Attachment to the Ordinance of the Rectorno 186/WST/2018

Subject name
Biochemistry

ECTS Code

Name of unit teaching the subject
THE ZBIGNIEW RELIGA FACULTY OF MEDICAL SCIENCES IN ZABRZE, THE UNIVERSITY OF TECHNOLOGY IN KATOWICE

Studies

Field of study	degree	mode	major	specialization
medical	Uniform Master's	stationary		

Surname of instructor (instructors)

Type of class, method of implementation and specified number of hours

A.Type of class
- **lecture,**
- **exercise classes,**
- clinical exercise classes
- **seminars,**
- design classes
- laboratories,
- lectureship,
- diploma seminar,
- professional internship.*

* mark where applicable

B.Method of implementation
- **classes in a didactic room**
- on-line classes/*blended learning*
- classes outside the didactic room (in this case must specify where they are held)

C. Amount of hours in accordance with the approved curriculum
Semester 03 = 80h
Lectures = 20h
Seminars = 20h
Exercise classes = 40h
Semester 04 = 80h
Lectures = 20h
Seminars = 20h
Exercise classes = 40h

Amount of ECTS points
Semester 03 including
-lecture – 1ECTS
-seminar – 3ECTS
-laboratory exercises – 2ECTS

Semester 04 including
-lecture – 1ECTS
-seminar – 3ECTS
-laboratory exercises – 2ECTS

Description of awarding ECTS points:

Activity	Student workload
Participation in lectures Semester 03 Semester 04	20 hours 20 hours
Participation in practical classes Semester 03 Semester 04	60 hours 60 hours
Preparation for practical classes and colloquiums Semester 03 Semester 04	30 hours 30 hours
Examination preparation Semester 04	60 hours
Consultations Semester 03 Semester 04	15 hours 15 hours
Total number of hours	310 hours / 25
Amount of ECTS points per module	**12 ETCS**

Didactic cycle
Semester 03 and semester 04

Subject status
- **mandatory** / facultative

Language of instruction
Polish

Didactic methods
- Problem-focused lecture based on multimedia presentation
- Lecture during exercise classes in accordance with the current topic with the use of a presentation
- Lecture and discussion during the seminars
- Laboratory exercises completed individually or in a group
- Review of results of laboratory exercises

Forms and methods of passing and general grading criteria or examination requirements

A. Method of passing
- **examination**
- passing with a grade*

* mark where applicable

B. Forms of passing:

- **written examination: test / with open questions (exercises)/longer written statement**
- oral examination
- **oral assessment/colloquium**
- completion of a semester assignment: preparation of a design or presentation/conducting research and presenting its results(written/oral)/completion of a specified practical work
- **agreeing on a passing grade based on partial grades received during the course of the semester***

* mark where applicable

C. Basic grading criteria

All the provisions of the UTK Study Guidelines, Subject Guidelines as well as Workshop Guidelines shall apply.
Participation in lectures, seminars, and exercise classes is mandatory. Each absence must be excused while material passed on a date and in a form agreed upon with the instructor
Theoretical preparation of the students for the topics of exercise classes and seminars
A grade of 3.0 or higher received from partial colloquiums during the course of the semester, encompassing material from lectures, seminars and exercise classes
A grade of 3.0 or higher received from the theoretical examination
Active participation in exercise classes and seminars
Keeping appropriate documentation of laboratory exercises

Definition of preparatory subjects and initial requirements

A. Formal requirements: necessary knowledge in high school and first year of studies organic and physical chemistry as well as biology

B. Initial requirements: basic familiarity with a chemical laboratory, ability to work independently and in a group, ability to use different sources on information, ability to present personal knowledge and views

Subject aim

C1. Familiarizing the students with basic theoretical information from static and dynamic biochemistry
C2. Familiarizing the students with chemical compounds which make up biomolecules
C3. Familiarizing the students with the course of basic metabolic processes and the dependencies between them
C4. Familiarizing the students with mechanisms regulating metabolic processes, their dysfunctions and possible effects of these dysfunctions
C5 Students acquire the ability to perform laboratory analyses of biological material (blood, urine)
C6. Students acquire the ability to interpret laboratory results

