UNIVERSITY OF TUZLA UNIVERZITET U TUZLI

SYLLABUS

1. Course title:

Biochemistry

2. Code:

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

/

7. Class restrictions:

/

8. Duration / semester(s):

1 | 2

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)
	5			
9.1. Lectures	3		Classes:	56,25
9.2. Seminars	0		Individual work:	105
9.3. Laboratory / Practice classes	2		In total:	161,25

10. Faculty:

Faculty of Pharmacy

11. Department/study program:

Cosmetology

12. Lecturer:

Dr.sc. Esmeralda Dautović°°°°

13. Course aims:

The aim of the course is for students to acquire fundamental knowledge of the structure and function of biomolecules, as well as the metabolic processes of nutrients in the human body. The aim of the practical classes is for students to master biochemical techniques and apply them as needed.

14. Learning outcomes:

The student will acquire fundamental theoretical and practical knowledge of the structure and function of biomolecules. They will be trained in the application of basic biochemical methods in the analysis of proteins, lipids, and carbohydrates. Based on the acquired knowledge, the student will be able to understand physiological processes at the molecular level, including the synthesis, degradation, and storage of major biomolecules, as well as the mechanisms of metabolic energy production and the regulation of metabolism, with particular emphasis on processes relevant to the structure, function, and health of the skin, hair, and nails.

15. Course content:

Introduction to Biochemistry: Molecular logic of life. Structure of the cell and biomolecules (water, proteins, lipids, carbohydrates, nucleic acids). Fundamental biochemical principles relevant to the structure and function of the skin and its derivatives.

- Proteins: Amino acid composition and structure. Levels of protein organization. Structure and functions of proteins in skin, hair, and nails. Fibrous and globular proteins. Protein denaturation.
- Enzymes: Classification, kinetics, and regulation of enzyme activity. Role of coenzymes.
- Cell membranes and transport: Molecular composition of membranes, lipids and their role in the skin's barrier function. Membrane transport and its importance for the effectiveness of cosmetic active substances.
- Carbohydrates and glycobiology: Structure and role of carbohydrates. Glycosaminoglycans and hyaluronic acid – importance for skin hydration and elasticity.
- Digestion and metabolism: Basics of digestion and absorption of nutrients. Anaerobic and aerobic metabolism. Glycolysis, gluconeogenesis, beta-oxidation, fat synthesis, amino acid metabolism. Citric acid cycle, respiratory chain, and oxidative phosphorylation.

16. Learning methods:

Lectures, experimental laboratory work in small groups, and consultations
The lectures cover the entire material outlined in the curriculum. Student attendance is mandatory, as the teaching is interactive.
Experimental exercises involve both individual and group work. Upon completion of each exercise, students submit their results to the teaching assistant for review and approval. During the exercises, interactive teaching is conducted through joint discussion.

17. Assessment methods:

Knowledge is assessed through two colloquia and two partial exams. During the scheduled laboratory exercises, two colloquia are conducted, covering both the theoretical basis of the exercises and the experimental procedures. The full material related to laboratory work and the theoretical background is included in the Biochemistry Practicum, which is recommended as reference literature. The colloquia are taken after completion of the first and second cycles of laboratory exercises.
Theoretical knowledge is assessed through two partial exams: the first partial exam is conducted in the 8th week of classes, and the second in the 15th week. Partial exams and colloquia are taken in written form. The minimum number of points required to pass the theoretical part is 18.5 points (maximum 35), and for the practical part 6 points (maximum 10) for each partial exam/colloquium. Continuous participation in lectures and exercises allows students to earn a maximum of 5 points (minimum 3) for theoretical classes and 5 points (minimum 3) for practical exercises. When all grading criteria are summed, the maximum number of points is 100. To pass the course, a student must achieve a minimum of 54 cumulative points.
The final exam and retake exams cover the parts of the exam that were not passed during the mid-term assessments. All students have the right to take the final and retake exams. If a student is not satisfied with their grade, they may take an oral exam to improve it.

18. Assessment components:

10 (A) -95-100- outstanding performance without errors or with minor errors
9 (B) - 85-94-above the average, with some errors
8 (C) - 75-84- average, with noticeable errors
7 (D) - 65-74 generally good, but with significant shortcomings
6 (E) - 54-64- meets the minimum criteria
5 (F, FX) <54- does not meet the minimum criteria

19. Mandatory reading list:

1-Lieberman M, Marks AD, Smith C.Marksove osnove biohemije. Data Status
2. Srabović N, Dautović E, Smajlović A, Softić A.Ugljikohidrati i masti kao metabolička goriva u zdravlju i bolesti,Tuzla: Off-Set, 2025
3. Begić L i sar. Praktikum iz biohemije sa teoretskim osnovama. Tuzla,:PrintCom, 2004

20. Additional reading list:

Berg JM, Tymoczko JL, Stryer L. Biokemija. Zagreb: Školska knjiga, 2013

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: