





<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Methodology of scientific research			
<b>Teachers:</b> Savić M. Miroslav, Krajnović M. Dušanka, Kotur-Stevuljević M. Jelena, Bogavac-Stanojević B. Nataša			
<b>Course status:</b> Mandatory common, module: Doctoral academic studies			
<b>Semester:</b> I	<b>Year of studies:</b> I		
<b>ECTS points:</b> 5	<b>Course code:</b> Д1031		
<b>Requirements:</b> none			
<b>Course aims:</b> The aim of this course is to provide participants with general scientific skills in order to formulate a scientific problem and plan the experiment, as well as to understand the complete process of preparation and publication of scientific research results			
<b>Course outcomes:</b> By the end of this course participants will be able to summarize and apply the principles of the methodology of scientific-research work and scientific writing			
<b>Course contents:</b> Science and scientific method. Problem and scientific problem. Hypothesis. Hypothesis verification: scientific observation and scientific experiment. Common methodology of scientific research in biomedicine. Classification of research. Experimental research in laboratory. Animal experiments. Types of studies in epidemiological investigations. Ethics and biomedical investigations. Ethical codex of scientific-research work. Generation of biomedical information. Communications. Networks. Internet. Internet search engines. Authorship/co-authorship. Role and duties of principal investigator. Protection of intellectual property. Classification of scientific work. Writing of scientific and professional papers. Literature citing. Review process. Oral presentation of scientific work (adaptation to audience and situation). Designing PowerPoint slides for a scientific presentation. Introduction to writing of project proposals. Master's thesis and doctoral dissertation.			
<b>Recommended literature:</b> 1 Cargill, M, O'Connor P. Writing scientific research articles: Strategy and steps. John Wiley & Sons, 2013. 2. Baumgartner TA, Hensley LD. Conducting and Reading Research in Health and Human performance. Mc Graw Hill, Boston, 2006 3. Machin D, Campbell MJ. Design of studies for medical research. John Wiley & Sons, Hoboken, 2005. 4. Peat J, Elliot E, Baur L, Keena V. Scientific writing – easy when you know how. BMJ Books, London, 2002. 5. Albert T. The A-Z of medical writing. BMJ Books, London, 2000. 6. Hudson Jones A, McLeallan F. Ethical Issues in Biomedical Publication. Baltimore: John Hopkins University Press, 2000.			
<b>The total of active learning classes</b>	<b>Lectures:</b> 30		
	<b>Individual research work:</b> 30		
<b>Teaching methods:</b> Lectures and study-research work			
<b>Grading system:</b> Seminar: 30 points; written exam: 70 points			

<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Statistics in research			
<b>Teachers:</b> Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena			
<b>Course status:</b> Mandatory common, module: Doctoral academic studies			
<b>Semester:</b> I	<b>Year of studies:</b> I		
<b>ECTS points:</b> 5	<b>Course code:</b> D1032		
<b>Requirements:</b> One semester of undergraduate studies in mathematics and statistics pharmaceutical / medical biochemistry / medicine			
<b>Course aims:</b> Understanding advanced statistical methods. Applying advanced statistical analyses in scientific research.			
<b>Course outcomes:</b> After completing the course students will be trained to: <ul style="list-style-type: none"> <li>- Recognizing the type of statistical analysis</li> <li>- Interpret the significance of the obtained statistical indicators and discuss the results,</li> <li>- Understand the importance of the application of statistical methods in the scientific research,</li> <li>- Use statistical software in the data analysis</li> </ul>			
<b>Course contents:</b> One-way analysis of variance (ANOVA). Two-way analysis of variance. ANOVA with replication. Post-hoc tests. Simple linear regression analysis. Multiple regression analyses. Logistic regression. Analysis of covariance. Nonparametric analysis of variance. Nonparametric correlation. Chi-square test. Confidence interval. Student's research: Solving different statistical problems and tasks.			
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. Sheskin DJ. Handbook of parametric and nonparametric statistical procedures Chapman &amp; Hall/CRC, Washington, D.C., 2000.</li> <li>2. Vittingoff E, Shiboski SC, Glidden DV, McCulloch CE. Regression Methods in Biostatistics, Springer Science + Business Media, New York, 2005.</li> <li>3. Selvin S. Statistica Analysis of Epidemiological Data, Oxford University Press, Oxford, 1996.</li> <li>4. Tamhane AJ, Dunlop DD. Statistics and Data Analysis, Prentice Hall, Upper Saddle River, NJ, 2000.</li> </ol>			
<b>The total of active learning classes</b>	<b>Lectures:</b> 30		
	<b>Individual research work:</b> 30		
<b>Teaching methods:</b> Lectures, computer exercises, solving practical problems			
<b>Grading system:</b> The presence at lectures: 30 points; Written Exam: 70 points.			


