<b>Course title:</b> Human Anatomy
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 2 / 2 <b>hours per semester:</b> 26 / 26 <b>Teaching method:</b> on-site	
<b>Credits:</b> 6	<b>Working load:</b> 150 hours
<b>Recommended semester/trimester:</b> 5.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> The control of study during the course: continuous tests - min. 60% of knowledge, active participation in exercises, writing protocols from laboratory examination. The final oral exam assessment will be based on the total number of points obtained from the review of knowledge: A – 100%-94% B – 93%-88% C – 87%-81% D – 80%-75% E – 74%-69% Fx – 68%- 0%.	
<b>Learning outcomes of the course:</b> In this subject, students gain knowledge in the anatomical principles of bones, joints, skeletal muscles, nerves, vessels and skin. The part of the study is concerned on topography of the visceral organs, i.e. digestive, urinary, reproductive and respiratory systems. Lectures will be supported by laboratory practise, including examination of appropriate cadaver materials. Emphasis is placed on the application of anatomical principles to correlate structure with function in developing an understanding of the bases of everyday activities.	
<b>Course contents:</b> Anatomical Terms – directions (e.g. proximal/distal, superior/inferior), planes (e.g. sagittal, frontal...) and movements (e.g. inversion, circumduction...); Surface anatomy, organisation of body cavities Upper Limb – bones, joints, muscles, vessels, nerves, regions; Lower Limb – bones, joints, muscles, vessels, nerves, regions; Head, Neck and the Vertebral Column – bones, joints, muscles, nerves, glands, regions The Nervous System – Overview of the main structures and their functions including the Brain and the Spinal Cord. The function anatomy and topography of visceral organs.	

**Recommended or required literature:**

1. Orel M.: Anatomie a fyziologie lidského těla: pro humanitní odbory. Vydavatel'stvo: Grada 2019, 448s. ISBN 978-80-271-0531-1
2. Mráz, P., Binovský, A., Holomáňová, A., Osvaldová, M., Ruttkay-Nedecká, E.: Anatómia ľudského tela 1 a 2, Slovak Academic Press, spol.s.r.o. Bratislava 2015
3. Dylevský I.: Funkční anatomie, Grada 2009, ISBN 978-80-247-3240-4
4. Dylevský I.: Základy funkční anatomie, Poznáni 2011
5. Marieb, E., N., Mallat J.: Anatomie lidského těla, CP Books Brno, 2005, ISBN 80-251-0066-9
6. Čihák R.: , Anatomie člověka I, II, III, Grada Publishing, 2002
7. Schmidtová, K., Petrovová, E., Maloveská, M.: Základy anatomie. Univerzita veterinárskeho lekár'stva a farmácie v Košiciach, 2017, ISBN 978-80-8077-542-1

**Language of instruction:****Notes:****Course evaluation:**

Assessed students in total: 12

A	B	C	D	E	FX
25.0	8.33	33.33	8.33	0.0	25.0

**Name of lecturer(s):** MVDr. Gabriela Hrkľová, PhD., RNDr. Mária Balážová, PhD.

**Last modification:** 26.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:  
doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD102B/22	<b>Course title:</b> Introduction to Chemistry for Biology Students
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 1.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competences of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. Continuous assessment during the semester: - The student demonstrates practical skills in the chemical laboratory in the correct handling of laboratory equipment, he can get max. 10 points. - The student demonstrates theoretical knowledge, which will be verified by 2 intermediate tests in accordance with thematic units, for each of which he can receive max. 20 points. Final assessment: cumulative percentage gain from the interim assessment (50%) and the oral practical exam (50%). Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> After completing the subject, the student will acquire the following knowledge, skills and competences: - has basic knowledge and skills about laboratory technology and handling laboratory glassware and laboratory aids, - knows and understands the principles of compliance with BPP in the chemical laboratory, - can independently and qualifiedly implement the basic procedures of dividing methods of selected experiments.	
<b>Course contents:</b> Safety at work in a chemical laboratory. Provision of first aid in case of possible accidents in the chemical laboratory. Health protection, work with chemicals, protective equipment.	

<p>Manipulation with laboratory chemical glass and laboratory aids. Working with glass, cork and rubber.</p> <p>Basic measurements of weight, volume, temperature in the laboratory (weighing, pipetting).</p> <p>Auxiliary operations (heating, cooling, drying, mixing, shaking).</p> <p>Separation and cleaning chemical operations</p> <p>Filtration.</p> <p>Centrifugation.</p> <p>Crystallization.</p> <p>Sublimation.</p> <p>Distillation.</p>																	
<p><b>Recommended or required literature:</b></p> <p>DURDIK, J., BELLOVÁ, R., GLONČÁK, P. 2005. Laboratórna technika: učebné texty-skriptá. KU-Ružomberok, 73 s., ISBN 80-8084-023-7.</p> <p>KAMENÍČEK, J. a kol., 2001. Praktická cvičení z anorganické chemie. Olomouc: Univerzita Palackého, 65 s., ISBN 80-244-0246-7.</p> <p>SÝKOROVÁ, D., MASTNÝ, L., 2009. Návod pro laboratoře anorganické chemie. VŠCHT, Praha, 2009 249 s. ISBN 978-80-7080-452-0.</p> <p>KURUCZ, J., BELLOVÁ, R., DURDIK, J. 2005. Laboratórne cvičenia zo všeobecnej a anorganickej chémie : skriptá - učebné texty. KU Ružomberok, 72 s., ISBN 80-8084-021-0.</p>																	
<p><b>Language of instruction:</b></p> <p>English language.</p>																	
<p><b>Notes:</b></p>																	
<p><b>Course evaluation:</b></p> <p>Assessed students in total: 36</p> <table border="1"> <thead> <tr> <th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>FX</th></tr> </thead> <tbody> <tr> <td>47.22</td><td>30.56</td><td>8.33</td><td>0.0</td><td>2.78</td><td>11.11</td></tr> </tbody> </table>						A	B	C	D	E	FX	47.22	30.56	8.33	0.0	2.78	11.11
A	B	C	D	E	FX												
47.22	30.56	8.33	0.0	2.78	11.11												
<p><b>Name of lecturer(s):</b> Ing. Dana Blahútová, PhD.</p>																	
<p><b>Last modification:</b> 22.08.2022</p>																	
<p><b>Supervisor(s):</b></p> <p>Person responsible for the delivery, development and quality of the study programme:</p> <p>doc. Ing. Miroslav Saniga, CSc.</p>																	

