

## **List of Course Information Sheets**

### **Study Programme: Medical Microbiology and Immunology**

(3rd degree, internal and external form)

#### **Profile courses:**

New Trends in Medical Microbiology and Immunology

Dissertation thesis I.

Dissertation thesis II.

Dissertation Examination

Defence of the Dissertation Thesis

#### **Compulsory subjects:**

Introduction to scientific research 1.

Introduction to scientific research 2.

Introduction to scientific research 3.

English Language and the exam in the English Language

#### **Compulsory elective subjects:**

The register of diseases, national healthcare registers, follow-up

Functional Anatomy of Human Reproduction and Clinical Embryology

Neuroscience – New Trends

Pathological Physiology and Pathology – new trends

New Medicaments and Strategies in Pharmacotherapy

New Trends in Medical Biology and Clinical Genetics

New Trends in Medical Clinical and Pharmacological Biochemistry

## *Course Information Sheets: New Trends Medical Microbiology and Immunology*

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> Faculty of Medicine, Bratislava	
<b>Subject Code:</b>	<b>Subject Title:</b> New Trends in Medical Microbiology and Immunology
<p><b>Type, scope and method of educational activities:</b> 12 hours of contact teaching and 12 hours of self-study completed by a test. The full-time form.</p>	
<b>Number of credits earned: 10</b>	
<b>Recommended semester/trimester of the study:</b> 2nd semester of the first year of the PhD study	
<b>Degree of Study:</b> 3.	
<b>Prerequisite courses:</b> the subject has no prerequisites	
<p><b>Grading policy:</b> Participants in doctoral studies will attend 12 lectures in Medical Microbiology and Immunology (6 x 2 hours) completed by a test. <b>Number of credits earned: 10</b> There will be one written examination; at least 60 % will be needed to complete it.</p>	
<p><b>Course objectives:</b> Gaining selected latest knowledge and information about new trends in Medical Microbiology and Immunology. The graduate of the course masters the principles of basic and modern diagnostic procedures in Medical Microbiology and Immunology, methods for examining the immune profile of patients, masters specialised examination procedures in medical microbiology and immunology, principles of molecular genetic techniques, PCR methodology, DNA isolation, RNA, sequencing, Elisa methodology, immunohistology. 2. He/she can work independently in the laboratory, receive and store samples, process results, statistically evaluate, interpret and present them in lectures and publications. 3. He/she can combine knowledge of medical microbiology with knowledge of immunology.</p>	
<p><b>Concise subject structure (Syllabus):</b> The course aims to acquaint doctoral students with clinical and theoretical fields of study with new knowledge and research trends. The lectures relate mainly to the latest selected knowledge of the origin and development of some of the most socially severe conditions and diseases. socially serious infectious diseases (Covid 19, AIDS, ...), infections of the cardiovascular system and blood and other systems, infections related to biofilm and foreign bodies, principles of rational antibiotic treatment and post-infectious immunopathological conditions. It also includes new findings in the field of immunogenetics, the role of cytokines, chemokines and subpopulations of lymphocytes and macrophages in the immunopathogenesis of diseases, classical and alternative inflammation, the role of inflammation as a key factor in tumour development and all diseases, the immunopathogenesis of sepsis, lung diseases, neuroinflammation, Alzheimer disease, neurodegenerative diseases, autoimmune and autoinflammatory diseases, the influence of the intestinal microbiome, the psyche, the endocrine system and the nervous system on the immune system.</p>	
<p><b>Suggested readings:</b> The recommended literature for a student to the subject</p> <ol style="list-style-type: none"> <li>1. Scientific articles linked to the topic of PhD thesis from Pubmed, Scopus and other web sites.</li> </ol>	

<ol style="list-style-type: none"> <li>2. Buc M. Basic and Clinical Immunology. 4th ed. Bratislava: Comenius University 2020, in press</li> <li>3. Shawkatová I. et al. Laboratory methods in Immunology, Comenius University 2019, 184 p.</li> <li>4. Buc M and Javor J.: Basic and Clinical Immunology for Dentistry Students. Bratislava: Comenius University 2017, 315 pp.</li> <li>5. Murray, P. R., Rosenthal, K. S., Pfaller, M. A.: Medical microbiology. London: Elsevier, 2021</li> </ol>												
<b>The language needed to pass the subject:</b> English, and Slovak												
<b>Other course information:</b> the subject will be held in the summer semester												
<b>Grading history</b> Final evaluation: "passed", "did not pass"												
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 16.6%;">A</td> <td style="width: 16.6%;">B</td> <td style="width: 16.6%;">C</td> <td style="width: 16.6%;">D</td> <td style="width: 16.6%;">E</td> <td style="width: 16.6%;">FX</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	A	B	C	D	E	FX						
A	B	C	D	E	FX							
<b>Lectures:</b> ass. prof. Mária Bucová, M.D., PhD., assoc prof. Adriana Liptáková, M.D., PhD, MPH.; assoc. prof. Lívia Slobodníková, RNDr., PhD., assoc. prof. Ivana Shawkatová, Mgr., PhD., assoc. prof. Vladimíra Ďurmanová, RNDr., PhD. and alternatively, other teachers												
<b>Last update:</b> 31. March 2021												
<b>Approved by:</b> assoc. prof. MUDr. Mária Bucová, CSc., adj. prof.												

### *Course Information Sheets: Dissertation thesis I.*

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> FACULTY OF MEDICINE	
<b>Subject code:</b>	<b>Subject Title: Dissertation thesis I.</b>
<b>Type, scope and method of educational activities:</b> without specification regarding it is a doctoral degree of the study (methods choice – in-person, distant, combined)	
<b>Number of credits: 10</b>	
<b>Recommended semester/trimester of the study:</b> 1st semester	
<b>Study degree:</b> 3rd grade	
<b>Prerequisite subjects:</b>	
<b>Conditions for the subject completion:</b> Evaluation of the course is individual according to a doctoral student's study plan and based on the agreement between the supervisor and the doctoral student. The part of the subject is mainly the individual study of literature focused on the dissertation thesis.	
<b>Educational results:</b> By completing the course, the student will gain sufficient information on the dissertation thesis project current issues following the specifics of particular topics. This amount of knowledge is essential for the firmly established theoretical skills of the graduate from the view of his/her knowledge. But it also supports his potential in the broad field of applied practice. Undoubtedly, the results will reflect in the student's overview in methodological approaches in the subject issues.	
<b>Concise subject structure:</b> The subject Dissertation thesis I. is part of doctoral student's study activities. It gains exclusively individual character regarding the specifics of the dissertation thesis topics. Its essential structure is noticeable already in the frame of the individual study plan of a doctoral student.	

The subject is essential, especially from understanding the essential theoretical and methodological aspects of the solved dissertation thesis, emphasising self-study and consultations with the supervisor and a broad spectrum of consultants. It contributes to creating the doctoral student's potential in his/her further (scientific) period of his/her study.
<b>Recommended literature:</b> Without the specification regarding the character of the dissertation thesis. The recommended literature is a part of the individual study plan of the doctoral student.
<b>The language needed to pass the subject:</b> Slovak combined with English (study literature in English)
<b>Notes:</b>
<b>Subject classification:</b> Subject completion is assessed by the classification grades passed or did not pass
<b>The overall number of classified students:</b> new subject
<b>Lecturers:</b> the doctoral student supervisor
<b>Last update:</b> 31. March 2021
<b>Approved by:</b> assoc. prof. MUDr. Mária Bucová, CSc., adj. prof.