Curriculum

A. Lecture content

Semester 03 – 10 lectures 2h each = 20h

1. Amino acids, peptides, proteins
2. Enzymes – biocatalysts
3. Energy creation in a cell
4. Carbohydrate metabolism I
5. Carbohydrate metabolism II
6. Porphyrins, heme, hemoglobin
7. Vitamins and microelement
8. Metabolism of fatty acids
9. Metabolism of steroids, cholesterol, serum lipoproteins
10. Food components, preventive and therapeutic role of a diet

Semester 04 – 10 lectures 2h each – 20h

1. Amino acid metabolism
2. Nucleotides
3. Nucleic acids
4. Biosynthesis and posttranslational modifications of proteins

5. Gene expression, the human genome
6. Hormones and cytokines
7. Blood biochemistry, eicosanoids
8. Transport through biological membranes
9. Metabolism interference and regulation
10. Effects on health of the presence of food additives

B. Content of seminars

Semester 03 – 10 seminars 2h each = 20h

1. Proteins, extracellular matrix of the connective tissue
2. Enzymes
3. Colloquium
4. Carbohydrates
5. Heme and hemoglobin
6. Colloquium
7. Bile pigments
8. Vitamins, coenzymes, microelements
9. Metabolism of fatty acids
10. Colloquium

Semester 04 – 10 seminars 2h each = 20h

1. Triglycerides, cholesterol, serum lipids
2. Hormones and cytokines
3. Colloquium
4. Calcium and phosphate balance
5. Urea, creatinine, uric acid
6. Colloquium
7. Nucleic acids
8. Protein biosynthesis and posttranslational modifications
9. Colloquium
10. Making up missed classes

C. Content of exercise classes

Semester 03 – 10 exercise classes 4h each= 40h

1. Review of OHS principles. Basic calculations of mass concentration
2. Familiarity with glass and laboratory equipment, preparing buffers and pH calculations
3. Protein assay
4. Protein electrophoresis and chromatography
5. Assaying AIAT and AspAT activity in serum and urine
6. Assaying lactic dehydrogenase
7. Assaying glucose concentration
8. Assaying vitamin C
9. Assaying hemoglobin and hemopexin concentration
10. Making up missed material and classes

Semester 04 – 10 exercise classes 4h each = 40h

`1. Iron assaying
2. Methods of hormone assaying and diagnostic assaying
3. Lipid concentration assaying
4. Cholesterol concentration assaying
5. Diagnosis of the calcium and phosphate balance
6. Methods of urea assaying
7. Assaying creatinine in serum and urine
8. Urine examination
9. Making up missed classes
10. Passing all exercise classes

Literature

A. Literature required to receive a final credit for classes (pass an exam):

- E. Bańkowski "Biochemia"
- D. Hames, N.W. Hooper "Biochemia"
- A. Zgirski, R. Gondko "Obliczenia Biochemiczne"

B. Supplementary literature

- R.K. Murray D.K. Granner, P.A. Mayes, W.V. Rodwell, "BiochemiaHarpera"
- T. Kętrzyna, "Chemia ogólna z elementami biochemii"
- P. Gajewski, A Szczeklik „Interna Szczeklika"

Educational effects:

Effect no	**Description of an educational effect**	Reference to field of study related effects
Knowledge:		
W1	Knows, lists, names, and describes the properties of organic compounds making up microparticles, know their characteristic reactions	B.W10
W2	Knows, lists and describes the construction of microparticles (proteins, nucleic acids, lipids, polysaccharides and others)	B.W11-B.W13
W3	Knows, lists and understands the functions and mutual dependencies of all microparticles in cellular and extracellular structures	B.W11-B.W14
W4	Knows, lists and understands the role of enzymes in catabolic and anabolic pathways, their placement in cellular structures and the connections between them	B.W15
W5	Knows the mechanisms of metabolic pathway regulation and their dependence on genetic and environmental factors	B.W14, B.W15
W6	Knows the basic reasons and consequences of metabolic pathway dysfunction and ways to remove (repair) them	B.W15, B.W17
W7	Knows the metabolism of basic organs and tissues	B.W16
W8	Knows methods of communicating between cells and the extracellular matrix as well as the way of transmitting signals in a cell, their dysfunctions and effects of these dysfunctions	B.W17
W9	Knows enzymes which take part in the digestion of nutrients, absorbing digestion products, knows the consequences of an unbalanced diet	B.W15, B.W17
Abilities:		
U1	Can use simple measuring devices, evaluate the accuracy of the performed measures and interpret them	B.U8, B.U9
U2	Can predict the direction of metabolic processes depending on the influence of exogenous factors on the cell	B.U6
U3	Can plan and perform simple scientific research, interpret results and suggest conclusions	B.U13

Methods used in the verification of educational effects

Educational effect	**Type of grade**				
	colloquiums	**Solving problems during exercise classes**	**Solving problems in groups**	**Oral examination**	**Written examination**
W1	**X**				**X**
W2	**X**				**X**
W3	**X**				**X**
W4	**X**				**X**

W5	**X**				**X**
W6	**X**				**X**
W7	**X**				**X**
W8	**X**				**X**
W9	**X**				**X**
U1	**X**	**X**			**X**
U2	**X**	**X**			**X**
U3	**X**				**X**

Criteria of evaluating educational effects					
Educational effect	**For a grade of 3**	**For a grade of 3.5**	**For a grade of 4**	**For a grade of 4.5**	**For a grade of 5**
W1	**Exhibits knowledge of the educational content on a level of 60-69%**	**Exhibits knowledge of the educational content on a level of 70-76%**	**Exhibits knowledge of the educational content on a level of 77-84%**	**Exhibits knowledge of the educational content on a level of 85-92%**	**Exhibits knowledge of the educational content on a level of 93-100%**
W2	**Exhibits knowledge of the educational content on a level of 60-69%**	**Exhibits knowledge of the educational content on a level of 70-76%**	**Exhibits knowledge of the educational content on a level of 77-84%**	**Exhibits knowledge of the educational content on a level of 85-92%**	**Exhibits knowledge of the educational content on a level of 93-100%**
W3	**Exhibits knowledge of the educational content on a level of 60-69%**	**Exhibits knowledge of the educational content on a level of 70-76%**	**Exhibits knowledge of the educational content on a level of 77-84%**	**Exhibits knowledge of the educational content on a level of 85-92%**	**Exhibits knowledge of the educational content on a level of 93-100%**
W4	**Exhibits knowledge of the educational content on a level of 60-69%**	**Exhibits knowledge of the educational content on a level of 70-76%**	**Exhibits knowledge of the educational content on a level of 77-84%**	**Exhibits knowledge of the educational content on a level of 85-92%**	**Exhibits knowledge of the educational content on a level of 93-100%**
W5	**Exhibits knowledge of the educational content on a level of 60-69%**	**Exhibits knowledge of the educational content on a level of 70-76%**	**Exhibits knowledge of the educational content on a level of 77-84%**	**Exhibits knowledge of the educational content on a level of 85-92%**	**Exhibits knowledge of the educational content on a level of 93-100%**
W6	**Exhibits knowledge of the educational content on a level of 60-69%**	**Exhibits knowledge of the educational content on a level of 70-76%**	**Exhibits knowledge of the educational content on a level of 77-84%**	**Exhibits knowledge of the educational content on a level of 85-92%**	**Exhibits knowledge of the educational content on a level of 93-100%**

W7	**Exhibits knowledge of the educational content on a level of 60-69%**				
W8	**Exhibits knowledge of the educational content on a level of 60-69%**				
W9	**Exhibits knowledge of the educational content on a level of 60-69%**				
U1	**Exhibits knowledge of the educational content on a level of 60-69%**				;
U2	**Exhibits knowledge of the educational content on a level of 60-69%**				
U3	**Exhibits knowledge of the educational content on a level of 60-69%**				