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD108A/22	<b>Course title:</b> Introduction to Natural Environment
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 2 / 1 <b>hours per semester:</b> 26 / 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 4	<b>Working load:</b> 100 hours
<b>Recommended semester/trimester:</b> 4.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the acquisition of the relevant knowledge, skills and competences of the student is implemented on the basis of theoretical and practical reviews during the semester teaching of the subject. In the course of the semester, they will be two writing verifications, for each additional 10 points. During the semester, the student will develop a project or presentation, as well as the consideration of the selected theme with the issue of ecology, even for these 2 activities can get a maximum of 10 percentage points. The upcoming to participate in the final written or oral test is necessary to obtain from semestral check and presentation or project at least 20 percentage points. At the final written or oral exam, the student can get a maximum of 60 percentage points. The overall assessment will be based on the sum of the percentage points obtained from semestral verifications, consideration, semestral presentation or project and the result of a knowledge from the final written or oral exam. Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> The aim of the course is to provide basic theoretical knowledge and practical skills for teaching in the framework of integral objects related to natural environment at primary and secondary schools. Education results: After completing the course, the student gains the following knowledge, skills and competences: <ul style="list-style-type: none"> <li>- student knows and understands theoretical knowledge of the essential components of the natural environment, ecological officials and conditions</li> <li>- student acquires knowledge of the natural environment of Slovakia, main types of habitats, as well as its protection (nature and country protection law no. 543/2002 Coll .)</li> <li>- student can apply biological disciplin methods- Student can use practical skills in working with devices, devices and material research in the laboratory and terrain</li> <li>- student can implement acquired knowledge within the Education Process of Education</li> </ul>	

- student is able to cooperate on project solutions Aimed at the Factors of the Natural Environment

**Course contents:**

1. Basic components of the natural environment. The definition of a natural environment, basic component abiotic and biotic environments.
2. Ecological agents and conditions. Breakdown of ecological officials: abiotic, biotic anthropical.
3. Climate as a soil formation factor - rainfall, hydrolimits, water in soil, soil air and soil temperature.
4. Edafone and humus. Edafone classification, selected groups, abiotic factors and their effects of bodies the organisms, the importance of the edafone and the effect of human activity on edaphon. Humus - its importance and indicators of humus.
5. Edafic environment factors. Distribution of plants in relation to the grain size of the soil, according to the bedfootop.
6. Water and organisms. Water Balance of Plants, Plant Adaptation to Water Lack, Vegetable Ecotypes Following Adapting to Water and Moisture.
7. Air and its flow. The action of air for organisms from eco-perspective, plant adaptation against oxygen lack.
8. Biotope, biocenosis and ecosystem.
9. Population relations in biocenosis - intraspecific relations in populations (reproductive ane-producing relationships), interspecific relations of populations (neutral, positive and negative).
10. Trophic chains - detrite, herbivorous, parasitic.
11. Types of habitats from the territory of Slovakia - water surfaces, meadows, forests (high-rise steps and forestry degrees in Slovakia), rock environment, urban environment, basic abiotic abiotic characteristics of these habitats (plant and animal representatives)
12. Protecting the natural environment in Slovakia - degrees of nature protection, large-area protected territories (National Park and Protected Landscape Area) and small protected areas (National Nature Reserve, Nature Reserve, National Natural Monument, Natural Monument), Protected Natural Equipment (Nature and Landscape Protection Act no. 543/2002 Coll.)



**Recommended or required literature:**

Barna, M., Bublinec, E.: Základy všeobecnej ekológie. VERBUM – vydavateľstvo Katolíckej univerzity v Ružomberku, Ružomberok, 2016, 130 s. ISBN: 978-80-561-0351-7.

Bedrna, Z.: Environmentálne pôdoznanectvo. Veda, Bratislava, 2002, 352 s.

Bublinec, E., Machava, J., Demko, J., Macko, J.: Základy prírodného prostredia – Pedológia. VERBUM – vydavateľstvo Katolíckej univerzity v Ružomberku, Ružomberok, 2018, 192 s. ISBN: 978-80-561-0530-6.

Odum, E. P.: Základy ekologie. Academia, Praha, 1977, 733 s.

Reichwalder, P., Jablonský, J.: Všeobecná geológia 1. Univerzita Komenského, Bratislava, 2003, 244 s.

Reichwalder, P., Jablonský, J.: Všeobecná geológia 2. Univerzita Komenského, Bratislava, 2003, 507 s.

Saniga, M.: Ekologické úvahy. Liptovské Revúce: Miroslav SANIGA, 2007, 107 s. ISBN: 978-80-89253-16-6.

Saniga, M.: Podnikanie v súlade s prírodou. Dolná Tižina: Alfa a Omega, s. r. o., 2015, 50 s. ISBN: 978-80-971266-7-4.

Saniga, M.: Všetko „naj...“ o našich vtákoch. Perfekt, Bratislava, 2015, 271 s. ISBN: 978-80-8046-732-6.

Saniga, M.: Rok v prírode. Perfekt, Bratislava, 2016, 224 s. ISBN: 978-80-8046-774-6.

Saniga, M.: Naša príroda v kocke. Bratislava: Vydavateľstvo SAV, 2016, 181 s. ISBN: 978-80-224-1557-6.

Saniga, M.: Kresťan a ekológia. Bratislava: Don Bosco, 2018, 40 s. ISBN: 978-80-8074-394-9.

Townsend, C. R., Begon, M., Harper, J. L.: Základy ekologie. Univerzita Palackého v Olomouci, Olomouc 2010, 506 s.

Trizna, M.: Meteorológia, klimatológia a hydrológia pre geografov. Bratislava, Geo-grafika, 2007, 143 s.

Zákon o ochrane prírody a krajiny č. 543/2002 Z. z.

**Language of instruction:****Notes:****Course evaluation:**

Assessed students in total: 12

A	B	C	D	E	FX
50.0	25.0	8.33	16.67	0.0	0.0

**Name of lecturer(s):** doc. Ing. Miroslav Saniga, CSc.

**Last modification:** 23.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:

doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok					
<b>Faculty:</b> Faculty of Education					
<b>Course code:</b> KBE/Bi-BD104B/22		<b>Course title:</b> Introduction to Parasitology			
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site					
<b>Credits:</b> 1		<b>Working load:</b> 25 hours			
<b>Recommended semester/trimester:</b> 2.					
<b>Level of study:</b> I.					
<b>Prerequisites:</b>					
<b>Requirements for passing the course:</b> angl					
<b>Learning outcomes of the course:</b>					
<b>Course contents:</b>					
<b>Recommended or required literature:</b>					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 7					
A	B	C	D	E	FX
57.14	0.0	0.0	0.0	0.0	42.86
<b>Name of lecturer(s):</b> MVDr. Gabriela Hrkľová, PhD.					
<b>Last modification:</b> 26.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD110A/22	<b>Course title:</b> Introductory Auditory Practice
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 2	<b>Working load:</b> 50 hours
<b>Recommended semester/trimester:</b> 5.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competences of the student is carried out on the basis of theoretical and practical examinations during the semester teaching of the subject. During the semester, the student will attend 10 mock biology lessons taught by a trainee teacher in an elementary or secondary school. During this time, he/she keeps a pedagogical diary in which he/she records the theoretical knowledge imparted in the field of biology as well as the didactic and pedagogical practices of the trainee teacher. With the trainee teacher, he/she carries out analyses of the lessons in which he/she has participated (the implementation is carried out in groups). The trainee teacher gives the student an evaluation which represents 60% of the grade. The student's work discipline and behaviour, cooperation with the trainee teacher, educational performance, the student's linguistic expression, interest in learning about the school environment and attitude towards the teaching profession are evaluated. The student shall prepare a report of each lesson where he/she evaluates the teacher's performance. These documents, as well as the preparation of pedagogical logs and lesson analyses with the trainee teacher, are used by the practice methodologist for the final evaluation of the student in the 40% range. Course evaluation: A - 100%-93% B - 92%-85% C - 84%-77% D - 76%-69% E - 68%-60% Fx - 59%- 0%	
<b>Learning outcomes of the course:</b> After completing the course, the student will acquire the following knowledge, skills and competences: The student will be able to observe, analyse and record in the hospital records and pedagogical diaries the pedagogical and psychological aspects of the educational process. The student is able to observe the teacher's work in the lesson, the work and the curriculum, the choice of methods and means and also the level of management of the pupils' learning and cognitive activity.	

The student is able, in cooperation with the trainee teacher, to make an analysis of the lesson. lessons and independently draw up a pedagogical diary.

**Course contents:**

- The student is acquainted with the necessary documentation required to enter the training school and the conditions for completing the internship.
- The student becomes familiar with the environment of the training school and the trainee teacher, sets the timetable for the practice.
- The student will participate in 10 biology classes taught by a practicum teacher at a selected elementary or secondary school.
- The student observes the educational process in a comprehensive form.
- The student observes the conditions in the school, focuses on pedagogical documentation and describes the observed phenomena in a pedagogical diary.
- The student, together with the trainee teacher, analyses the lessons.
- The student draws up protocols of each lesson, where he/she also evaluates the activity of the trainee teacher.
- The student submits the pedagogical diary prepared according to the requirements of the trainee teacher and the practice methodologist.

**Recommended or required literature:**

KRAMÁREKOVÁ, H. a kol. 2012. Pedagogická prax v príprave učiteľov, 1. vyd. Nitra: Univerzita Konštantína Filozofa, Pedagogická fakulta, ISBN: 978-80-558-0160-5.  
GNOTH, M. a kol. 2003. Pedagogická prax pre študentov učiteľských kombinácií, PriF UK Bratislava, 140 s.  
ČAPEK, R., 2015. Moderní didaktika : lexikon výukových a hodnoticích metod. Praha : Grada, 2015, 604 s., ISBN 978-80-247-3450-7.  
PETLÁK, E., 2016. Všeobecná didaktika. Bratislava : Iris 3. vyd., 2016, 322 s., ISBN 978-80-8153-064-7.  
Učebnice biológie pre základné a stredné školy.

**Language of instruction:**

English language.

**Notes:**

**Course evaluation:**

Assessed students in total: 9

A	B	C	D	E	FX
88.89	0.0	0.0	11.11	0.0	0.0

**Name of lecturer(s):** Ing. Dana Blahútová, PhD.

**Last modification:** 30.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:  
doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD103B/22	<b>Course title:</b> Latin
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 2.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> The control of study during the course: continuous tests - min. 60% of knowledge, active participation in exercises. The final oral exam assessment will be based on the total number of points obtained from the review of knowledge: A – 100%-94% B – 93%-88% C – 87%-81% D – 80%-75% E – 74%-69% Fx – 68%- 0%.	
<b>Learning outcomes of the course:</b> - the student knows the basics of Latin pronunciation and grammar - knows how to use and apply Latin grammar to compound expressions in anatomy terminology and creating binomial terms in botany and zoology	
<b>Course contents:</b> 1. Introduction. Pronunciation - exercise. 2-3/ Basics of grammar. Word types. I. declination. Vocabulary 4-5/ II. declination. Creation of expressions. Vocabulary. adjectives of I. and II. declination. 6-7/ III. declination. Grading of adjectives. Vocabulary. Practicing compound expressions 8-9/ IV. declination. Numerals 10-11/ V. declination. Binomial nomenclature 12-13/ Formation of compound latin words	
<b>Recommended or required literature:</b> 1. Kábrt J.: Latinský jazyk, Osveta Martin 2010, ISBN 978-80-8063-353-0 2. Šimon, F.: Latinská lekárska terminológia, Osveta Martin 1990, ISBN 80-217-0297-4 3. Špaňár, J.: Latinsko-Slovenský. Slovensko-Latinský slovník. SPN Mladé letá Bratislava 1998, ISBN 80-08-02816-5 4. Caban, P.: Lingua latina in millenio tertio. Magnet Press Slovakia Bratislava 2002. ISBN 80-968073-7-4	
<b>Language of instruction:</b>	
<b>Notes:</b>	

<b>Course evaluation:</b>					
Assessed students in total: 19					
A	B	C	D	E	FX
42.11	15.79	21.05	5.26	0.0	15.79
<b>Name of lecturer(s):</b> MVDr. Gabriela Hrkľová, PhD.					
<b>Last modification:</b> 26.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD100B/22	<b>Course title:</b> Microscopy Technology
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 1.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the relevant knowledge, skills and competencies of the student is carried out based on theoretical and practical examinations during the semester teaching. During the exercises during the semester, the student demonstrates his practical skills by independently preparing microscopic preparations, displaying them in the microscope as required, and making a documentary record. He / she presents theoretical knowledge about individual types of microscopes and microscopic preparations during the final examination. Final assessment: total percentage gain from practical examinations 70% and from theoretical knowledge 30%. Subject evaluation: A – 100% - 93% B – 92% - 85% C – 84% - 77% D – 76% - 69% E – 68% - 60% Fx – 59% - 0%	
<b>Learning outcomes of the course:</b> Subject objective: The goal of the subject is to enable students to gain the maximum amount of experience working with microscopes and microscopic preparations of various types, but especially with those that they will later use in exercises of other subjects during their studies at the Faculty of Education of the KU. In addition, students will also acquire general theoretical knowledge about more advanced types of microscopes and microscopy. Education outcomes: (knowledge, skills, and competencies): - the student knows how to work with a microscope - he / she is able to independently prepare microscopic preparations - he / she orients himself / herself in the general theory of microscopy, while he / she is also familiar with more advanced methods, techniques and procedures and knows individual types of microscopes	
<b>Course contents:</b>	

1. General characteristics of optical systems and optical laws.
2. General description of the microscope and its basic parts.
3. Basics of working with a microscope.
4. Basics of working with a microscope.
5. Native preparation and vital staining.
6. Native preparation and vital staining.
7. Permanent preparation, production of preparation with water-miscible and water-immiscible media.
8. Permanent preparation, production of preparation with water-miscible and water-immiscible media.
9. Basics of working with a stereoscopic microscope.
10. Basics of working with a stereoscopic microscope.
11. Advanced methods and techniques in microscopy – electron microscope, fluorescence microscope, polarizing microscope, phase contrast, dark field.
12. Advanced methods and techniques in microscopy – electron microscope, fluorescence microscope, polarizing microscope, phase contrast, dark field

**Recommended or required literature:**

**Language of instruction:**

**Notes:**

**Course evaluation:**

Assessed students in total: 36

A	B	C	D	E	FX
75.0	2.78	5.56	0.0	0.0	16.67

**Name of lecturer(s):** doc. RNDr. Michal Baláž, PhD.

**Last modification:** 24.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:

doc. Ing. Miroslav Saniga, CSc.



## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD106A/22	<b>Course title:</b> Molecular biology
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 3.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> During the semester, students complete several partial tests and tasks aimed at continuous assessment of the comprehensibility of the subject matter and with the aim of ensuring the continuity of the subject matter and the student's self-evaluation. At the end of the semester, they take a final exit written test, which will be used to determine the final evaluation of the subject. Subject assessment: 100 - 94% A 93 - 85% B 84 - 76% C 75 - 69% D 68 - 60% E 59 - 00% Fx	
<b>Learning outcomes of the course:</b> The aim of the subject is to obtain basic theoretical knowledge about the molecular nature of genetic information and the way it is realized in the cell After completing the course Molecular Biology, the student will acquire the following knowledge, skills and competencies: Know and understand the basics of the molecular structure and function of nucleic acids and proteins. Know the processes related to the transfer of genetic information from DNA to protein. Can effectively and creatively apply acquired knowledge to everyday life situations, from nature protection to individual health protection	
<b>Course contents:</b> Syllabus/Indicative Content: 1. History of molecular biology; relation between heredity, chromosomes and DNA 2. Characteristics of molecular biology, central dogma 3. Structure of the DNA molecule, biological information, gene and gene expression 4. Transcription in prokaryotic and eukaryotic cells 5. Characteristics of individual types of RNA and post-transcriptional modifications of hnRNA 6. Genetic code	