<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>	
<b>Course title:</b> Seminar 1		
<b>Teachers:</b> Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plečaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R. Svetlana, Đuriš D. Jelena, Grbić V. Sandra, Đurić R. Zorica, Vladimirov M. Sote, Agbaba D. Danica, Bulat L. Zorica, Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana		
<b>Course status:</b> Mandatory common, module: Doctoral academic studies		
<b>Semester:</b> I	<b>Year of studies:</b> I	
<b>ECTS points:</b> 5	<b>Course code:</b> D1033	
<b>Requirements:</b> none		
<b>Course aims:</b> This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English.		
<b>Course outcomes:</b> By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English		
<b>Course contents:</b> Collection of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and presentation of the published results.		
<b>Recommended literature:</b> 1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003. 2. Original scientific papers and review articles in the field of the participant's research activity.		
<b>The total of active learning classes</b>	<b>Lectures:</b> 30	
	<b>Individual research work:</b> 60	
<b>Teaching methods:</b> Study-research work		
<b>Grading system:</b> Seminar: 70 points; written exam: 30 points		

<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>	
<b>Course title:</b> Seminar 2		
<b>Teachers:</b> Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plečaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R. Svetlana, Đuriš D. Jelena, Grbić V. Sandra, Đurić R. Zorica, Vujić B. Zorica, Čudina A. Olivera, Bulat L. Zorica, Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana		
<b>Course status:</b> Mandatory common, module: Doctoral academic studies		
<b>Semester:</b> II	<b>Year of studies:</b> I	
<b>ECTS points:</b> 5	<b>Course code:</b> D1034	
<b>Requirements:</b> none		
<b>Course aims:</b> This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; upgrade his/her capacities for giving a successful oral presentation in English.		
<b>Course outcomes:</b> By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English		
<b>Course contents:</b> Collection of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and presentation of the published results.		
<b>Recommended literature:</b> 1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003. 2. Original scientific papers and review articles in the field of the participant's research activity.		
<b>The total of active learning classes</b>	<b>Lectures:</b> 30	
	<b>Individual research work:</b> 60	
<b>Teaching methods:</b> Study-research work		
<b>Grading system:</b> Seminar: 70 points; written exam: 30 points		


<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>	
<b>Course title:</b> Seminar 3		
<b>Teachers:</b> Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plečaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R. Svetlana, Đuriš D. Jelena, Grbić V. Sandra, Đurić R. Zorica, Vujić B. Zorica, Čudina A. Olivera, Bulat L. Zorica, Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana		
<b>Course status:</b> Mandatory common, module: Doctoral academic studies		
<b>Semester:</b> III	<b>Year of studies:</b> II	
<b>ECTS points:</b> 5	<b>Course code:</b> D2031	
<b>Requirements:</b> none		
<b>Course aims:</b> This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; upgrade his/her capacities for giving a successful oral presentation of results of personal research activities		
<b>Course outcomes:</b> By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation in English		
<b>Course contents:</b> Collection of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and presentation of the published results.		
<b>Recommended literature:</b> 1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003. 2. Original scientific papers and review articles in the field of the participant's research activity.		
<b>The total of active learning classes</b>	<b>Lectures:</b> 30	
	<b>Individual research work:</b> 60	
<b>Teaching methods:</b> Study-research work		
<b>Grading system:</b> Seminar: 70 points; written exam: 30 points		


