

Standard Course Syllabus on the academic year 2015/2016										
Description of the subject										
Na Name of subject:	Biochemistry II	The group of detailed educational results								
		Group code: B	Group name: Scientific principles of medicine							
Faculty:	Medicine									
Major:	Medicine									
Speciality	Not applicable									
Level of studies	Uniform MA Studies X									
Form of studies	full-time X part-time X									
Year of studies:	II	Semester:	Winter							
Type of class:	obligatory X elective <input type="checkbox"/>									
Language of instruction:	English X									
Unit:	Course hours									
	Form of education									
	Lectures (L)	Seminars (SE)	Auditorial Classes (AC)	Major Classes – not clinical	Clinical Classes (CC)	Laboratory Classes (LC)	Classes in Simulated conditions	Foreign Language Course Minimum (FLC)	Optional Classes (OC) – minimum 24	
Winter semester										
	16	10				40				
Summer semester										
Total per year: 66										
<p>Educational aims: (max. 6 items)</p> <p>C1. Acquisition of the knowledge on the metabolism of the main groups of chemical compounds in physiological and pathological conditions.</p> <p>C2. Understanding the processes leading to the diversion of normal into pathological biochemical pathways, and molecular basis of chosen disorders development.</p> <p>C3. Acquaintance with the basic scientific techniques applied in biochemistry.</p> <p>C4. Familiarity with the analysis and interpretation of the results obtained in biochemical experiments (calculations, graphs analysis etc.).</p> <p>C5. The formation of an essential biochemical foundation for further insight into molecular processes in pathological conditions and the possibilities of their regulation, in the subsequent stages of medical education.</p>										

The education result matrix for the course in relation to the methods of intended education result verification and to the type of class.				
No. of the subject education result	No. of the education result	Student who has obtained a credit from the subject knows/ can/ is able to	Methods of the achievement verification	Type of class ** Enter the symbol
W1	B.W11.	Student: Describes the structure of lipids and polysaccharides, and their functions in cellular and extracellular structures;	test, presentation, oral response, report, colloquium, written examination	L, SE, LC
W2	B.W13.	Knows the functions of nucleotides in the cell, primary and secondary structures of DNA and RNA as well as chromatin structure;		
W3	B.W14.	Knows the functions of genome, transcriptome and proteome of the human, and the basic methods applied in their analysis; describes the processes of replication, repairing and recombination of DNA, transcription and translation, as well as degradation of DNA, RNA and proteins; knows the idea of the regulation of gene expression;		
W4	B.W15.	Describes the basic catabolic and anabolic pathways, the modes of their regulation, and the impact of genetic and environmental factors;		
W5	B.W16.	Knows metabolic profiles of the basic organs and systems;		
W6	B.W18.	Knows the enzymes involved in digestion, the mechanism of hydrochloric acid generation in the stomach, the role of the bile, the process of the absorption of digestion products, and its disturbances;		
W7	B.W19.	Knows the consequences of an improper diet including a long-time starvation as well as the intake of excess-calories meals and unbalanced diet;		
W8	B.W20.	Knows the consequences of vitamins and minerals deficiency or excess in the organism;		
W9	B.W21.	Knows the biochemical pathways of the communication between cells, between the cell and extracellular matrix, as well as signal transduction pathways in the cell, and the examples of disturbances in these processes resulting in the onset of cancer and other diseases;		
W10	B.W22.	Knows processes such as: cell cycle, proliferation, differentiation and aging of cells, apoptosis and necrosis and their role in the functioning of organism;		
W11	B.W24.	Knows the biochemistry of the skeletal and smooth muscles, and biochemical functions of the blood;		
W12	B.W26.	Knows biochemical mechanisms of hormones actions, and the consequences of disturbances in hormonal regulation;		
W13	B.W34.	Knows the principles of the experimental biochemical investigations as well as in vitro studies serving the development of medicine;		
U1	B.U3.	Student: Indicates the relation between factors disturbing the equilibrium of biological processes, and physiological/pathophysiological changes.	test, presentation, oral response, report, colloquium, written examination	L, SE, LC
U2	B.U4.	Performs biochemical calculations (calculates molar and per cent		

U3	B.U7.	concentrations of compounds in solutions).		
U4	B.U8.	Can foresee the direction of biochemical processes on the basis of the energetic status of the cell;		
U5	B.U10.	Describes biochemical changes in the organism functioning in the situation of homeostasis disturbance, especially defines its biochemical response to physical exercise, exposition to high or low temperature, the loss of blood or water;		
U6	B.U11.	Uses basic laboratory techniques such as quality analysis, titration, spectrophotometry, pH measurements, chromatography, electrophoresis of proteins and nucleic acids, applied in biochemistry;		
U7	B.U12.	Handles simple measurement utilities applied in biochemistry, and evaluates the precision of the performed measurements;		
U8	B.U15.	Takes advantage of biochemical data bases including the Internet ones, and is able to search for the required information with the aid of the available tools;		
		Can design and perform a simple biochemical scientific investigation, interpret the obtained results, and draw conclusions.		