7. Amino acids and protein characteristics 8. Translation in prokaryotic and eukaryotic cells, post-translational modifications 9. Gene expression control 10. Replication in prokaryotic and eukaryotic cells, recombinant DNA 11. Classification of mutations, physical, chemical and biological mutagenic 12. Genome of individual forms of organisms 13. Basic overview of biotechnology in molecular biology					
<b>Recommended or required literature:</b> Rosypal,S.: Úvod do molekulární biologie I-IV, Brno 2003 Watson, J.D. et al. Molecular biology of the gene. Cold Spring Harbor Laboratory Press, 2008, 6th ed. Allison, L.A. Fundamental molecular biology. Malden: Blackwell, 2007 Griffiths A.J.F. et al. Introduction to genetic analysis, 10th ed., International ed., New York, N.Y. : W.H. Freeman , 2012 Stollárová, N. Molekulová biológia v praxi. Ružomberok, Pedagogická fakulta KU, 2003					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 22					
A	B	C	D	E	FX
13.64	4.55	4.55	22.73	27.27	27.27
<b>Name of lecturer(s):</b> Prof. RNDr. Peter Kubatka, PhD., RNDr. Mária Balážová, PhD.					
<b>Last modification:</b> 24.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD106B/22	<b>Course title:</b> Mycology
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 3.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the degree of acquisition of the relevant knowledge, skills and competences of the student is carried out on the basis of one continuous test, in which he demonstrates his theoretical knowledge from an overview of the kingdom of fungi, about its position in the system of living organisms. A minimum pass rate of 60% is required in the test. Final evaluation: cumulative percentage gain from the continuous written test (30%) and the theoretical exam (70%).	
<b>Learning outcomes of the course:</b> The aim of the subject is to provide basic theoretical knowledge and practical skills in defining the basic structure of the mushroom kingdom and in determining individual species according to macroscopic features. Learning outcomes (knowledge, skills and competences): - the student can define systematic features and 3 basic systems of division of the kingdom of fungi, - master the orientation in mycological atlases, which he can apply when determining collected species, - master the methodology of using individual types of mushrooms, not only for personal consumption, but also for use in the pharmaceutical, food and chemical industries, - is familiar with the position of mushrooms in nature and the necessity of their protection not only in terms of species but also territorially.	
<b>Course contents:</b> 1. The position of fungi and fungal organisms in the system of living organisms. 2. Brief development of mycology in the world and in Slovakia. 3. System of non-lichenized fungi, their phylogenetic development, components and structure of the thallus, occurrence and ecology. 4. Phylum Chytridiomycota – components and structure of the thallus, reproduction, occurrence and ecology, phylogenetic development, system and representatives. 5. Tribe Zygomycota - components and structure of the thallus, reproduction, occurrence and ecology, phylogenetic development, system and representatives.	

6. Tribe Ascomycota - components and structure of the thallus, reproduction, occurrence and ecology, phylogenetic development, system and representatives, orders: yeast-like, gorse-like, fungi-like, deer-like
7. Phylum Ascomycota – continued – orders: cup-shaped genera of cups, earwigs, snots, morels, truffles, black-shaped, calyx-shaped, lecanor-shaped, submersible
8. Basidiomycota tribe - components and structure of the thallus, reproduction, occurrence and ecology, phylogenetic development, system and representatives
- 9th class Teliomycetes: order of rust-forming and folder-forming fungi
- 10th class Ustomycetes: order snotiforms, snotiforms
- 11th class Basidiomycetes: subclass delenobasidia fungi
- 12th class Basidiomycetes: subclass all basidiomycetes, striatum, funnelform, liverwort, arachnoid, mushroom, mushroom
13. Importance of protection of fungi and fungal organisms.

**Recommended or required literature:**

1. Gáper J., Pišút I.: Mykológia – systém, vývoj a ekológia húb, ISBN – 8-8055-863-9
2. Kotlaba F., Antonín V.: HUBY – veľká encyklopédia
3. Kol. autorov – Huby, veľká encyklopédia, Raders Digest Výber, Slovensko, 2006, ISBN 80-88983-78-9
4. L. Hagara, V. Antonín, J. Baier – Veľký atlas húb, Ottovo nakladatelství Praha, 2005, ISBN 80-7360-333-0
5. M. Smotlacha, J. Malý – Atlas húb – príručka na určovanie húb, Ottovo nakladatelství Praha, 2005, ISBN 80-7181-853-4

**Language of instruction:**

English language.

**Notes:**

**Course evaluation:**

Assessed students in total: 9

A	B	C	D	E	FX
44.44	22.22	0.0	22.22	0.0	11.11

**Name of lecturer(s):** Ing. Kristína Urbanová

**Last modification:** 30.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:  
doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD107B/22	<b>Course title:</b> Ornithology
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 3.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b> KBE/Bi-BD102A/22	
<b>Requirements for passing the course:</b> Verification of the relevant knowledge, skills and competencies of the student is carried out based on theoretical and practical examinations during the semester teaching. During the semester, the student demonstrates his / her practical skills by working independently on the characteristics of individual signs of birds that are related to the ability to fly. At the same time, the student is evaluated based on the determination of different species of birds living in Europe, both in the classroom and during field exercise. Final assessment: total percentage gain from practical driving tests 50% and from theoretical knowledge 50%. Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> Subject objective: The aim of the course is to introduce students to the most important characteristics of birds related to the ability to fly, as well as the species and ecological diversity of this group of vertebrates. Education outcomes: (knowledge, skills, and competencies): - the student has theoretical knowledge about the development, differentiation, and diversity of the bird group (Aves) - he / she is able to name the basic evolutionary, anatomical, physiological and ecological manifestations of birds and is able to analyse them within the whole group of vertebrates. - he / she understands the uniqueness of this group of vertebrates based on the ability of active flight, which determines all the above-mentioned characteristics - he / she orients himself / herself in the systematics of birds and manages the basic methodologies of bird observation and research	
<b>Course contents:</b> 1. General characteristics of the group of birds (Aves) and its interaction with humans.	