<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Seminar 4			
<b>Teachers:</b> Ivanović P. Darko, Zečević L. Mira, Malenović M. Anđelija, Stojanović S. Biljana, Miletić Đ. Ivanka, Šobajić S. Slađana, Stanković M. Ivan, Đorđević I. Brižita, Vuleta M. Gordana, Milić R. Jela, Primorac M. Marija, Savić D. Snežana, Vasiljević D. Dragana, Krajišnik R. Danina, Đekić M. Ljiljana, Spasić M. Slavica, Jelić-Ivanović D. Zorana, Spasojević-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatović D. Svetlana, Topić S. Aleksandra, Dopsaj B. Violeta, Bogavac-Stanojević B. Nataša, Kotur-Stevuljević M. Jelena, Tasić M. Ljiljana, Marinković D. Valentina, Krajnović M. Dušanka, Miljković R. Branislava, Vezmar Kovačević D. Sandra, Vučićević M. Katarina, Kovačević N. Nada, Petrović D. Silvana, Maksimović A. Zoran, Kundaković D. Tatjana, Drobac M. Milica, Ugrešić D. Nenad, Stepanović-Petrović M. Radica, Savić M. Miroslav, Ilić V. Katarina, Novaković N. Aleksandra, Tomić A. Maja, Leposavić M. Gordana, Arsenović-Ranin M. Nevena, Stojić-Vukanić M. Zorica, Plečaš-Solarović A. Bosiljka, Pešić P. Vesna, Nedeljković S. Miodrag, Milenković T. Marina, Antić Stanković A. Jelena, Parojčić V. Jelena, Ibrić R. Svetlana, Đuriš D. Jelena, Grbić V. Sandra, Đurić R. Zorica, Vujić B. Zorica, Čudina A. Olivera, Bulat L. Zorica, Matović J. Vesna, Antonijević M. Biljana, Vujanović L. Dragana, Đukić M. Mirjana			
<b>Course status:</b> Mandatory common, module: Doctoral academic studies			
<b>Semester:</b> IV		<b>Year of studies:</b> II	
<b>ECTS points:</b> 5		<b>Course code:</b> D2032	
<b>Requirements:</b> none			
<b>Course aims:</b> This course aims to enable the participant to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; upgrade his/her capacities for giving a successful oral presentation of results of personal research activities; prepare publications containing the results obtained in the performed personal investigation			
<b>Course outcomes:</b> By the end of this course participants will be able to: search the scientific literature effectively and thoroughly; perform a critical analysis of publications relevant for his/her study field; apply the principles of making a successful oral presentation and preparing publications containing the personal results			
<b>Course contents:</b> Collection of pertinent literature (by use of bibliographic databases, web sites of publishers, general search engines). Preparation of personal databases. Contextual analysis of key publications in a field. Preparation and oral and written presentation of the personal results.			
<b>Recommended literature:</b> 1. Alley M. The craft of scientific presentations. Critical steps to succeed and critical errors to avoid. Springer-Verlag New York, Inc., 2003. 2. Original scientific papers and review articles in the field of the participant's research activity.			
<b>The total of active learning classes</b>		<b>Lectures:</b> 30	
		<b>Individual research work:</b> 60	
<b>Teaching methods:</b> Study-research work			
<b>Grading system:</b> Seminar: 70 points; written exam: 30 points			


