

Standard Course Syllabus on the academic year 2015/2016									
Description of the subject									
Na Name of subject:	BIOCHEMISTRY I				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:	I				Semester:	Summer			
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									
Summer semester									
	17	10				40			
Total per year: 67									
<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.W1.	Student: Describes biochemical regulation of water-electrolyte metabolism in biological systems;	test, presentation, oral response, report, colloquium, written examination	L, SE, LC
W2	B.W2.	Understands acid-base balance and the mechanism of buffering in physiological fluids, and their significance in the organism homeostasis;		
W3	B.W10.	Knows the structure of simple organic compounds – components of macromolecules present in cells, extracellular matrix and body fluids		
W4	B.W11.	Describes the structure of polysaccharides, and understands their functions within intracellular and extracellular structures;		
W5	B.W12.	Knows primary, secondary, tertiary and quaternary structures of proteins; knows posttranslational and functional protein modifications and their significance;		
W6	B.W15.	Describes the basic catabolic and anabolic pathways, the modes of their regulation, and the impact of genetic and environmental factors;		
W7	B.W16.	Understands and compares metabolic profiles of the basic organs and systems;		
W8	B.W17.	Knows the concepts of oxidative potential of the organism and oxidative stress;		
W9	B.W19.	Explains medical consequences of an improper diet including the intake of excess-carbohydrates meals;		
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 concentrations of compounds in solutions).		
U3	B.U7.	Can foresee the direction of biochemical processes on the basis of the energetic status of the cell;		
U4	B.U8.	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;		
U5	B.U10.	Uses basic laboratory techniques such as quality analysis, titration, spectrophotometry, pH measurements, chromatography, electrophoresis of proteins and nucleic acids, applied in biochemistry;		

U6	B.U11.	Handles simple measurement utilities applied in biochemistry, and evaluates the precision of the performed measurements;		
U7	B.U12.	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;		
U8	B.U15.	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.):	67
2. Student's own work (hrs.):	23
Summary of the student's workload:	90
ECTS points per subject:	3,5
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. (1h) The structure of peptides and proteins. Peptide hormones.
2. (1h) Structure and functions of fibrous and globular proteins.
3. (2h) Enzymes – properties and kinetics.
4. (1h) Mechanisms of action and regulation of enzyme activity.
5. (2h) Transport across membranes, membrane receptors.
6. (1h) Catabolic processes. Tricarboxylic acid cycle.
7. (1h) Respiratory chain and oxidative phosphorylation.
8. (1h) Oxidative stress and antioxidant potential of the organism.
9. (1h) Structure and function of carbohydrates.
10. (1h) Glucose metabolism.
11. (1h) Glycogen metabolism.
12. (1h) Fructose and galactose metabolism.
13. (1h) Metabolism of heteroglycans.
14. (2h) Regulation of carbohydrate metabolism.

Seminars

1. The structure of amino acids, peptides and proteins. Peptide bond. Biological properties of proteins.
2. Classification of enzymes. Kinetics of enzymatic reactions.
3. Regulation of metabolism by control of enzyme activity.
4. The functions of biological membranes
5. Transport across biological membranes
6. Oxidoreductases and their cofactors
7. Transport of hydrogen atoms across mitochondrial membrane (glycerol-3-phosphate shuttle and malate-aspartate shuttle).
8. Tricarboxylic acid cycle – connections with other metabolic pathways.
9. Glycolysis – energy yield. Glycogen metabolism and its disturbances.
10. The control of blood glucose concentration, and its disturbances leading to diabetes.

Classes

Laboratories

I laboratory section AMINO ACIDS, PROTEINS AND ENZYMES

1. Introductory classes; acquaintance with safety regulations, measurement utilities in the biochemical laboratory, and biochemical calculations. Determination of inorganic phosphate..
2. Isolation and quantitative determination of fibrinogen.
3. Studies on kinetics of phosphatase reaction.
4. Determination of isoelectric point of proteins. Credit for I laboratory section

II laboratory section OXIDATIVE PROCESSES

5. Quantitative determination of vitamin C.
6. Examination of enzymatic reactions catalyzed by succinate dehydrogenase .
7. Examination of the reaction catalyzed by horseradish peroxidase.
8. Determination of catalase activity. Credit for II laboratory section.

III laboratory section CARBOHYDRATE METABOLISM

9. Quantitative determination of reducing sugars.
10. Effect of pH on saccharase activity.
11. Glycogen degradation by muscle pulp's enzymes.
12. Determination of salivary amylase activity. Credit for III laboratory section.
13. Repetition of laboratories. Credit for the summer 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. 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).

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 second semester in biochemistry.

Grade:	Grade criteria: (only for subjects completed with the exam)
Very good (5,0)	
Good plus (4,5)	
Good (4,0)	
Sufficiently good (3,5)	
Sufficient (3,0)	

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
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BIOCHEMII LEKARSKIEJ
adiunkt
[Signature]
dr Izabela Berdowska

The syllabus has been drawn up by
Dr Izabela Berdowska

Signature of the Head of the unit conducting the course

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kierownik

[Signature]
prof. dr hab. Andrzej Gamian

The signature of the Dean of the Faculty of Medicine

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