2. Evolution of birds - development of the class and successful settlement of habitats of the world. 3. Anatomy and morphology of birds, focusing on differences related to the ability to fly. 4. Anatomy and morphology of birds, focusing on differences related to the ability to fly. 5. Physiology of birds, focusing on differences related to the ability to fly. 6. Physiology of birds, focusing on differences related to the ability to fly. 7. Behaviour of birds - obtaining food and breeding. 8. Behaviour of birds - obtaining food and reproduction. 9. Behaviour of birds - territoriality and social behaviour, communication, biorhythms, and migrations. 10. Behaviour of birds - territoriality and social behaviour, communication, biorhythms, and migrations. 11. Bird diversity. 12. Birds of Slovakia and Europe. 13. Threat and protection.					
<b>Recommended or required literature:</b>					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 16					
A	B	C	D	E	FX
93.75	0.0	0.0	0.0	0.0	6.25
<b>Name of lecturer(s):</b> doc. RNDr. Michal Baláž, PhD.					
<b>Last modification:</b> 24.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD105B/22	<b>Course title:</b> Practise in Vertebrates Determination
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 2.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the relevant knowledge, skills and competencies of the student is carried out based on theoretical and practical examinations during the semester teaching. In exercises during the semester, the student demonstrates his / her practical skills by working independently in identifying various species of vertebrates of the fauna of Slovakia using determination keys and handbooks. Evaluation is ongoing based on the success of the determination. Final assessment: total percentage gain from practical driving tests 80% and from theoretical knowledge 20%. Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> Subject objective: The aim of the subject is to introduce students to the most important species of vertebrates living in Slovakia in such a way that students can identify them without any problems. Education outcomes: (knowledge, skills, and competencies): - the student knows the types of vertebrates living in Slovakia - he / she knows the most important determining features that can be used in determining the species of this group - he / she is able to independently determine individual species and knows their ecology, habitat requirements, as well as their threat status	
<b>Course contents:</b> 1. Characteristics of the most important representatives of Central European fish species. Characteristics of the habitats that these animals inhabit. Threat status and protection of fish.	

2. Characteristics of the most important representatives of Central European fish species. Characteristics of the habitats that these animals inhabit. Threat status and protection of fish.
3. Characteristics of the most important representatives of Central European fish species. Characteristics of the habitats that these animals inhabit. Threat status and protection of fish.
4. Characteristics of the most important representatives of Central European species of amphibians and reptiles. Characteristics of the habitats that these animals inhabit. Threat status and protection of amphibians and reptiles.
5. Characteristics of the most important representatives of Central European species of amphibians and reptiles. Characteristics of the habitats that these animals inhabit. Threat status and protection of amphibians and reptiles.
6. Characteristics of the most important representatives of Central European species of amphibians and reptiles. Characteristics of the habitats that these animals inhabit. Threat status and protection of amphibians and reptiles.
7. Characteristics of the most important representatives of Central European bird species. Characteristics of individual types of habitats that these animals inhabit. State of threat and their protection.
8. Characteristics of the most important representatives of Central European bird species. Characteristics of individual types of habitats that these animals inhabit. State of threat and their protection.
9. Characteristics of the most important representatives of Central European bird species. Characteristics of individual types of habitats that these animals inhabit. State of threat and their protection.
10. Characteristics of the most important representatives of Central European mammal species. Characteristics of the individual types of habitats that these animals inhabit, their state of threat and protection.
11. Characteristics of the most important representatives of Central European mammal species. Characteristics of the individual types of habitats that these animals inhabit, their state of threat and protection.
12. Characteristics of the most important representatives of Central European mammal species. Characteristics of the individual types of habitats that these animals inhabit, their state of threat and protection.

**Recommended or required literature:**

**Language of instruction:**

**Notes:**

**Course evaluation:**

Assessed students in total: 10

A	B	C	D	E	FX
80.0	0.0	0.0	0.0	0.0	20.0

**Name of lecturer(s):** doc. RNDr. Michal Baláž, PhD.

**Last modification:** 24.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:

doc. Ing. Miroslav Saniga, CSc.



## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD111A/22	<b>Course title:</b> School experiments in biology
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 6.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Assessment of acquired knowledge, skills and competencies of the student is carried out on the basis of the preparation of practical experiments in biology applicable in the school environment of primary and secondary schools. The student prepares a total of 12 attempts, for each of which he can get 5 points, which he applies during the exercise. The total gain of points is thus 60. Course assessment: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> The aim of the course is to present, active preparation and didactic analysis of school biology experiments. After completing the School experiments in biology, the student will acquire the following knowledge, skills and competencies: The student acquire the basic technique of work in the school laboratory as well as practical skills that can be used in basic classes The student is able to prepare simple and interesting school experiments with regard to authenticity and connection with real life. The student can modify basic biological experiments taking into account the material equipment and safety conditions of the school	
<b>Course contents:</b> Syllabus/Indicative Content: 1. Experiments of the domain Cytology 1 2. Experiments of the domain Cytology 2 3 Experiments of the domain Anatomy and morphology of plants 1 4. Experiments of the domain Anatomy and morphology of plants 2 5. Experiments of the domain Physiology of plants	