### ***Course Information Sheets: Dissertation thesis II.***

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> FACULTY OF MEDICINE	
<b>Subject code:</b>	<b>Subject Title: Dissertation thesis II.</b>
<b>Type, scope and method of educational activities:</b> without specification regarding it is a doctoral degree of the study (methods choice – in-person, distant, combined)	
<b>Number of credits: 10</b>	
<b>Recommended semester/trimester of the study:</b> 3rd semester	
<b>Study degree:</b> 3rd degree	
<b>Prerequisite subjects:</b>	
<b>Conditions for the subject completion:</b> Evaluation of the course is individual according to a doctoral student's study plan and based on the agreement between the supervisor and the doctoral student. The part of the subject is mainly the individual study of literature focused on the dissertation thesis.	
<b>Educational results:</b> By completing the course, the student will gain sufficient information on the dissertation thesis project's current issues following the specifics of particular topics. This amount of knowledge is essential for the firmly established theoretical skills of the graduate from the view of his/her knowledge. But it also supports his potential in the broad field of applied practice. Undoubtedly, the results will reflect in the student's overview in methodological approaches in the subject issues.	
<b>Concise subject structure:</b> The subject Dissertation thesis II. is part of doctoral student's study activities. It gains exclusively individual character regarding the specifics of the dissertation thesis topics. Its essential structure is noticeable already in the frame of the individual study plan of a doctoral student. The subject is essential, especially from understanding the essential theoretical and methodological aspects of the solved dissertation thesis, emphasising the self-study and consultations with the supervisor and a broad spectrum of consultants. It contributes to creating the doctoral student's potential in his/her further (scientific) period of his/her study.	

<b>Recommended literature:</b> Without the specification regarding the character of the dissertation thesis. The recommended literature is a part of the individual study plan of the doctoral student.
<b>The language needed to pass the subject:</b> Slovak combined with English (study literature in English)
<b>Notes:</b>
<b>Subject classification:</b> Subject completion is assessed by the classification grades passed or did not pass
<b>The overall number of classified students:</b> new subject
<b>Lectures:</b> the doctoral student supervisor
<b>Last update:</b> 31. March 2021
<b>Approved by:</b> assoc. prof. MUDr. Mária Bucová, CSc., adj. prof.

### ***Course Information Sheets: Dissertation Examination***

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> FACULTY OF MEDICINE	
<b>Subject code:</b>	<b>Subject Title: Dissertation Examination</b>
<b>Type, scope and method of educational activities:</b> state examination, without a specification as it is the doctoral study degree	
<b>Number of credits: 20</b>	
<b>Recommended semester/trimester of the study:</b> in the full-time form 4th semester at the latest, in the external form 5th semester at the latest	
<b>Study degree:</b> 3rd grade	
<b>Prerequisite subjects:</b> compulsory and other compulsory elective subjects following the accreditation file and the individual study plan of the doctoral student, acquiring a minimum of 60 credits, elaboration of the written work to the dissertation thesis	
<b>Conditions for the subject completion:</b> The subject assessment is done in the state examination frame following the Study Regulations of the Faculty of Medicine Comenius University in Bratislava. After submitting the written work to the dissertation thesis in the determined period (until half of the study at the latest). The state examination subjects involve the debate on the written work to the dissertation thesis (elaborated by the doctoral student) and others by the Dean approved subjects of the oral examination (ad hoc). Assessment is standard and reflects sufficiently the student's orientation in the given issues. The conditions for successful subject completion are in concord with the Faculty of Medicine CU's Study regulations.	
<b>Educational results:</b> The graduate from the subject masters the tenets of the scientific work and has built the scientific thinking and scientific work system, masters the scientific work methodology, he/she knows how to prepare an abstract and overview scientific publication. The outcome of this knowledge is the completion of the written work to the dissertation thesis. The doctoral student shall complete the dissertation examination under the Law No. 131/2002 Coll. on Higher Education, § 54 Doctoral study programme and the Faculty of Medicine's Study regulations, Comenius University in Bratislava.	
<b>Concise subject structure:</b> The study of scientific publications related to the topics of the doctoral study. Elaboration of the written work to the dissertation examination containing the overview of the current knowledge in the given issues. Forming the scientific goals of the dissertation thesis. Acquiring theoretical	

<p>knowledge and practical skills related to the dissertation examination thesis and the subject of the doctoral study. The primary outcome is the written work to the dissertation thesis and its completion following the Study regulations FM CU. The form and the work content are regulated in Art. 29, Sec. 4 of the Study regulations FM CU. The dissertation examination consists of the debate over the written work to the dissertation examination and part when the doctoral student shall show theoretical knowledge from the study programme. The composition of the examination committee, determination of the opponent and the course of the dissertation examination follows the Study regulations FM CU.</p>
<p><b>Recommended literature:</b> Without the specification regarding the character of the dissertation thesis. The recommended literature is a part of the individual study plan of the doctoral student.</p>
<p><b>The language needed to pass the subject:</b> Slovak combined with English (study literature in English)</p>
<p><b>Notes:</b></p>
<p><b>Subject classification:</b> The dissertation examination is evaluated as a whole by the classification grade passed or not passed.</p>
<p><b>The overall number of classified students:</b></p>
<p><b>Lecturer:</b> supervisor, the chairman of the examination committee and members of the examination committee</p>
<p><b>Last update:</b> 31. March 2021</p>
<p><b>Approved by:</b> assoc. prof. MUDr. Mária Bucová, CSc., adj. prof.</p>

### *Course Information Sheets: Defence of the Dissertation Thesis*

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> FACULTY OF MEDICINE	
<b>Subject code:</b>	<b>Subject Title: Defence of the Dissertation Thesis</b>
Type, scope and method of educational activities: state examination, without a specification as it is the doctoral study degree	
<b>Number of credits: 30</b>	
<b>Recommended semester/trimester of the study:</b> in the full-time form the 8th semester at the latest, in the external form the 10th semester at the latest	
<b>Study degree:</b> 3rd grade	
<b>Prerequisite subjects:</b> Dissertation Examination	
<p><b>Conditions for the subject completion:</b></p> <ol style="list-style-type: none"> <li>1. The successful completion of all compulsory subjects and the other 2 compulsory elective subjects.</li> <li>2. Realisation of the examination in the English Language,</li> <li>3. Completed dissertation examination,</li> <li>4. A doctoral student in the full-time and external form must be an author of a minimum of 3 scientific works 'in extenso'. A minimum of one work must be related to the dissertation work thesis in the indexed journal as the first author. The scientific work in the indexed journal means that it is available in the databases WEB of SCIENCE, PUBMED or SCOPUS. The doctoral student must have a minimum of one work in the journal with the impact factor (minimum IF=0.5) as the first author or co-author. In the frame of FMCU, the only credible IF value we consider just the date, which comes from the Journal Citation Reports (JCR), which is the only one that the database Web of Science recognises.</li> </ol>	

5. Just those outcomes are taken into consideration that has been already published. It means not those which were just sent for publishing or accepted for publishing. In reasonable cases, it is possible to recognise one missing publication based on the acceptance list. It is also possible to recognise the publication which is already available on PubMed as 'ahead of print.'

6. Acquiring a minimum of 210 credits + 30 credits for acceptance of the dissertation thesis for defence

Evaluation of the subject runs in the state examination frame following the Study Regulations FM CU in Bratislava after submitting the dissertation work (as a final thesis). Assessment is standard and reflects sufficiently the student's orientation in the given issues. The conditions for successful subject completion are in concord with the Faculty of Medicine CU's Study Regulations.

**Educational results:**

The subject goal is to use the theoretical, methodological and applied knowledge of the doctoral study in the elaboration, subsequent defence of the dissertation thesis and completion of the doctoral study.

**Concise subject structure:**

It depends on the dissertation thesis. With the dissertation thesis, the student presents the ability and readiness for independent scientific and creative activity in the field of research or development or independent theoretical and creative activity. It shall be characterised by a high level of analysis and synthesis of knowledge and a good overview of existing professional literature. The work must be original, created by the author, following the rules for work with the information sources. The work must not have a plagiarism character and must not breach other authors' rights. The author is obliged to cite precisely used information sources, state names, and concrete results of other author teams' research by citing the relevant source to precisely describe laboratory results and terrain research of other authors or author teams. The citing technique is regulated by the given field's customs, respecting the relevant standards and norms.

**Recommended literature:**

It depends on the dissertation thesis. Without the specification regarding the character of the dissertation thesis. The recommended literature is a part of the individual study plan of the doctoral student.

**The language needed to pass the subject:**

Slovak combined with English (study literature in English)

**Notes:**

**Subject classification:**

The defence of the dissertation thesis is classified with the classification grade Passed or FX.

**The overall number of classified students:**

**Lecturers:** supervisor, the chairman of the examination committee and members of the examination committee

**Last update:** 31. March 2021

**Approved by:** assoc. prof. MUDr. Mária Bucová, CSc., adj. prof.

***Course Information Sheets: Introduction to scientific research 1.***

**University:** Comenius University in Bratislava

**Faculty:** FACULTY OF MEDICINE

**Subject code:**

**Subject Title: Introduction to scientific research 1.**



<p><b>Type, scope and method of educational activities:</b>  <b>Tuition form:</b> in person + self-study  <b>The recommended scope of tuition (in hours):</b> 12 hours of lectures + 12 hours of self-study  <b>Within the study:</b> lectures are divided into three 4-hour courses in the semester  <b>Study methods:</b> in-person</p>
<p><b>Number of credits:</b> 10</p>
<p><b>Recommended semester/trimester of the study:</b> The 1st or the 2nd semester</p>
<p><b>Degree of study:</b> the third</p>
<p><b>Prerequisite courses:</b> it does not have any prerequisite subject</p>
<p><b>The subject completion conditions:</b> presence minimum 75%, abstract or poster elaboration in the electronic form. The final test was completed (evaluation A for 75% of points, B 70%, C 65%, D 60%, E 55%). Credits will not be granted if the doctoral student does not elaborate on the abstract of the poster and does not gain a minimum of 55% in the final test.</p>
<p><b>Educational results:</b> The subject graduate masters the tenets of the scientific work, has built the system of scientific thinking and scientific work, masters the methodology of the scientific work, he/she knows how to prepare an abstract, poster and a scientific publication. He/she masters the ethical and legal aspects of experimental and clinical research and can present the scientific research results in publication and lecture activities. The graduate from the subject masters the work with electronic information sources (licensed and freely available). How to work with these sources and the ability to utilise them in the scientific-research and pedagogical work.</p>
<p><b>Concise subject structure:</b>  Why science and research are essential. Ethical principles in science and research. Clinical observations and clinical studies. Types of presentations at scientific events. Tenets of rhetoric and communication.  How to prepare a scientific lecture. How to select and read scientific articles. Result processing and analysis. How to prepare a poster presentation. How to write parts of the scientific publication How to write a scientific article. How to proceed the scientific article into the journal. How to publish scientific results. Basic information on the organisation of libraries at CU. Academic Library of FM CU. Databases produced at CU. Orientation in the collected online catalogue of the faculty libraries. Database of the publication activities. The way of searching in the databases of the publication activity according to various selective criteria. Collective catalogue of SR periodicals. Project CVTI ST – the National Information System of the Support for Research and Development in Slovakia → access to electronic information sources. Abstract databases. Full-text databases. Electronic journal archives. Scientometric databases. Guideline on publication activities. Categorisation of the publication activities. Categorisation of responses. Current journals. Scientometric indicators. Medicine based on evidence. Reference managers.</p>
<p><b>Recommended literature:</b>  Z. Zelinková: Úvod do vedeckej práce pre študentov medicíny a doktorandov medicínskych odborov, 2012, 65 s., elektronická kniha dostupná na web stránke LF UK  P. Celec: Ako publikovať v biomedicínskych vedách, 2012, 55 s., elektronická kniha dostupná na web stránke LF UK  I. Hulín et al: Úvod do vedeckého bádania 1, SAP, Bratislava 2003, 553 s  I.Hulín et al: Úvod do vedeckého bádania 2, Dialógy, úvahy a zamyslenia, SAP, Bratislava 2005, 531 s.  Library research tutorials and guides [online]. Owned by: Janis McKenzie. Burnaby: Simon Fraser University Library. Last Modified: 9 April 2018. [cit. 2018-05-07]. Available on the internet: <a href="https://www.lib.sfu.ca/help/research-assistance/tutorials">https://www.lib.sfu.ca/help/research-assistance/tutorials</a></p>
<p><b>The language needed to pass the subject:</b> Slovak, English</p>



<b>Notes:</b>					
<b>Subject classification:</b> Final classification: 'passed', 'failed'					
<b>Overall number of classified students:</b>					
A	B	C	D	E	FX
<b>Lecturer:</b> prof. MUDr. Viera Štvrtinová, CSc. MUDr. Jozef Záhumenský, Ph.D. RNDr. Ivan Varga, PhD.					
<b>Last updated:</b> 29 March 2021					
<b>Approved by:</b> prof. MUDr. Viera Štvrtinová, CSc.					

### ***Course Information Sheets: Introduction to scientific research 2.***

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> FACULTY OF MEDICINE	
<b>Subject code:</b>	<b>Subject Title: Introduction to scientific research 2.</b>
<b>Type, scope and method of educational activities:</b> <b>Tuition form:</b> in person + self-study <b>The recommended scope of tuition (in hours):</b> 12 hours of lectures + 12 hours of self-study <b>Within the study:</b> lectures are divided into three 4-hour courses in the semester <b>Study methods:</b> in-person	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of the study:</b> The 2nd or the 3rd semester	
<b>Study degree:</b> 3	
<b>Prerequisite subjects:</b> -	
<b>The subject completion conditions:</b> presence minimum 75% and completion of the final test (over 60%).	
<b>The educational results:</b> basic knowledge of scientific procedures in the medical research, forming and testing of scientific hypotheses, their connection with basic experimental and clinical designs, basis of statistical evaluation of medical data, practical mastering of descriptive statistics in the text, table and graphic form, testing intergroup and intragroup differences and relations in the most frequently occurring situations. The subject graduate masters the tenets of the lecture presentation and the work defence, which can gather the information from the scientific research to present in the table and graphic form in the publishing and lecture form.	
<b>Concise subject structure:</b> 1. The relation between medicine based on evidence and statistics, medical experiment/clinical study, research hypothesis, 2. Work with the data file, descriptive statistics, data division, graphic date presentation, extreme deviations (data transformation, division normalisation), the importance of estimating the size of choice 3. Introduction to testing, statistical hypotheses, 4. Parametric tests of significance for one or two selections, non-parametric alternatives, 5. The significance tests compare more than two means – analyses of variance (ANOVA) methods of multiple comparisons, non-parametric alternatives, 6. Contingency tables and statistics based on $\chi^2$ tests, significance tests for proportions, methods used in population and diagnostic-based research, 7. Correlation, regression, multiple regression, 8. Logistic regression, Kaplan-Meier survival analysis, Cox model of proportionate risk. The subject also focuses on the possibilities and ways of MS Office utilisation in the research and presentations. It deals with MS PowerPoint usage in the correlation of information into	

presentations usable at lectures and defences of final theses. Insertion of texts, images, tables, graphs, hypertext links to existing external sources. It involves the work with graphic templates, animations and various other effects. In the explanation, there are involved essential principles of creation and presentation of presentation slides. Another aim of the course is to utilise several functions of the programme MS Excel to present information in the table form and subsequent transformation of selected data to the graph. The subject is oriented to the creation of tables, data insertion, correct cell formation, framing, background colouring of columns and rows, calculations in the tables using mathematical, statistical, text and date functions, creation of graphs and formatting of graphical elements at tables with high data content there is explained ordering and filtration of data according to multiple criteria.

**Recommended literature:**

WACZULÍKOVÁ Iveta a Peter SLEZÁK. *Introductory Biostatistics*. Comenius University in Bratislava, 2015. ISBN 978-80-223-3938-4

ZVÁROVÁ Jana. *Základy statistiky pro biomedicínské obory*. Praha: Karolinum, 2011. ISBN 80-71-84-786-0

LANG Thomas A. and Michelle SECIC. *How to report statistics in medicine: annotated guidelines for authors, editors, and reviewers*. Philadelphia: American College of Physicians, 1997. ISBN 0-943126-44-4.

**The language needed to pass the subject:** Slovak or English

**Notes:**

**Subject classification:**

Final classification: 'passed', 'failed'

**Overall number of classified students:**

A	B	C	D	E	FX

**Lecturers:** prof. MUDr. Daniela Ostatníková, PhD., prof. MUDr. Ján Pečeňák, CSc., doc. MUDr. Alexandra Bražinová, PhD., MPH

**Last updated:** 29 March 2021

**Approved by:** *prof. MUDr. Daniela Ostatníková, PhD.*

**Course Information Sheets: Introduction to scientific research 3.**

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> FACULTY OF MEDICINE	
<b>Subject code:</b>	<b>Subject Title:</b> Introduction to scientific research 3.
<b>Type, scope and method of educational activities:</b>	
<b>Tuition form:</b> in person + self-study	
The recommended scope of tuition (in hours): 12 hours of lectures + 12 hours of self-study	
<b>Within the study:</b> lectures are divided into three 4-hour courses in the semester	
Study methods: in-person	
<b>Number of credits:</b> 10 credit points	
<b>Recommended semester/trimester of the study:</b> The 3rd or the 4th semester	
<b>Study degree:</b> 3.	
<b>Prerequisite subjects:</b> -	
<b>Conditions for the subject completion:</b> The condition of granting credits is min. 100% presence at lectures and completion of the final test	
<b>Educational results:</b> The course is focused on planning, assessing the clinical students and analysis of clinical data, and planning of scientific grant projects. It involves four sections: 1 a)	

general introduction to the clinical studies, 2) division of clinical studies, the protocol of a clinical study, 3) introduction to the correct clinical practice 4) forms for the elaboration of a scientific grant project. At the end of the course, the participants will be evaluated based on the presented issues.

**Concise subject structure:**

- 1) Introduction to clinical studies
  - why clinical studies are essential, medicine based on evidence
  - clinical study aims
  - study parameters – accidental and systemic error
  - test sensitivity
  - internal and external validity
- 2) Study division
  - design of clinical studies, file selection, calculation of file frequency
  - clinical protocol
  - basics of file statistics – validity, file robusticity, types of analysed data, analysis interpretation
- 3) Introduction to good clinical practice (GCP)
  - GCP historical background
  - basic concepts: sponsor, investigator, ethical committee, monitor, audit
  - ŠUKL role
- 4) Elaboration of the scientific grant project
  - GUK (Comenius University Grants)
  - VEGA grants
  - KEGA grants
  - APVV projects

**Recommended literature:** Lecture handouts

**The language needed to pass the subject:** Slovak, English

**Notes:** -

**Subject classification:**

**Final classification:** 'passed', 'failed'

**Overall number of classified students:**

A	B	C	D	E	FX

**Lecturers:** prof. MUDr. Michal Mego, PhD., DrSc., prof. MUDr. Boris Mravec, PhD., prof. MUDr. Fedor Šimko, CSc.

**Last updated:** 29 March 2021

**Approved by:** *prof. MUDr. Michal Mego, PhD., DrSc.*

**Course Information Sheets: English Language and the exam in the English Language**

<b>University:</b> Comenius University in Bratislava
<b>Faculty:</b> Faculty of Medicine
<b>Code of the subject:</b> LF/L-PhD-008/15   <b>Course:</b> English language
<b>Study design:</b> Seminars: 12 lessons/semester; Form of educational activities: combined
<b>Number of credits earned: 10</b>
<b>Recommended semester:</b> 1st and 2nd semester
<b>Degree:</b> 3rd

<b>Prerequisite courses:</b>
<b>Grading policy:</b> Oral examination – presentation
<b>Course objectives:</b> Integration of receptive and productive communication skills at an advanced level based on terminology focused on students' professional needs, which will enable them to communicate at the required level in both written and oral form. Students' language competence enables essential communication in everyday situations focused on situations in the university and medical environment with particular emphasis on language competence in the chosen PhD study field. Focus on the extension of professional vocabulary with particular emphasis on the needs of practice in the individual specialisations.
<b>Syllabus:</b> <b>Grammar:</b> Application of the semantic-functional approach in combination with the extension of grammatical structures in context, the system of English tenses, infinitives, passives, compounding and shortening of sentences, subordinate clauses, etc. <b>Vocabulary:</b> Active mastery of professional vocabulary in the general medical context, differentiating between lay words and technical terms in medical terminology. Word formation using suffixes and prefixes. Collocations. Reading comprehension and writing: Ability to create written text, its oral presentation, the differences between the written and oral form of presentation. Creation of PP presentation, ability to present research results on academic forums using relevant professional terminology.
<b>Recommended literature:</b> Sam McCarter: Medicine I, II. Student's Book. Oxford University Press. 144s. ISBN: 0194023001
<b>The course is held in</b> Slovak and English
<b>Other course information:</b>
<b>Grading history:</b> passed - failed
<b>Lecturers:</b> Ing. Janka Bábellová, PhD., Mgr. Katarína Hromadová, PhD., Tomáš Hamar, PhD.
<b>Last update:</b> 31. March 2021
<b>Approved by:</b> PhDr. Tomáš Hamar, PhD.

***Course Information Sheet: The register of diseases, national healthcare registers, follow-up***

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> Faculty of Medicine	
<b>Subject code:</b>	<b>Subject Title: The register of diseases, national healthcare registers, follow-up</b>
<b>Type, scope and method of educational activities:</b> <b>Tuition form:</b> in person + self-study The recommended scope of tuition (in hours): 12 hours of lectures + 12 hours of self-study <b>Within the study:</b> lectures are divided into three 4-hour courses in the semester Study methods: in-person + filing in the form the report on Malignant Tumour of Selected Disease for the National Cancer Register.	
<b>Number of credits:</b> 10 credit points	
<b>Recommended semester/trimester of the study:</b> the 1st year of the doctoral study, the 2nd semester	
<b>Study degree:</b> 3rd grade of the study	
<b>Prerequisite subjects:</b> completion of the 2nd degree of the university study	
<b>Conditions for the subject completion:</b> Presence at lectures and seminar	

Within the semester, there will be one final written test – 50 points. To gain A minimum of 45 points is needed, for B minimum of 40 points, for C minimum of 35 points, for D minimum of 30 points and E minimum 25 points.

Credits will not be granted to the student who does not complete the lectures and the written test.

**Educational results:**

The student obtains the overview on registers under the National Centre of Healthcare Information (NCZI) maintenance and the NCZI maintenance. He/she will have an overview of the diagnoses that are liable to the Report on relevant case studies that might be demonstrated from the Department of Ophthalmology Comenius University's clinical dispensary. The student will become familiar with diseases which classify into the register, dispensary. The register data are the base for publication activity for assessing the incidence of concrete disease, geographical division, age groups and so on.

**Concise subject structure:**

The requirement for standards is defined for collecting, storage, safety, processing, and provision and publishing of data gathered in the national health registers.

1) Patients' registration in SR, recording, dispensary

Information of registers under the NCZI maintenance and out of it. The register gathers clinical-epidemiological data on patients with diseases, processes information on morbidity and mortality, e.g., oncological diseases, incidence trends of these diseases in the population groups, the health condition of patients, and the level of provided healthcare.

2) NOR – the National Register of Patients with oncological diseases is a population clinical-epidemiological register of patients covering the whole SR territory. The register aims to gather selected clinical-epidemiological data on patients with oncological diseases in the Slovak Republic, to process the information on morbidity and mortality, e.g., from oncological diseases, incidence trends of these diseases in the population groups, on the health condition of patients and the type and level of provided healthcare. There are gathered information on the incidence of malignant tumours, tumours in situ, tumours of uncertain biological behaviour, and benign tumours of the nervous system and endocrine glands in the register. Data from the register are completed with the data from the database of the dead and causes of death, which allows data on mortality from particular oncological disease and data on patients' survival with the given disease. Data are classified according to gender and age group of patients and their geographical distribution concerning internationally recognised diseases classification systems (MKCH, MKCH-O, TNM). Data and outcomes processing serve as the materials for epidemiological analyses and studies of followed disease distribution in the population, analyse the time series and trends, analyse the region burden by the followed diseases to detect population preventive and treating strategies for evaluation of population risks.

3) Utilisation of data from the databases of the electronic healthcare

The detailed information on the programme of electronic healthcare implementation in Slovakia.

Important documents related to the implementation of electronic healthcare, information on projects and their anticipated outcomes.

Documents and websites on electronic healthcare in Europe and worldwide. **Essential information on electronic healthcare, its mission, and goals.**

4) Data utilisation from the registers, databases

Data serve as materials for permanent improvement of the provided healthcare and enhancement of preventive population measures. The divisions use processed data at the Ministry of Healthcare Slovakia Republic as materials for planning the healthcare policy, evaluating inhabitants' health condition, preparing population preventive and intervention programmes, and international comparison for the World Health Organisation, OECD Eurostat. Professional healthcare societies utilise the data for clinical-epidemiological analyses and evaluate patients' management level with the selected disease.

5) Practical use in the clinical practice, in publication activities.

Based on our clinical results and experience with the registering, dispensary we demonstrate particular groups of diseases in ophthalmology. We will point out publication outcomes allowed just thanks to data from NCR. (NOR).

The student, when preparing his/her publications, will follow the data from registers. Therefore he/she must be informed on the sources and access to the sources.

### **Recommended literature:**

DUŠEK, L., MUŽÍK, J., KUBÁSEK, M., KOPTÍKOVÁ, J., ŠNAJDROVÁ, L., ONDRUŠOVÁ, M. Národní portál epidemiologie zhoubných nádorů ve Slovenské republice. 2007. [cit. 2010-03-04]. ISBN 978-80-89292-05-9. Available on the internet: <http://www.svod.cz/>.

FURDOVÁ, A., OLÁH, Z.: Nádory oka a okolitých štruktúr. CERM, Brno, 2010, 151s. ISBN 978-80-7204-689-8

FURDOVÁ, A., OLÁH, Z. Incidencia, geografická distribúcia, vekové rozloženie, mortalita a histologická verifikácia u intraokulárnych tumorov (dg.190) v SR v r. 1968-1989 (štúdia). Československá oftalmologie, 1995, roč. 51, č. 3, s. 143-151 ISSN 0009-059X

FURDOVÁ, A. OLÁH Z., SVETLOŠÁKOVÁ, Z., KUSENDA, P.: Súčasný stav evidencie zhoubných nádorov oka a očných adnexov (dg. C69) v SR a ČR. Česká a slovenská oftalmologie, 68 (5), 2012, s. 195-201 ISSN 1211-9059

ONDRUŠOVÁ, M., PLEŠKO, I., SAFEI-DIBA, CH., OBŠITNÍKOVÁ, A., ŠTEFAŇÁKOVÁ, D., ONDRUŠ, D. Komplexná analýza výskytu a úmrtnosti na zhubné nádory v Slovenskej republike 1978-2003. [online]. Bratislava, Národný onkologický register SR, NCZI [cit. 4.3.2010]. ISBN 978-80-89292-05-9., Dostupné na Internete: <http://www.nor-sk.org/>.