<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> General Biochemistry			
<b>Teachers:</b> Jelic-Ivanovic D. Zorana, Spasojevic-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatovic D. Svetlana, Topic S. Aleksandra; Dopsaj B. Violeta, Bogavac-Stanojevic B. Natasa, Kotur-Stevuljevic M. Jelena, Zeljkovic R. Aleksandra, Stefanovic Z. Aleksandra, Vekic Z. Jelena			
<b>Course status:</b> Mandatory modules, module: Medical Biochemistry			
<b>Semester:</b> I, II	<b>Year of studies:</b> I		
<b>ECTS points:</b> 15	<b>Course code:</b> ДМБ1ОМ1		
<b>Requirements:</b> Biology, Organic Chemistry, General Biochemistry (one-semester course at Integrated Academic Studies)			
<b>Course aims:</b> Introduction of structures of biomolecules and types of intercellular communications, metabolic pathways in health organism, as well as in some special physiological conditions, genetics and mechanisms of gene regulation; overview of transfer of genetic information from DNA through RNA to primary protein structure.			
<b>Course outcomes:</b> This course enables students to successfully attend further courses dedicated to learning of disorders of metabolism in different pathophysiological conditions.			
<b>Course contents:</b> Association of protein structure and function. Lipids and lipoproteins. Carbohydrates. Structure of cell membrane. Enzyme kinetics and inhibition. Molecular mechanisms of hormone activity. Molecular basis for cellular growth and differentiation. Molecular basis for extracellular and intracellular communication. Organization of intermediary metabolism: catabolic and anabolic pathways. Energetics of biochemical reactions. Specific pathways in carbohydrates, lipids and proteins metabolism. Metabolic pathways in different organs. Metabolic processes in starving, pregnancy, lactation and stress. Biosynthesis of ribonucleotides and deoxyribonucleotides. Regulation of nucleotides levels in cell. Prokaryotic and eukaryotic DNA structure. DNA replication and transcription. DNA recombination. Translation. Protein biosynthesis and regulation in mitochondria. Posttranslational modifications of proteins.			
<b>Recommended literature:</b> 1. Devlin, TM. Textbook of Biochemistry with Clinical Correlation. John Wiley & Sons. 2010. 2. Voet D, Voet JG, Pratt CW. Fundamentals of Biochemistry: Life at the molecular level. John Wiley & Sons. 2012. 3. Nelson DL, Cox ME. Lehninger Principles of Biochemistry. WH Freeman. 2004. 4. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular biology of the cell, 5th Edition. Garland Science, 2007.			
<b>The total of active learning classes</b>	<b>Lectures:</b> 90		
	<b>Individual research work:</b> 90		
<b>Teaching methods:</b> Lectures, interactive classes, laboratory classes, workshops, seminars, panel discussions			
<b>Grading system:</b> Lectures, seminars: 30 points; Exam: 70 points			


<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Medical Biochemistry			
<b>Teachers:</b> Jelic-Ivanovic D. Zorana, Spasojevic-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatovic D. Svetlana, Topic S. Aleksandra; Dopsaj B. Violeta, Bogavac-Stanojevic B. Natasa, Kotur-Stevuljevic M. Jelena, Zeljkovic R. Aleksandra, Stefanovic Z. Aleksandra, Vekic Z. Jelena			
<b>Course status:</b> Mandatory modules, module: Medical Biochemistry			
<b>Semester:</b> I, II		<b>Year of studies:</b> I	
<b>ECTS points:</b> 15		<b>Course code:</b> ДМБ1ОМ2	
<b>Requirements:</b> General Biochemistry, Medical Biochemistry (course at Integrated Academic Studies)			
<b>Course aims:</b> Investigation and measurement of biochemical changes in human diseases.			
<b>Course outcomes:</b> Gaining knowledge in biochemical bases of human diseases, formulation and following of practical procedures in laboratory assessment, evaluation and interpretation of laboratory results.			
<b>Course contents:</b> Electrophoresis. Chromatography. Mass spectrometry. Atomic absorption spectrophotometry. Immunochemistry methods. Biochemistry and hematology analyzers. Flow cytometry. Interferentions in methods for determination of analytes in biological samples. Methods evaluation. Metabolism, disorders of metabolism and clinical significance of determination of carbohydrates, proteins, BUN, aminoacids, lipids, lipoproteins, apolipoproteins, nucleic acids, electrolites, vitamins and microelements in biological samples. Disorders of water homeostasis and acid-base status. Biochemical investigation of functions of kidney, liver, gastrointestinal tract, heart and nervous system.			
<b>Recommended literature:</b> 1. Carl A.Burtis, Edward R. Ashwood, David E.Bruns: Tietz Textbook of Clinical Chemistry and Molecular Diagnosis, W.B.Saunders Company, 2012. 2. Kaplan L.A., Pesce J.P. and Kazmierczak C.K., Clinical Chemistry: Theory, Analysis, Correlation, Mosby, 4th Edition, 2010.			
<b>The total of active learning classes</b>		<b>Lectures:</b> 90	
		<b>Individual research work:</b> 90	
<b>Teaching methods:</b> Lectures, interactive classes, laboratory classes, workshops, seminars, case reports, problem based learning, panel discussions, participation in research projects.			
<b>Grading system:</b> Lectures, seminars: 30 points; Exam: 70 points			