6. Experiments of the domain Taxonomy of plants 7. Experiments of the domain Anatomy and morphology of animals and humans 1 8. Experiments of the domain Anatomy and morphology of animals and humans 2 9. Experiments of the domain Physiology of animals and humans 1 10. Experiments of the domain Physiology of animals and humans 2 11. Experiments of the domain Taxonomy of animals 12. Experiments of the domain Genetics 13 Experiments of the domain Molecular Biology					
<b>Recommended or required literature:</b> Jones, A., Reed, R., Weyers, J. 2012. Practical Skills in Biology (5th Edition). Pearson Education, Canada. Shields, M., 2005. Biology Inquiries: Standards-Based Labs, Assessments, and Discussion Lessons, Jossey-Bass, San Francisco. Lorbber, G.C., Nelsonová, L.W. 1998 Biologické pokusy pro děti. Portál, Praha. Anna Sandanusová, A. 2011 Indoor experimenty – biológia. Nitra: Univerzita Konštantína Filozofa, Fakulta prírodných vied					
<b>Language of instruction:</b>					
<b>Notes:</b>					
<b>Course evaluation:</b> Assessed students in total: 4					
A	B	C	D	E	FX
75.0	0.0	0.0	0.0	0.0	25.0
<b>Name of lecturer(s):</b> RNDr. Mária Balážová, PhD.					
<b>Last modification:</b> 30.08.2022					
<b>Supervisor(s):</b> Person responsible for the delivery, development and quality of the study programme: doc. Ing. Miroslav Saniga, CSc.					

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD108B/22	<b>Course title:</b> Teriology
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 <b>hours per semester:</b> 13 <b>Teaching method:</b> on-site	
<b>Credits:</b> 1	<b>Working load:</b> 25 hours
<b>Recommended semester/trimester:</b> 3.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b> KBE/Bi-BD102A/22	
<b>Requirements for passing the course:</b> Verification of the relevant knowledge, skills and competencies of the student is carried out based on theoretical and practical examinations during the semester teaching. During the semester, the student demonstrates his / her practical skills by working independently on the characteristics of individual signs of mammals (mainly those characteristics that cannot be found in another group of Vertebrates). At the same time, the student is evaluated based on the determination of different species of mammals living in Europe, both in the classroom and during field exercise. Final assessment: total percentage gain from practical driving tests 50% and from theoretical knowledge 50%. Subject evaluation: A – 100%-93% B – 92%-85% C – 84%-77% D – 76%-69% E – 68%-60% Fx – 59%- 0%	
<b>Learning outcomes of the course:</b> Subject objective: The aim of the subject is to introduce students to the most important characteristics of mammals, especially those that do not occur in any other animal group, as well as the species and ecological diversity of this group of vertebrates. Education outcomes: (knowledge, skills, and competencies): - the student has acquired basic knowledge about the development and diversity of the mammal group (Mammalia) - he / she has knowledge about evolution, anatomy, physiology, ecology and general manifestations of life and can apply it also in connection with the position of man in the zoological system and his kinship relations with other groups - he / she orients himself / herself in systematics, can identify the most important species and manages the basic methods of observing and researching mammals	

**Course contents:**

1. General characteristics of mammals with a focus on features that are unique to this group of vertebrates.
2. Evolution of mammals and successful settlement of the habitats of the world.
3. Anatomy and morphology of mammals with a focus on uniqueness compared to other groups of vertebrates.
4. Anatomy and morphology of mammals with a focus on diversity within the class of mammals.
5. Distribution and zoogeography of mammals within the global area.
6. Diversity and system of mammals - Monotremata.
7. Diversity and system of mammals - Marsupialia.
8. Diversity and system of mammals - Afrotheria.
9. Diversity and system of mammals – Xenarthra.
10. Diversity and system of mammals – Laurasiatheria.
11. Diversity and system of mammals - Euarchontoglires.
12. Diversity and system of mammals of Slovakia and Europe.
13. Threat and protection.

**Recommended or required literature:****Language of instruction:****Notes:****Course evaluation:**

Assessed students in total: 12

A	B	C	D	E	FX
83.33	8.33	0.0	0.0	0.0	8.33

**Name of lecturer(s):** doc. RNDr. Michal Baláž, PhD.

**Last modification:** 24.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:

doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD101A/22	<b>Course title:</b> Zoology I
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 2 / 2 <b>hours per semester:</b> 26 / 26 <b>Teaching method:</b> on-site	
<b>Credits:</b> 5	<b>Working load:</b> 125 hours
<b>Recommended semester/trimester:</b> 1.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b>	
<b>Requirements for passing the course:</b> Verification of the relevant knowledge, skills and competencies of the student is carried out based on theoretical and practical examinations during the semester teaching. During the exercises, the student demonstrates his theoretical knowledge by solving tasks focused on the issues discussed in the lecture. Independently works out tasks that consist of searching for logical connections in the given issue. At the same time, student demonstrates practical skills in identifying and classifying studied species or higher taxonomic groups of animals. Final assessment: total percentage gain from practical driving tests 50% and from theoretical knowledge 50%. Subject evaluation: A – 100% - 93% B – 92% - 85% C – 84% - 77% D – 76% - 69% E – 68% - 60% Fx – 59% - 0%	
<b>Learning outcomes of the course:</b> Subject objective: The aim of the subject is to present animals as a group within the living organisms. The animals are a diverse group with several separate evolutionary lines and with species characterized by diverse life strategies. The goal is also to present the groups and species of animals living in Slovakia. The graduate of the subject has a sufficient basis for a future profession in the biological field. Education outcomes: (knowledge, skills and competencies): <ul style="list-style-type: none"> <li>- the student knows and understands the theory of the zoological system</li> <li>- he / she orients himself in current knowledge on major groups of organisms</li> <li>- he / she knows the principles of animal classification and has an overview of the most important taxonomic units of the animal kingdom, respecting their evolution</li> <li>- he / she is able to identify selected species of animals of individual groups</li> <li>- he / she knows the morphological and anatomical structure of selected groups of animals</li> <li>- he / she has an overview of the phylogenetic development of animal organ structures and the overall structure of their body</li> </ul>	