ONDRUŠOVÁ, M., DUŠEK, L., ONDRUŠ, D., MUŽÍK, J.. Aká je dostupnosť údajov o epidemiológii zhoubných nádorov v Slovenskej republike? Onkológia, 2007, roč. 2, č. 5, s. 292-293 ISSN 1336-8176

<http://www.ezdravotnictvo.sk/en/Pages/default.aspx>

<http://www.ehealth.nsw.gov.au/programs/clinical>

Sendek Stanislav: Kvantifikácia dopadov aplikácie ehealth zdravotnom sektore v podmienkach Slovenskej republiky Mendelova Univerzita v Brne, Provozne ekonomická fakulta, 190 s., 2016 [https://theses.cz/id/jzy5je/zaverecna\\_prace.pdf](https://theses.cz/id/jzy5je/zaverecna_prace.pdf)

**The language needed to pass the subject:** Slovak or English

<b>Notes:</b> The subject is delivered if a minimum of 10 students enrolled					
<b>Subject classification:</b>					
<b>Final classification:</b> 'passed', 'failed'					
<b>Overall number of classified students:</b>					
A	B	C	D	E	FX
<b>Lecturer:</b> prof. PhDr. MUDr. Alena Furdová, PhD., MPH, MSc., FEBO					
<b>Last updated:</b> 29 March 2021					
<b>Approved by:</b> prof. <i>PhDr. MUDr. Alena Furdová, PhD., MPH, MSc., FEBO</i>					

**Course Information Sheets: Functional Anatomy of human reproduction and clinical embryology**

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> FACULTY OF MEDICINE	
<b>Subject code:</b>	Subject Title: Functional Anatomy of Human reproduction and Clinical Embryology
<b>Type, scope and method of educational activities:</b> The recommended scope of tuition (in hours): 12 hours of lectures + 12 hours of self-study <b>Within the study:</b> lectures are divided into three 4-hour courses in the semester Study methods: in-person	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of the study:</b> the 1st year of the doctoral study or the 2nd semester	
<b>Degree of Study:</b> the third	
<b>Prerequisite courses:</b> it does not have any prerequisite subject	
<b>Conditions for the subject completion:</b> Presence at lectures is obligatory. The final multiple question test (evaluation A for 80% of points, B 75%, C 70%, D 65%, E 60%). Credits will not be granted if the doctoral student does not undergo the lectures and does not achieve a minimum of 60% in the final test.	
<b>Educational results:</b> Acquiring the selected latest knowledge and information on new trends in clinical embryology and reproductive medicine. The subject graduate masters anatomy and physiology of human reproduction, causes of origination and possibilities for diagnosis and treatment of the most frequent congenital developmental disorders, masters on theoretical level the causes and diagnostic, and treating infertility possibilities selected laboratory methods of assisted reproduction. The subject benefit is also a comprehensive overview of human reproduction issues and points to the intersection between theoretical knowledge on embryology and experimental biology and clinical research in gynaecology, obstetrics, and neonatology. The foundation for cooperation between theoretical and clinical workplaces dealing with research in the field of reproductive medicine.	
<b>Concise subject structure:</b> 1. New knowledge in anatomy and histology of male and female reproductive organs. Ovarian and menstruation cycle. Spermogenesis. Reproductive endocrinology and immunology 2. Fertilisation and early embryogenesis. Critical periods in the embryo and foetus development. 3. Prenatal screening and diagnosis of congenital developmental errors. Current possibilities in foetal surgery.	



4. Teratology, causes of congenital errors origination and possibilities for their prevention. Selected aspects of care for a new-born with congenital developmental errors.
5. Infertility. Causes of male and female infertility. Diagnosis and treatment of infertility.
6. Methods of assisted reproduction: spermiology and ejaculate analysis, micromanipulation methods and intra cytoplasm injections of the sperm to the oocyte, in vitro cultivation of the early embryo and assessment of its development, cryopreservation in reproductive medicine, pre-implementation genetic diagnostics, ethical and legal aspects of clinical embryology.
7. Biological and therapeutical potential of embryonal stem cells.

**Recommended literature:**

1. Coward K, Wells D. (Eds). Textbook of Clinical Embryology. Cambridge University Press. 2013. 392 s. ISBN 978-0-521-16640-9.
2. Sadler TW. Langmanova lékařská embryologie. Překlad 10. vyd. Praha: Grada, 2011. 414 s. ISBN 978-80-247-2640-3.
3. Řezáčová J. (Ed). Reprodukční medicína. Současní možnosti v asistované reprodukci. Praha: Mladá fronta. 2018. 710 s. ISBN 978-80-204-4657-2.

**The language needed to pass the subject:** Slovak, English

**Notes:**

**Subject classification:**

**Final classification:** 'passed', 'failed'

**Overall number of classified students:**

A	B	C	D	E	FX
a	b	c	d	e	f

**Lecturers:** prof. RNDr. Ivan Varga, PhD. MUDr. Jozef Záhumenský, Ph.D.

**Last updated:** 29 March 2021

**Approved by:** prof. RNDr. Ivan Varga, PhD.

### **Course Information Sheets: Neuroscience – New Trends**

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> Faculty of Medicine	
<b>Subject code:</b>	<b>Subject Title:</b> Neuroscience – New Trends
<b>Type, scope and method of educational activities:</b>	
<b>Recommended scope of tuition (in hours):</b> 12 hours of lectures + 12 hours of self-study	
<b>Within the study:</b> lectures are divided into three 4-hour courses in the semester	
Study methods: in-person	
<b>Number of credits:</b> 10 credit points	
<b>Recommended semester/trimester of the study:</b> <i>The 2nd semester of the 1st year of the doctoral study.</i>	
<b>Study degree:</b> 3.	
<b>Prerequisite subjects:</b> the subject does not have any prerequisite subjects:	
<b>Conditions for the subject completion:</b> <i>Active presence at lectures (control questions) and a minimum of 60% of points in the final written test</i>	
<b>Educational results:</b> <i>acquiring selected latest knowledge and information on new neuroscience research trends and research in neurological diseases and psychical disorders.</i>	
<b>Concise subject structure:</b> The subject aims to familiarise doctoral students with theoretical and clinical branches with new research trends in the neuroscience field. Lectures are related to the latest knowledge on the central and peripheral nervous system's activities, the etiopathogenesis of neurological diseases and psychiatric disorders. The students will also get	

the latest knowledge of the nervous system's regulation impact on other organ systems' activity. The main subject contribution is to allow the students to gain a complex overview of neuroscience and point out to the intersection between theoretical knowledge from neuroscience and clinical research in neurology, psychiatry, and neurosurgery. The foundation for cooperation between theoretical and clinical workplaces dealing with research in the field of reproductive medicine.

**Recommended literature:** Handouts of lectures; Squire et al. *Fundamental Neuroscience, 4th edition, 2012*; Kandel et al. *Principles of Neural Science, 2012*.

**The language needed to pass the subject:** English and Slovak

**Notes:** *The subject is provided in the summer semester*

**Subject classification:**

**Credit granting for completion and successful test result**

**Final classification:** 'passed', 'failed'

**Overall number of classified students:**

A	B	C	D	E	FX

**Lecturers:** prof. MUDr. Daniela Ostatníková, PhD., prof. MUDr. Ján Pečeňák, PhD., prof. MUDr. Boris Mravec, PhD. Alternatively, other teachers.