<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Selected Topics in Medical Biochemistry			
<b>Teachers:</b> Jelic-Ivanovic D. Zorana, Spasojevic-Kalimanovska V. Vesna, Stojanov D. Marina, Ignjatovic D. Svetlana, Topic S. Aleksandra; Dopsaj B. Violeta, Bogavac-Stanojevic B. Natasa, Kotur-Stevuljevic M. Jelena, Zeljkovic R. Aleksandra, Stefanovic Z. Aleksandra, Vekic Z. Jelena			
<b>Course status:</b> Mandatory modules, module: Medical Biochemistry			
<b>Semester:</b> III		<b>Year of studies:</b> II	
<b>ECTS points:</b> 10		<b>Course code:</b> ДМБ2ОМ1	
<b>Requirements:</b> General Biochemistry, Medical Biochemistry (course at Integrated Academic Studies)			
<b>Course aims:</b> Investigation and measurement of biochemical changes in human diseases.			
<b>Course outcomes:</b> Acquirement of biochemical basis for changes in special condition, formulation and following of practical procedures in laboratory assessment, evaluation and interpretation of laboratory results.			
<b>Course contents:</b> Determination of cytokines, tumor markers, enzyme activity. Inborn errors of metabolism. Prenatal diagnostics. Laboratory endocrinology. Laboratory hematology. Biochemical markers in organ transplantation. Changes of biochemical markers in pregnancy and ageing. Biochemical aspects of nutrition. Bone diseases markers.			
<b>Recommended literature:</b> 1. Carl A.Burtis, Edward R. Ashwood, David E.Bruns: Tietz Textbook of Clinical Chemistry and Molecular Diagnosis, W.B.Saunders Company, 2012. 2. Kaplan L.A., Pesce J.P. and Kazmierczak C.K., Clinical Chemistry: Theory, Analysis, Correlation, Mosby, 4th Edition, 2010. 3. McPherson RA, Pincus MR. Henry's Clinical Diagnosis and Management by Laboratory Methods. Saunders. 2011.			
<b>The total of active learning classes</b>		<b>Lectures:</b> 60	
		<b>Individual research work:</b> 60	
<b>Teaching methods:</b> Lectures, interactive classes, laboratory classes, workshops, seminars, case reports, problem based learning, panel discussions, participation in research projects			
<b>Grading system:</b> Lectures, seminars: 30 points; Exam: 70 points			


