



Pomeranian Medical University in Szczecin

SYLLABUS of the MODULE (SUBJECT)

valid from the academic year 2017/2018

General Information

| Module title | Medical Chemistry |
|---|--|
| Module type | Obligatory |
| Faculty | Faculty of Medicine & Dentistry (WL-S) |
| Field of study | Medicine and Dentistry (KLD) |
| Major | Not applicable |
| Level of study | II level/ long-cycle (S2J) |
| Mode of study | intramural |
| Year of studies, semester | Year 1, semestr 1 |
| ECTS credits (incl. semester breakdown) | 3 |
| Type/s of training | Lectures 6h. Seminar 11h Practical classes 23h |
| Form of assessment | Non-graded assessment |
| Head of the Department/ Clinic, Unit | Prof.dr hab.Joanna Bober |
| Tutor responsible for the module | Dobrosława Stańkowska-Walczak, PhD, dobroslaw.walczak@pum.edu.pl Jolanta Szymańska-Pasternak, PhD, jolantas@pum.edu.pl Patrycja Kłos, PhD, patison@pum.edu.pl Maria Dąbkowska PhD, Maria dabkowska@pum.edu.pl |
| Department's/ Clinic's/ Unit's website | www.pum.edu.pl/wydzialy/wydzial-lekarski/katedra-biochemii-i-chemii-medycznej/zaklad-chemii-medycznej |
| Language | English |

*replace ☐ with X where applicable

Detailed information

| | | |
|-------------------------------------|-------------|---|
| Module objectives | | <p>The purpose of teaching medicinal chemistry is to prepare students to learn and understand the metabolic processes presented in the course of medical studies. Students will become familiar with basic issues of bioinorganic chemistry, bioorganic, physical and analytical. Student will learn approximate relationship between the structure and chemical properties and function of compounds found in living organisms. Teaching begins with a discussion of the chemical bonds stabilizing chemical structure. Then widely discussed are the properties of water and solutions, as the dominant component of the human body. Particular emphasis is placed on familiarizing students with the basics including calculation, fluid and electrolyte balance and acid-base balance. Students also learn about the chemical composition and some properties of saliva.</p> <p>Other issues of bioinorganic chemistry are associated with the analysis of the mineral composition of the human body, with particular emphasis on the properties of the elements of micro- and ultra-essential or toxic to living organisms. The main issues of bioorganic chemistry is to present characteristics of the main groups of compounds that are building blocks of living organisms - proteins, lipids, carbohydrates, nucleic acids. Particular emphasis is given to learn the conformation of molecules, which facilitate the understanding of the analysis of biological effects. During the course students learn the basics of practical work in the chemical laboratory and elements of qualitative, quantitative and instrumental analysis of organic and inorganic compounds.</p> <p>The last, pursued objective is to familiarize students with the basics of dental materials science, chemical structure and reactivity of substances applicable in dentistry.</p> |
| Prerequisite/essential requirements | Knowledge | Having a knowledge of chemistry at the high school level |
| | Skills | Ability to self-study in a targeted manner |
| | Competences | Ability to work effectively in a team |

| 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, O, SL, PS, W |
| W02 | knows importance of electrolytes, buffer systems and chemical reactions in biological systems | K_B.W02 | |
| W03 | 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, enzymes and hormones reactions. | K_B.W04 | |
| W04 | knows role and importance of body fluids with regard to saliva | K_B.W06 | |
| W04 | knows principles of acid-base equilibrium and transport of oxygen and carbon dioxide in human body | K_B.W21 | |
| U01 | refers chemical phenomena to processes going on in oral cavity | K_B.U01 | K |
| U02 | shares knowledge with other people | K_D.U16 | |
| U03 | interprets results of laboratory examination | K_E.U04 | |

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 | | | | | |
| 3. | K_B.W04 | X | X | X | | | | | |
| 4. | K_B.W06 | X | X | X | | | | | |
| 5. | K_B.W21 | X | X | X | | | | | |
| 6. | K_B.U01 | X | X | X | | | | | |
| 7. | K_D.U16 | | | X | | | | | |
| 8. | K_E.U04 | | | X | | | | | |

| Module (subject) contents no. | Description of teaching programme | No. of hours | References to learning outcomes |
|--|---|-------------------------|--|
| | Lecture and Seminar: | | |
| TK01 | Functions of elements in biological systems. Chemical bonding in organic compounds: | 2 | W01 |
| TK02 | Acid-base equilibrium | 2 | W02 |
| TK03 | Colloids | 2 | W21 |
| TK04 | The chemistry of free radicals | 2 | W04 |
| TK05 | Lipids, Heterocyclic compounds | 2 | W04 |
| TK06 | Water in human body | 2 | W21 |
| TK07 | Composition and properties of saliva | 2 | W01, U01 |
| TK08 | Metals in dentistry | 1 | W01 |
| TK09 | Complex carbohydrates | 1 | W02 |
| TK10 | Instrumental methods in biochemical analysis | 1 | W04 |
| | Practical class: | | |
| TK11 | Calculating concentrations | 2 | W02, U02 |
| TK12 | Chemical analysis of selected ions. | 4 | W04, U02 |
| TK13 | Buffers' properties | 2 | W02, U02 |
| TK14 | Donnan's equilibrium and properties of colloidal systems. | 2 | W04, U02 |
| TK15 | Properties and chemical composition of saliva. | 2 | W04, U01, U02 |
| TK16 | Amino acids: structure, classification and physicochemical properties. | 2 | W04, U02 |
| TK17 | Chemical kinetics and thermodynamics bases. Kinetics of saccharose hydrolysis. | 3 | W04, U02 |
| TK18 | Simple carbohydrates. Physicochemical properties of monosaccharides. | 3 | W04, U02 |
| TK19 | Adsorption and partition chromatography. | 3 | W04, U02 |

| Booklist | | | |
|---|------------------------|---------|---------|
| Obligatory literature: | | | |
| 1. Bober J., Dołęgowska B., Stańkowska-Walczak D: Chemistry for the First Year Students, PAM, Szczecin 2011 | | | |
| 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 | 40 | | |
| Time spent on preparation to seminars/ practical classess | 20 | | |
| Time spent on reading recommended literature | 5 | | |
| Time spent on writing report/making project | - | | |
| Time spent on preparing to colloquium/ entry test | 15 | | |
| Time spent on preparing to exam | - | | |
| Other | - | | |
| Student's workload in total | 80 | | |
| ECTS credits for the subject (in total) | 3 | | |
| 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...