**Last updated:** 29 March 2021

**Approved by:** *prof. MUDr. Daniela Ostatníková, PhD.*

## Course Information Sheets: Pathological Physiology and Pathology – New Trends

**University:** Comenius University in Bratislava

**Faculty:** Faculty of Medicine

**Subject code:**

**Subject Title: Pathological Physiology and Pathology – New Trends**

**Type, scope and method of educational activities:**

Recommended scope of tuition (in hours): 12 hours of lectures + 12 hours of self-study

**Within the study:** lectures are divided into three 4-hour courses in the semester

Study methods: in-person

**Number of credits:** 10 credit points

**Recommended semester/trimester of the study:** the 2nd semester of the 1st year of the study

**Study degree:** 3.

**Prerequisite subjects:** the subject does not have any prerequisite subjects:

**Conditions for the subject completion:** Active presence at lectures (control questions) and a minimum of 60% of points in the final written test

**Educational results:** *acquiring selected latest knowledge and information on new pathology, pathophysiology, and molecular biomedicine trends.*

**Concise subject structure:** The subject aims to familiarise the doctoral students with clinical and theoretical study branches with new trends in research and the state-of-art methodological procedures used in pathophysiology, pathology, and molecular biomedicine. The lectures are related mainly to the latest knowledge of origination and development of some socially most serious diseases (neurological, psychiatric, oncological, cardiovascular, infectious). The enrichment will be case studies of patients from pathologists and pathophysiologists and new opportunities in molecular diagnosis. The main subject benefit is the emphasis on possible

intersections of basic and clinical research to support cooperation in clinical and experimental research at preclinical and clinical workplaces.					
<b>Recommended literature:</b> Handouts and CD of lectures; Kandel et al. Principles of Neural Science (2012); Mladosiëvicova B. et al. Molekulové mechanizmy patogenézy nádorov, (2012) SAP, 130 s.					
<b>The language needed to pass the subject:</b> English and Slovak					
<b>Notes:</b> The subject is provided in the summer semester					
<b>Subject classification:</b> Credit granting for completion and successful test result					
<b>Final classification:</b> 'passed', 'failed'					
<b>Overall number of classified students:</b>					
A	B	C	D	E	FX
<b>Lecturer:</b> prof. MUDr. Beata Mladosiëvičová, CSc.; alternatively, other teachers.					
<b>Last updated:</b> 29 March 2021					
<b>Approved by:</b> <i>prof. MUDr. Beata Mladosiëvičová, CSc.</i>					

### **Course Information Sheets: New medicaments and strategies in pharmacotherapy**

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> Faculty of Medicine	
<b>Subject code:</b>	<b>Subject Title:</b> New medicaments and strategies in pharmacotherapy
<b>Type, scope and method of educational activities:</b> Recommended scope of tuition (in hours): 12 hours of lectures + 12 hours of self-study <b>Within the study:</b> lectures are divided into three 4-hour courses in the semester Study methods: in-person	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of the study:</b> the 1st year of the doctoral study or the 2nd semester	
<b>Study degree:</b> 3rd grade	
<b>Prerequisite courses:</b> it does not have any prerequisite subject	
Conditions for the subject completion: compulsory presence at lectures and completion of the oral exam, verifying the subject knowledge.	
<b>Educational results:</b> Acquiring new knowledge in strategy in developing new drugs at a general level with the impact on the safety aspects. The doctoral student also gains the latest knowledge in developing new medicaments in selected clinical disciplines like cardiology, endocrinology, psychiatry, neurology, rheumatology, oncology. The subject graduate will understand drug evaluation principles from medicine based on evidence (the ratio benefit/risk).	
<b>Concise subject structure:</b> Strategy in the drug development with the aspect on drug safety. Rational methods of drug development. New drugs and strategies in pharmacotherapy New medicaments and strategies in cardiology New medicaments and strategies in endocrinology New medicaments and strategies in	

neurology New medicaments and strategies in rheumatology New medicaments and strategies in oncology												
<b>Recommended literature:</b> Kristová, V., Wawruch, M., Tisoňová, J. a kol. Kardiovaskulárne liečivá. Bratislava: Univerzita Komenského, 2011. 238 s. ISBN 978-80-223-2964-4. Kriška, M. a kol. Memorix klinickej farmakológie a liekov. Bratislava: SAP, 2006. 610 s. ISBN 80-89104-92-4. Magulová, L., Božeková, L., Kriška, M., Interakcie liečiv v klinickej praxi. 2. dopl. a uprav. Vyd. Bratislava: SAP, 2004. 333 s. ISBN 80-89104-53-3. Kriška M (Ed). Riziko liekov v medicínskej praxi. Bratislava: Slovak Academic Press, 2000. 474 s. ISBN 80-88908-58-2. Wawruch, M., Laššánová, M., Tisoňová, J. Kapitoly z klinickej farmakológie. Bratislava: Univerzita Komenského, 2012. 176 s. ISBN 978-80-223-3140-1. Pečeňák J., Kořínková V. a kol. Psychofarmakológia. Wolters Kluwer 2016. 666s., ISBN 978-80-8168-542-2. Brenner GM, Stevens CM. Pharmacology. 5th ed. Philadelphia: Saunders Elsevier, 2018. 540 p. ISBN 978-0-323-39166-5.												
<b>The language needed to pass the subject:</b> Slovak, English												
<b>Notes:</b> -												
<b>Subject classification:</b> <b>Final evaluation:</b> 'Passed', 'failed' <b>Overall number of classified students:</b>												
<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></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	A	B	C	D	E	FX						
A	B	C	D	E	FX							
<b>Teacher:</b> prof. MUDr. Martin Wawruch, PhD., alternatively other teachers												
<b>Last updated:</b> 29 March 2021												
<b>Approved by:</b> <i>prof. MUDr. Martin Wawruch, PhD.</i>												

### ***Course Information Sheets: New Trends in Medical Biology and Clinical Genetics***

<b>University:</b> Comenius University in Bratislava	
<b>Faculty:</b> Medical Faculty	
<b>Subject Code:</b>	<b>Course Title</b> New Trends in Medical Biology and Clinical Genetics
<b>Type, scope and method of educational activities:</b> Altogether 12 hours of courses: 12 hours lectures/semester (2 x 6 hours) + 12 hours of self-study. <b>Form of study:</b> lectures <b>Total scope of the course (in hours):</b> 24 <b>Weekly:</b> 2 x 6 <b>Overall:</b> 24 <b>Study method:</b> combined	
<b>Number of credits earned:</b> 10	
<b>Recommended semester:</b> first year of PhD study, second semester	
<b>Degree of Study:</b> 3.	
<b>Prerequisite courses:</b>	
<b>Grading policy:</b> Compulsory attendance at lectures combined with self-study. Passing the final multiple-choice test (evaluation A when obtaining 75% points, B when obtaining 70%	

points, C when obtaining 65% points, D when obtaining 60% points, E when obtaining 55% points). Credits will not be awarded if the doctoral student does not attend lectures and does not obtain at least 55% in the final test.

**Course objectives:**

The graduate of this course will gain knowledge in medical biology, molecular genetics, tissue engineering, regenerative medicine, and clinical genetics, focusing on the problematics of mechanisms and pathological processes in the human body. The graduate will master the principles of molecular genetic techniques, utilisation of nucleic acid analysis in medicine, the basics of personalised medicine, types of genetically and non-genetically persistent diseases, their frequency in the population, and basic principles of gene therapy.

**Concise subject structure (Syllabus):**

Analysis of cellular and human biological samples in research and diagnostics.

Development of molecular genetic methods and revealing the molecular basis of hereditary diseases. The human genome and programs are supporting the use of data-driven knowledge in medicine. Types of molecular, genetic, metabolic and tumour pathologies and molecular levels of disorder manifestation (metabolomics, genomics, proteomics).

Methods used in diagnostics:

- methods of DNA, RNA isolation, transcription of mRNA into cDNA
- DNA amplification methods (PCR, Real-Time PCR)
- DNA sequencing, hybridisation and fragmentation analyses
- advanced methods in molecular genetics
- qualitative and quantitative measurement of gene expression
- whole genome, exome, transcriptome sequencing, personalised medicine and the perspective of whole-genome sequencing along with data problematics. Biological model organisms and tissue cultures in research. Regenerative medicine and in-vitro preparation of tissue replacements.

**Recommended literature:**

1. Böhmer, Daniel, Danišovič, Ľuboš, Repiská, Vanda: Lekárska biológia a genetika 1 [elektronický dokument]. - 2. dopl. vyd. Bratislava: Comenius University in Bratislava 102 s. ISBN 978-80-223-4922-2.
2. Gbelcová, Helena, Repiská, Vanda, Shawkatová, Ivana: Nukleové kyseliny a proteíny: Analytické metódy a postupy. - 1. vyd. - Bratislava: Univerzita Komenského, 2017. - 316 s. ISBN 978-80-223-4472-2
3. Repiská, Vanda, Böhmer, Daniel, Danišovič, Ľuboš, Klimová, Daniela: Medical biology and molecular genetics. - 1. vyd. - Bratislava: Univerzita Komenského v Bratislave, 2020. - 306 s. ISBN 978-80-223-4984-0
4. Repiská, Vanda, Böhmer, Daniel, Braxatorisová, Tatiana, Malová, Jana: Lekárska biológia a genetika 2 [elektronický dokument]. - 1. vyd. - Bratislava: Univerzita Komenského v Bratislave, 2020. - 135 s. ISBN 978-80-223-4929-1
5. Strachan, Tom: Human Molecular Genetics. – 4<sup>th</sup> edition - Taylor & Francis Ltd., 2010. 777 s. ISBN: 081-53-414-90
6. Nussbaum, Robert, McInnes, Roderick R., Huntington F. Willard: Thompson & Thompson Genetics in Medicine. - Elsevier Books, 2015. – 560 s. ISBN: 1437706967

**Language, the course is held in** Slovak, English

**Another course information:** -

**Grading history**

A	B	C	D	E	FX
3.	b	c	d	e	f

**Lecturers:**

prof. RNDr. Vanda Repiská, PhD. MUDr. Daniel Böhmer, PhD. RNDr. Ľuboš Danišovič, PhD. Ing. Helena Gbelcová, Ph.D.

**Last update:** 31. March 2021

Approved by: prof. RNDr. Vanda Repiská, PhD.

## ***Course Information Sheets: New Trends in Medical Clinical and Pharmacological Biochemistry***

<b>University:</b> Comenius University in Bratislava	
<b>Faculty):</b> Faculty of Medicine	
<b>Subject Code:</b>	<b>Course Title</b> New Trends in Medical Clinical and Pharmacological Biochemistry
<b>Type, scope and method of educational activities:</b> 12 hours lectures/semester + 12 hours of self-study. Lectures are held three times per semester in 4-hour sessions. Lectures are held in person	
<b>Number of credits earned:</b> 10	
<b>Recommended semester/trimester of the study:</b> 2. semester of the PhD study – no later than the date of the dissertation examination	
<b>Degree of Study:</b> 3 <sup>rd</sup> degree	
<b>Prerequisite courses:</b> No prerequisite courses are required.	
<b>Grading policy:</b> To complete the course, attendance at lectures is required + successful completion of the final test.	
<b>Course objectives:</b> The student will gain information on current issues and trends in medical, pharmaceutical, and clinical biochemistry by completing the course. The course content will enable the updating of knowledge in the field of metabolomics, proteomics and transcriptomics in association with information on new detection methods of various biomolecules used in mentioned areas of interest. The acquired knowledge will contribute to a deeper understanding of the pathophysiological processes taking place during cardiovascular, metabolic, tumour, neurodegenerative diseases, or ageing physiological processes. Insight into the possibility of influencing these processes by bioactive substances, by the reduction of oxidative stress, lifestyle interventions or by new therapeutic strategies (nanoparticles, new methods of drug delivery to target organs, neuroprotective and regenerative strategies...) will provide the graduate with a basis for further increase of his/her knowledge and skills in future clinical or scientific practice.	
<b>Concise subject structure (Syllabus):</b> <ul style="list-style-type: none"><li>- Fibrogenesis in the liver and the possibility of its monitoring by non-invasive laboratory tests</li><li>- Disorders of lipid metabolism, hyperlipoproteinemia, a new view on the interpretation of dyslipidaemias (lipoprint and its use), lipoprotein indices in the assessment of CVD risk</li><li>- Participation of oxidative stress in the pathology of various diseases and the possibility of its influence by natural substances with biomodulatory activities</li></ul>	

- Effect of physical activity and selected nutrients (proteins, vitamin D, omega-3 fatty acids, probiotics, etc.) on the ageing process
- The potential risk of metal nanoparticles and metal oxides used in nanomedicine
- Neurodegenerative diseases and changes in cognitive functions in terms of metabolic diseases and ageing, biochemical detections of CNS dysfunction, strategies of neuroprotection and CNS regeneration

**Suggested readings:**

Ďurovcová, Eva, Mareková, Mária, Molčányiová, Angela, Turecký, Ladislav: Klinická biochémia : vybrané kapitoly, 1. vyd., Martin : Vydavateľstvo Osveta, 2020. 300 s. ISBN 978-80-8063-489-6.

Turecký, Ladislav: Klinická biochémia pre medikov. 2. rozš. vyd., Bratislava: Asklepios, 2014. 204 s, ISBN 978-80-7167-181-7

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**The language needed to pass the subject:**

Slovak and English

**Another course information:**

The course is provided only in the summer semester if at least 5 students are enrolled.

**Grading history**

New subject

A	B	C	D	E	FX
a	b	c	d	e	f

**Lecturers:**

prof. MUDr. Ladislav Turecký, CSc., doc. RNDr. Jana Muchová, PhD., doc. Ing. Ingrid Žitňanová, PhD., doc. RNDr. Monika Ďurfinová, PhD.

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**Approved by:**

Prof. MUDr. Ladislav Turecký, CSc.