<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Clinical enzymology			
<b>Teachers:</b> Spasojević-Kalimanovska V. Vesna			
<b>Course status:</b> elective, module: Medical biochemistry			
<b>Semester:</b> II	<b>Year of studies:</b> I		
<b>ECTS points:</b> 5	<b>Course code:</b> ДМБ1И1		
<b>Requirements:</b> One semester course of clinical enzymology from the master study			
<b>Course aims:</b> Enzyme distribution in human body. Factors affecting enzyme concentrations in plasma or serum. Enzymes profiles of damaged organs. Diagnostic enzymology and selection of enzyme test. Measurement of enzyme activity. Enzyme analysis for measurement of substrates.			
<b>Course outcomes:</b> Application of enzyme analysis in disease diagnosis			
<b>Course contents:</b> Enzyme kinetics, Allosteric regulation of enzyme reaction. Inhibition of enzyme activity. Isoenzymes. Enzyme analysis. Measurement of enzyme activity and mass concentration. Separation methods for isoenzymes and isoforms. Methods for determination of enzyme phenotype and genotype. Diagnostic enzymology: pancreatic enzymes, bone enzymes, muscle enzymes, liver enzymes. Erythrocyte enzymes. Diagnostic enzymology in pregnancy. Enzymes as tumor markers.			
<b>Recommended literature:</b> 1. Burtis CA, Ashwood ER, Bruns DE. Tietz Textbook of Clinical Chemistry and Molecular Diagnosis, W.B. Saunders Company, 2012. 2. Moss WD, Rosalki SB. Enzyme Test in Diagnosis, Arnold, London, 1996. 3. Kaplan LA, Pesce AJ, Kazmierczak S. Clinical Chemistry, 5th Edition - Theory, Analysis, Correlation, W.B. Saunders Company, 2010.			
<b>The total of active learning classes</b>	<b>Lectures:</b> 30		
	<b>Individual research work:</b> 30		
<b>Teaching methods:</b> Interactive theoretical lectures; student practical work, seminars; case problem study			
<b>Grading system:</b> 40 poens pre exam ; final exam: 60 poens			

<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Laboratory hematology			
<b>Teachers:</b> Violeta B. Dopsaj			
<b>Course status:</b> elective, module: Medical biochemistry			
<b>Semester:</b> I		<b>Year of studies:</b> II	
<b>ECTS points:</b> 5		<b>Course code:</b> ДМБ1И2	
<b>Requirements:</b> Courses in hematology and laboratory methods in hematology from the basic studies			
<b>Course aims:</b> Introducing with special laboratory methods and procedures in hematology.			
<b>Course outcomes:</b> The possibility of applying specific hematology laboratory methods in diagnostic procedures.			
<b>Course contents:</b> The molecular, cellular and immunological basis in hematology. Stem cells and hematopoietic disorders. Anemia. malignancy in hematology. Laboratory procedures in diagnosis of hematology disorders. Morphological analysis of cells in body fluids within the hematology investigations. Haemostasis and thrombosis. Special tests and hematological procedures. Automation in hematology and haemostasis. Quality control in hematology laboratories.			
<b>Recommended literature:</b> 1. Barbara J Bain. Blood cell, a practical guide. Blackwell Publishing 2006. 2. Dacie and Lewis. Practical Haematology. Churchill Livingstone 2006. 3. Shirlyn McKenzie. Clinical Laboratory haematology. Pearson 2010. 4. Hoffman R, Benz E, Furie B, Cochen H. Hematology - Basic principles and practice. Churchill Livingstone 2005. 5. Williams WJ, Beutler E, Erslev AJ, Lichtman. Hematology. McGraw Hill, New York 2001.			
<b>The total of active learning classes</b>		<b>Lectures:</b> 30	
		<b>Individual research work:</b> 30	
<b>Teaching methods:</b> Lectures, seminars, practical work in the laboratory .			
<b>Grading system:</b> Seminar articles (2 articles) with presentation: 40 points, oral examination: 60 points			

