



# Pomeranian Medical University in Szczecin

## SYLLABUS of the MODULE (SUBJECT)

valid from the academic year 2018/2019

### General Information

Module title	Biochemistry
Module type	Obligatory
Faculty	Faculty of Medicine and Dentistry
Field of study	Medicine and Dentistry
Major	Not applicable
Level of study	level II, long-cycle (S2J)
Mode of study	intramural
Year of studies, semester	Year 2, semester III and IV
ECTS credits (incl. semester breakdown)	9 (3+6)
Type/s of training	lectures 12h practical 90h (sem III – 42, sem. IV – 48)
Form of assessment	graded assessment: -descriptive -test final examination: -descriptive -test -oral
Head of the Department/ Clinic, Unit	Prof. dr hab. n. med. Dariusz Chlubek
Tutor responsible for the module	Prof. dr hab. n. med. Dariusz Chlubek dclubek@pum.edu.pl
Department's/ Clinic's/ Unit's website	www.pum.edu.pl –Wydział lekarski z Oddziałem Nauczania w Języku Angielskim / Katedra Biochemii i Chemii Medycznej / Katedra Biochemii
Language	English

**Detailed information**

<b>Module objectives</b>		<p>The attainment target of biochemistry is analyzing vital processes at the molecular level and explaining connections between the structure and the function of biomolecules in the living organism. This knowledge is a base of understanding action of individual tissues and organs, and in consequence functioning of the entire organism in health and illness. It lets also consciously react to the appearance of pathological processes by implementing the effective treatment. It enables the tooth decay to take preventive action with reference to diseases associated with the progress of civilization.</p> <p>It also preparing students for studying of clinical objects is an attainment target of biochemistry.</p>
Prerequisite /essential requirements	Knowledge	<p>Student knows patterns of basic substances. Explains concepts: of atom, molecule, substance, a chemical reaction, the functional group. Recognizes and defines organic compounds: hydrocarbons, alcohols, aldehydes, ketones, acids, esters, ethers, amides, amines. Knows and classifies chemical bonds. Defines notions: of solubility, diffusion, osmosis, osmotic pressure, molarity. Knows notions: of solution, molar concentration, percentage concentration, normal setting, electrolytic dissociation, ion, anion, cation.</p>
	Skills	<p>Student is able to use the basic laboratory equipment (use the speedy pipette, measure appropriate volumes of solutions out, prepare solutions according to the recommended concentration, titrate). Performs chemical calculations based on knowledge of chemistry and mathematic. Knows principles of operation in a chemical laboratory. He is able to react actually in emergencies in a chemical laboratory (functioning of gobbling, flammable, poisoning associations, action of the highest temperature and e.c.).</p>
	Competences	<p>Student is able to work in a team and actually to perform tasks requiring the precision, acting according to the closely established procedure. He is able to behave responsibly in emergencies. A habit has self-educations.</p>

Description of the learning outcomes for the subject /module			
No. of learning outcome	Student, who has passed the (subject) knows /is able to /can:	SYMBOL (referring the standards) ZEK	Method of verification of learning outcomes
W01	knows importance of main and trace elements in processes within human body with regard to intake, absorption and transport	K_B.W01	S, RZC, W, ET, EP, EU
W02	knows importance of electrolytes, buffer systems and chemical reactions in biological systems	K_B.W02	S, RZC, W, ET, EP, EU
W03	knows biochemical bases of human body integrity	K_B.W03	S, RZC, W, ET, EP, EU
W04	knows structure and functions of significant chemical compounds found in human body. In particular properties, functions, metabolism and energy aspects of proteins, nucleic acids, carbohydrates, lipids, enzyme and hormones reactions.	K_B.W04	S, RZC, W, ET, EP, EU
W05	knows principles of calcium-phosphate metabolism	K_B.W05	S, RZC, W, ET, EP, EU
W06	knows role and importance of body fluids with regard to saliva	K_B.W06	S, RZC, W, ET, EP, EU

U01	refers chemical phenomena to processes going on in oral cavity	K_B.U01	S, RZC, W, ET, EP, EU
K01	shows habit of self-education and lifelong education	K_K01	S, RZC, W
K02	accepts need of standards of conduct and legislation regarding medical practice	K_K02	S, RZC, W
K03	can co-operate with team members and care about occupational safety	K_K03	S, RZC, W

Table presenting learning outcomes of the subject/module in relation to the form of classes