** L - Lecture; SE - seminar; AC – Auditorial classes ; MC – Major classes (not clinical); CC – Clinical classes; LC – Laboratory Classes; CSC – Classes in Simulated Conditions; FLC – Foreign Language Course; OC – Optional Classes

Please use a cross to mark a scale 1-3, how the mentioned education results place Your class in the following sections: the transfer of knowledge, transfer of skills: (ex. knowledge +++; skills ++)

Knowledge (K): +++

Skills (S): +++

Student's workload input (ECTS points)

The form of student's workload	Student's workload (h)
1. Lessons on-site (hrs.):	66
2. Student's own work (hrs.):	102,2
Summary of the student's workload:	168,2
ECTS points per subject:	6
Notes:	

Subject of class: (please provide the topic of individual classes including type of class; remember the topic of class has to translate into intended education results).

In the case of coordinated subjects, please provide the topic of performed classes separately for each unit performing them:

Lectures

1. Functions and transport of lipids (lipoprotein fractions: chylomicrons, VLDL, LDL, HDL). Genetic disorders of apolipoproteins.
2. Oxidation and biosynthesis of fatty acids.
3. Triacylglycerols metabolism.
4. Cholesterol metabolism and its disorders
5. The structure and function of steroid hormones, vitamin D, prostaglandins, leukotriens.
6. Nitrogen metabolism – amino acid metabolism. Genetic disorders.
7. Urea cycle.
8. Metabolism of porphyrins and bile pigments.
9. Nucleotide metabolism.
10. Functional biochemistry of connective tissue (collagen – synthesis and disorders).
11. Biochemistry of blood cells.
12. Liver – its role in metabolism (biotransformation reactions).
13. Iron metabolism, its regulation and disorders.
14. Calcium-phosphate metabolism, its regulation and disturbances (the role of vitamin D₃).
15. Mechanisms of peptide and steroid hormones action (vitamin A and D₃). Receptors of hormones and vitamins.
16. Biochemistry of vision (vitamin A significance).

Seminars

1. Digestion, absorption and transport of lipids.
2. Biochemistry of adipose tissue. Metabolism of fatty acids and triacylglycerol synthesis.
3. Chemical structure and metabolism of steroid compounds.

4. Atherosclerosis – diagnostic significance of TAG, LDL, HDL measurements.
5. Metabolism of arginine – generation of nitric oxide and creatine.
6. Transamination reaction; its mechanism and diagnostic importance of AspAT and AlAT.
7. Metabolism of nucleotides and porphyrins.
8. Biochemistry of muscles.
9. Endogenous regulators of metabolic processes.
10. Iron metabolism and calcium-phosphate metabolism

Classes

Laboratories:

IV laboratory section LIPID METABOLISM

1. Hydrolysis of lipids. Determination of lipase activity.
2. Total cholesterol and HDL cholesterol determination in serum.
3. Quantitative determination of triacylglycerols. Determination of β -lipoproteins concentration.
4. Glycation in microwaves. Credit for IV laboratory section

V laboratory section NITROGEN METABOLISM

5. Quantitative determination of creatinine.
6. Quantitative determination of uric acid.
7. Examination of transamination reaction.
8. Quantitative determination of urea in urine. Credit for V laboratory section.

VI laboratory section TISSUE METABOLISM

9. Quantitative determination of total bilirubin.
10. Determination of hemoglobin and its derivatives.
11. Quantitative determination of calcium.
12. Determination of GGT activity in serum. Credit for VI laboratory section.
13. Repetition of laboratories. Credit for the winter semester.
14. III terms of laboratory tests.