<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Selected Topics in Immunochemistry			
<b>Teachers:</b> Nevena M. Arsenović-Ranin, Zorica M. Stojić-Vukanić			
<b>Course status:</b> elective, module: Medical Biochemistry			
<b>Semester:</b> II	<b>Year of studies:</b> I		
<b>ECTS points:</b> 5	<b>Course code:</b> ДМБ1ИЗ		
<b>Requirements:</b> None			
<b>Course aims:</b> Broader knowledge of antigens and immune system activation; better understanding of the structures and biological functions of antibodies, cytokines and complement in immune response.			
<b>Course outcomes:</b> Substantially developed intellectual and professional skills in key areas of immunochemistry.			
<b>Course contents:</b> Regulation of immune processes, relationships between immune system and other biological systems. Immunological specificity, immune recognition. Isolation and characterization of bacterial, viral, parasite, fungal and tissue antigens. Purification of IgG, IgM, IgA, IgE, immunoglobulin chains and fragments. Recombinant DNA technology in immunochemistry. Antigens as reagents. Antibodies as reagents: monoclonal and polyclonal antibodies. Immunochemical characterization of the specificity of monoclonal antibodies. Assessment of antibody affinity for the antigen. Qualitative and quantitative immunochemical tests. Automatization of immunoassays.			
<b>Recommended literature:</b> 1. A K Abbas, A H Lichtman, S Pillai. Basic Immunology, 4th Edition. Elsevier, Saunders, 2012. 2. Richard A. Goldsby, Thomas J. Kindt, Barbara A. Osborne, Janis Kuby: Immunology; W.H. Freeman and Company, 2003. 3. A P Johnstone, MW Turner: Immunochemistry 1 and 2; Oxford University Press, 1997.			
<b>The total of active learning classes</b>	<b>Lectures:</b> 30		
	<b>Individual research work:</b> 30		
<b>Teaching methods:</b> Lectures, seminars, video-presentations, workshops, discussions			
<b>Grading system:</b> Lectures and seminars : 30 points; exam : 70 points			

<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Biochemical Tests in Prenatal Diagnosis			
<b>Teachers:</b> Ignjatović D. Svetlana			
<b>Course status:</b> elective, module: Medical Biochemistry			
<b>Semester:</b> III	<b>Year of studies:</b> I		
<b>ECTS points:</b> 5	<b>Course code:</b> ДМБ2И1		
<b>Requirements:</b> Course Clinical Chemistry - Integrated academic studies			
<b>Course aims:</b>			
Introduction to laboratory methods of prenatal diagnosis to be applied in order to detect disorders caused by changes in the level of genes and chromosomes.			
<b>Course outcomes:</b>			
The knowledge acquired will enable understanding of diagnosis and prevention of genetic diseases.			
<b>Course contents:</b>			
The function of the fetal-placental-decidual unit. Changes in the concentration of protein (alpha-1-antitrypsin, hemoglobin), polypeptide (hCG, gonadotropin and placental lactogen) and the steroid (progesterone and estrogens) hormones during pregnancy. Assessment of fetal lung maturity. Early diagnosis of neural tube defects and Down 's syndrome. Calculation of risk for some diseases and birth defects. The analysis of the amniotic fluid. Determination of AFP, hCG, unbound estriol and PAPP-A.			
<b>Recommended literature:</b>			
1. Carl A.Burtis, Edward R. Ashwood, David E.Bruns: Tietz Textbook of Clinical Chemistry and Molecular Diagnosis, W.B.Saunders Company, 2011.			
2. Nicolaidis KH, Sebire NJ, Snijders RJM. 11-14 Week Scan: The Diagnosis Of Fetal Abnormalities. Pearl River, New York, 1999.			
<b>The total of active learning classes</b>	<b>Lectures:</b> 30		
	<b>Individual research work:</b> 30		
<b>Teaching methods:</b>			
Theory, computer simulation problems.			
<b>Grading system:</b>			
Lectures and seminars: 30 points; exam: 70 points.			