- he / she can work with a microscope

**Course contents:**

Subject content:

1. Basics of classification of living organisms and the zoological system.
2. Unicellular eukaryotes (Protista) as a group outside the animal system.
3. Theories of the origin of multicellular organisms and the primary groups of multicellular organisms - Placozoa, Porifera and Radiata.
4. Formation of tissues, organs and organ systems and their characteristics.
5. Characteristics and phylogeny of the integument and skeletal system.
6. Characteristics and phylogeny of the digestive, vascular, and respiratory systems.
7. Characteristics and phylogeny of regulatory systems and senses.
8. Characteristics and phylogeny of the excretory and reproductive system.
9. The main differences between the developmental groups of Protostomia and Deuterostomia.
10. Phylogeny and characteristics of groups of Platyhelminthes and Rotifera.
11. Phylogeny and characteristics of the Mollusca and Annelida groups.
12. Phylogeny and characteristics of Nematoda and Arthropoda groups.
13. Phylogeny and characteristics of the Arthropoda group.

**Recommended or required literature:****Language of instruction:****Notes:****Course evaluation:**

Assessed students in total: 41

A	B	C	D	E	FX
24.39	7.32	4.88	14.63	24.39	24.39

**Name of lecturer(s):** doc. RNDr. Michal Baláž, PhD.

**Last modification:** 22.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:  
doc. Ing. Miroslav Saniga, CSc.

## COURSE INFORMATION SHEET

<b>University:</b> Catholic University in Ružomberok	
<b>Faculty:</b> Faculty of Education	
<b>Course code:</b> KBE/Bi-BD102A/22	<b>Course title:</b> Zoology II
<b>Type and range of planned learning activities and teaching methods:</b> <b>Form of instruction:</b> Lecture / Seminar <b>Recommended study range:</b> <b>hours weekly:</b> 1 / 3 <b>hours per semester:</b> 13 / 39 <b>Teaching method:</b> on-site	
<b>Credits:</b> 5	<b>Working load:</b> 125 hours
<b>Recommended semester/trimester:</b> 2.	
<b>Level of study:</b> I.	
<b>Prerequisites:</b> KBE/Bi-BD101A/22	
<b>Requirements for passing the course:</b> Verification of the relevant knowledge, skills and competencies of the student is carried out based on theoretical and practical examinations during the semester teaching. During the exercises, the student demonstrates his / her theoretical knowledge by solving tasks focused on the issues discussed in the lecture. Independently works out tasks that consist of searching for logical connections in the given issue. Within the study of this subject student completes a field work exercise. During the field work exercise, he / she will work with some wild animals living in Slovakia. Final assessment: total percentage gain from practical driving tests 50% and from theoretical knowledge 50%. Subject evaluation: A – 100% - 93% B – 92% - 85% C – 84% - 77% D – 76% - 69% E – 68% - 60% Fx – 59% - 0%	
<b>Learning outcomes of the course:</b> Subject objective: The aim of the subject is to present chordates as an important phylogenetic group of animals. The aim is also to present the species of vertebrates living in the territory of Slovakia so that the graduate of the course has a sufficient basis for a future profession in the biological field. Education outcomes: (knowledge, skills and competencies): - the student knows the current knowledge on the phylogenetic status of groups of chordates - knows and identifies selected species of chordates of individual groups - knows and identifies selected species of vertebrates living in Slovakia - he / she is familiar with the methods of research, observation, trapping and methods of handling selected groups of animals that live in the territory of Slovakia	
<b>Course contents:</b>	

1. Basic characteristics of the Deuterostomia and Chordata groups and their evolution. Origin and development of the chorda.
2. Characteristics of the groups Urochordata and Cephalochordata with regard to common and different features with the group of vertebrates (Vertebrata).
3. Formation of the skeleton. Characteristics of the jawless group (Agnatha).
4. Transformation of gill arches, formation of jaws. Characteristics of the jawed group (Gnathostomata).
5. Characteristics of the group of Chondrichthyes.
6. Formation of the bony skeleton. Basic characteristics and phylogenetic position of the Teleostomi group.
7. Characteristics of the group of ray-finned fish (Actinopterygii) with a focus on groups whose species also live in Slovakia.
8. Characteristics of the Sarcopterygii group, the transition of vertebrates to dry land and the evolution of tetrapods (Tetrapoda).
9. Characteristics of the amphibian group (Amphibia).
10. Formation of germ layers, definitive colonization of dry land. Characteristics of the group of reptiles (Reptilia).
11. Characteristics of the group of birds (Aves) with a focus on groups living in Slovakia.
12. Characteristics of the group of mammals (Mammalia) with a focus on groups living in Slovakia.
13. Methods of observation, attraction, trapping, manipulation, and research of individual groups of vertebrates living in Slovakia.

**Recommended or required literature:**

**Language of instruction:**

**Notes:**

**Course evaluation:**

Assessed students in total: 19

A	B	C	D	E	FX
36.84	10.53	10.53	5.26	15.79	21.05

**Name of lecturer(s):** doc. RNDr. Michal Baláž, PhD.

**Last modification:** 23.08.2022

**Supervisor(s):**

Person responsible for the delivery, development and quality of the study programme:

doc. Ing. Miroslav Saniga, CSc.