No.	SYMBOL (referring the standards) ZEK	Type/s of training							
		Lecture	Seminar	Practical classes	Clinical classes	...	...	...	Other...
1.	K_B.W01		X	X					
2.	K_B.W02		X	X					
3.	K_B.W03		X	X					
4.	K_B.W04		X	X					
5.	K_B.W05		X	X					
6.	K_B.W06		X	X					
7.	K_B.U01		X	X					
8.	K_K01		X	X					
9.	K_K02		X	X					
10.	K_K03		X	X					

Module contents no.	Description of teaching programme	No. of hours	References to learning outcomes
TK 01	Amino acids and peptides - classification, properties, functions. Proteins: molecular structure, properties, functions. <i>Practical classes</i>	6,30'	W02,03,04, K01,02,03
TK 02	Nucleotides. Nucleic acids. Protein biosynthesis. <i>Practical classes</i>	4,30'	W02,03,04, K01,02,03
TK 03	Enzymes - general properties, kinetic of enzymatic reactions, mechanisms of action, regulation of the activity. <i>Lecture</i> <i>Practical classes</i>	1 9	W02,03,04, K01,02,03
TK 04	Nutritional proteins. Biological value of the proteins. Nitrogen balance. Protein digestion. Amino acids absorption. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W02,04, K01,02,03
TK 05	Catabolism of amino groups of amino acids. Urea cycle. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W02,04, K01,02,03
TK 06	Getting the energy in the cell. Citric acid cycle. Mitochondrial respiratory chain. <i>Lecture</i> <i>Practical classes</i>	1 5,30'	W02,03,04, K01,02,03

TK 07	Nutritional sugars. Sugars digestion and absorption. Metabolism of glycogen. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W02,04, K01,02,03
TK 08	Glucose metabolism. Glycolysis. Gluconeogenesis. <i>Lecture</i> <i>Practical classes</i>	1 8,30'	W02,04, K01,02,03
TK 09	Pentose cycle. The metabolism of the fructose and galactose. Uronic acid pathway. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W02,04, K01,02,03
TK 10	Nutritional lipids. Lipids digestion and absorption. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W02,04, K01,02,03
TK 11	Lipids transport and storage. Lipoproteins. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W02,04, K01,02,03
TK 12	Metabolism of fatty acids: lipogenesis, $\beta$ -oxidation, ketogenesis. Triacylglycerol metabolism: synthesis and lipolysis. <i>Lecture</i> <i>Practical classes</i>	1 5,30'	W02,04, K01,02,03
TK 13	Cholesterol and bile acids metabolism. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W02,04, K01,02,03
TK 14	Iron and porphyrins metabolism. The synthesis and the catabolism of the hem. Metabolism of bilirubin. <i>Lecture</i> <i>Practical classes</i>	1 4,30'	W01,02,04, K01,02,03
TK 15	Macro- and microelements. Calcium-phosphate metabolism. <i>Practical classes</i>	5,30'	W01,05, K01,02,03
TK 16	Biochemistry of the oral cavity. Saliva. Chemical composition of tissues of the tooth. Processes of the demineralization and the remineralization. Biochemical aspects of tooth decay and periodontal diseases. <i>Practical classes</i>	4,30'	W06, U01, K01,02,03

**Booklist**

Obligatory literature:

1. P. Champe, R. Harvey, D. Ferrier. Lippincott's Illustrated Reviews: Biochemistry. Ed. Lippincott Williams & Wilkins

Student's workload (balance sheet of ECTS credits)			
Form of student's activity (in-class participation; activeness, produce a report, etc.)	Student's workload [h]		
	Tutor	Student	Average
Contact hours with the tutor	102		
Time spent on preparation to seminars/ practical classess	70		
Time spent on reading recommended literature			
Time spent on writing report/making project			
Time spent on preparing to colloquium/ entry test	17		
Time spent on preparing to exam	80		
Other .....			
Student's workload in total	269		
ECTS credits for the subject (in total)	9		
Remarks			

\* Selected examples of methods of assessment:

EP – written examination

EU – oral examination

ET – test examination

EPR – practical examination

K – colloquium

R – report

S – practical skills assessment

RZC – practical classes report, incl. discussion on results

O – student's active participation and attitude assessment

SL – lab report

SP – case study

PS - assessment of student's ability to work independently

W – entry test

PM – multimedial presentation

other...