<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Methods in Molecular Biology			
<b>Teachers:</b> Spasojević-Kalimanovska V. Vesna			
<b>Course status:</b> elective, module: Medical biochemistry			
<b>Semester:</b> III	<b>Year of studies:</b> II		
<b>ECTS points:</b> 5	<b>Course code:</b> ДМБ2И2		
<b>Requirements:</b> Biochemistry			
<b>Course aims:</b> Introduction in basic principles of molecular biology, techniques of molecular genetics and their application in disease diagnosis and genetic polymorphisms.			
<b>Course outcomes:</b> Application of different methods for isolation, amplification, separation and detection of nucleic acids. Ability for interpretation of the obtained results in molecular biology.			
<b>Course contents:</b> Genomes and nucleic acid alterations. Replication, transcription and translation. Regulation of gene expression. Human genom. Recombinant DNA. Viral genomes and sequence alterations. Nucleic acid enzymes. Amplification techniques. Polymerase chain reaction. Target amplification. Detection techniques. Visualization of nucleic acids. Labeled probes. Discrimination techniques. Northern and Southern blotting techniques. Hybridisation assays. Real time-PCR and gene expression. Molecular genetics and diagnosis of inherited diseases and other diseases.			
<b>Recommended literature:</b> 1. Devlin, T.M. Textbook of Biochemistry with clinical correlation. John Wiley&Sons. 2010. 2. Voet D, Voet JGG, Pratt CW. Fundamentals of biochemistry: life at molecular level. John Wiley&Sons.2012. 3. Pasternak JJ. An introduction to human molecular genetics. Mechanisms of inherited diseases. Wiley-Liss, Ontario, 2005.			
<b>The total of active learning classes</b>	<b>Lectures:</b> 30		
	<b>Individual research work:</b> 30		
<b>Teaching methods:</b> Interactive theoretical lectures; student practical work, seminars; case problem study e-learning.			
<b>Grading system:</b> 30 poens pre exam ; final exam: 70 poens			

<b>University of Belgrade</b> <b>Faculty of Pharmacy</b>	<b>DOCTORAL ACADEMIC STUDIES</b>		
<b>Course title:</b> Laboratory Endocrinology			
<b>Teachers:</b> Marina D. Stojanov			
<b>Course status:</b> elective, module: Medical Biochemistry			
<b>Semester:</b> III	<b>Year of studies:</b> II		
<b>ECTS points:</b> 5	<b>Course code:</b> ДМБ2И3		
<b>Requirements:</b> Passed all exams from the 1st year of doctoral studies : Biomolecules and cell signalization; Metabolic pathways in human body; Biosynthesis of nucleic acids and proteins			
<b>Course aims:</b> Investigation of mechanisms by which endocrine system control and coordinate functions of specialized tissues as components of human body.			
<b>Course outcomes:</b> Possibility to explain the endocrine system functioning at molecular level.			
<b>Course contents:</b> Analytical methods for determination of biogenic amines, peptide hormones, steroid hormones, their metabolites and receptors in body fluids. The effect of preanalytical factors on hormon assays. Laboratory diagnosis of adrenal gland disorders. Laboratory tests for investigation of hypothalamus-pituitary axis function. Investigation of thyroid disorder. Laboratory tests for reproductive hormones investigation.			
<b>Recommended literature:</b> 1. Janet E, Hall, Lynette K. Nieman: Handbook of Diagnostic Endocrinology, Humana Press 2010. 2. David Gardner, Dolores Shoback : Greenspan's Basic & Clinical Endocrinology, 9th Lange Medical Books, 2011.    3. Carl A. Burtis, Edward R. Ashwood, David E. Burns : Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 5th ed., Elsevier, 2012. 4. Michael T. Johnstone, Aristides Veres : Diabetes and Cardiovascular Disease, 2nd ed., The American Association for Clinical Chemistry, 2005.			
<b>The total of active learning classes</b>	<b>Lectures:</b> 30		
	<b>Individual research work:</b> 30		
<b>Teaching methods:</b> Lectures, seminars, video-presentations, work-shops			
<b>Grading system:</b> Lectures and seminars : 30 points; exam : 70 points			