Primary sources: (list in accordance with significance, not more than 3 items)

1. Richard A. Harvey et al. "Lippincot's Illustrated Reviews: Biochemistry"
2. Michael Lieberman, Allan D. Marks "Mark's Basic Medical Biochemistry: A Clinical Approach", Fourth Edition
3. Robert K. Murray et al. "Harper's Biochemistry"

Secondary sources with other didactic help: (not more than 3 items)

1. 2. Thomas M. Devlin „Biochemistry with Clinical Correlations”, Willey-Liss, New York
2. Gerard Meisenberg, Wiliam H. Simmons "Principles of Medical Biochemistry" Mosby Elsevier, 2nd Edition
3. L. Baynes., M. Dominiczak, „Medical Biochemistry”, Mosby Elsevier, Third Edition

Requirements for teaching resources: (e.g. laboratory, multimedia projector, other ...)

1. Laboratories, seminar rooms, lecture halls.
2. Laboratory utilities; water baths, centrifuges, incubators, spectrophotometers, glassware, pippets, chemical reagents
3. Multimedia projectors, computers, whiteboards.

Preliminary terms and conditions:

(minimal terms and conditions required before the student commences the course).

Student should know the principles of chemistry and biology and have molecular biology, medical chemistry and biophysics courses completed (at the university level).

Student should have the credit for the first semester in biochemistry.

Conditions for completing the course: specify the terms and conditions for completing the classes included in the subject's scope, specify the requirements the student has to meet to be allowed to sit in the theoretical and/or practical exam, specify the form of the exam and the requirements for passing the exam, specify the criteria for particular grades

In order to obtain a credit for biochemistry it is compulsory to get a credit for all thematic sections:

1. Properly conduct the experiments designed in the course plan and present reports summarizing the obtained data, calculations and conclusions (taking into account §12 subparagraph 3 of Wrocław Medical University Regulations of Studies "Student has a right to miss 10% of obligatory classes in a given subject without giving any explanation of the

absence and without the necessity to repeat these classes").

2. Actively participate in seminars – prepare and present chosen issues and actively participate in discussion.
3. Obtain a positive grade for all three laboratory exams covering both theoretical and practical material concerning three sections.

A credit for all the laboratory sections is a prerequisite for participation in the final exam in biochemistry.

Final exam is in the form of a test consisting of both single-choice and open questions. To pass the exam the student should obtain at least 60% from each of the parts (single-choice and open questions). Percentage of correct answers required to obtain specific grades is given below:

Grade:	Grade criteria: (only for subjects completed with the exam)
Very good (5,0)	90% - 100%
Good plus (4,5)	85% - 90%
Good (4,0)	75% - 85%
Sufficiently good (3,5)	70% - 75%
Sufficient (3,0)	60% - 70%

Name and address of unit conducting the course, contact information: telephone and e-mail

Department of Medical Biochemistry, Chałubińskiego 10, 50-368 Wrocław

Secretarial office: e-mail: biochsek@bioch.umed.wroc.pl; phone: 784-13-70

The list of teachers performing the classes: Name and Surname, academic or professional degree/title, field of study, occupation, type of classes:

In the case of coordinated subjects, please provide the topic of performed classes separately for each unit performing them.

Teachers	Degree, field of science, profession	Form of classes
Iwona Bednarz-Misa	Doctor of Medical Sciences, Biochemist, Laboratory diagnostician, adjunct	Laboratories, seminars
Izabela Berdowska	Doctor of Medical Sciences, Biochemist, adjunct	Lectures, laboratories, seminars
Małgorzata Krzystek-Korpacka	Doctor of Medical Sciences, Biochemist, adjunct	Laboratories, seminars
Małgorzata Matusiewicz	Doctor of Medical Sciences, Biochemist, adjunct	Lectures, laboratories, seminars
Ewa Seweryn	Doctor of Medical Sciences, Biochemist, adjunct	Laboratories, seminars
Bogdan Zieliński	Doctor of Medical Sciences, Biochemist, adjunct	Lectures, laboratories, seminars

Person responsible for the course:

Dr Małgorzata Matusiewicz

Drawn up on (date): 30.06.2015

Uniwersytet Medyczny we Wrocławiu
KATEDRA I ZAKŁAD
BIOCHEMII LEKARSKIEJ
adiunkt
Dr Izabela Berdowska

The syllabus has been drawn up by
Dr Izabela Berdowska

Signature of the Head of the unit conducting the course

The signature of the Dean of the Faculty of Medicine

Wrocław Medical University
FACULTY OF MEDICINE
VICE-DEAN FOR STUDIES IN ENGLISH
Prof. Andrzej Hendrich, PhD

Uniwersytet Medyczny we Wrocławiu
KATEDRA I ZAKŁAD BIOCHEMII LEKARSKIEJ
Kierownik
prof. dr hab. Andrzej Gamiński