The discipline designation	**Biochemistry**
Semester(s) in which the discipline is taught	5
Responsible teacher	Makhammadiyev Davron Muyassarovich, senior teacher Matmuratova Gulnoza Bakhtiyarovna, teacher
Language of education	Uzbek
Relation to the curriculum	elective
Study load (including contact hours, SRS)	Total workload: 120 h Contact hours: Lecture-30 h Laboratory-30 hours SRS- 60 h
ECTS	4
Prerequisites	General chemistry, Inorganic chemistry, Organic chemistry
The aims of the discipline	The aim of the discipline is to develop students' knowledge about the chemical composition, structure and functions of living organisms, the exchange of high-molecular compounds, as well as the role and importance of these intermediate metabolic products in general metabolism. **Learning outcomes** - reveal the biochemical mechanisms of the body's vital functions using the example of some high-molecular compounds and their metabolism; - consolidate theoretical knowledge acquired during laboratory work; -form an idea of molecular genetic mechanisms; - master basic biochemical research methods; - master the principles of modeling biochemical processes at the organismal, cellular and molecular levels; - to form a systematic approach to the problems of modern biochemistry with the possibility of further use of the acquired knowledge for the analysis and assessment of the state of the body of biological objects; - know and master biochemical terminology; - formulate scientific hypotheses when discussing literature and own data; - use the acquired knowledge to improve your health.
The content of the lesson	Content 1.Goals and objectives, methods, history of the biological chemistry course 2. Chemical composition and functions of proteins. 3.Structure, classification of proteins 4. Nucleic acids. Their chemical composition 5.Biological role and function of nucleic acids 6.Carbohydrates and their importance in a living organism. 7. Lipids: structure and function. 8. Enzymes, their structure. Mechanism of action of enzymes. 9.Properties of enzymes. Classification of enzymes 10. Biologically active compounds: classification of vitamins, their structure, and function 11. Hormones. Their classification and function 12. General idea of metabolism 13.Glycolysis. Krebs cycle 14. Anaerobic oxidation of carbohydrates, pentose phosphate cycle. Krebs cycle 15.Protein metabolism

Exam form	Written
Training and examination requirements	To successfully master the disciplines of Biochemistry, it is necessary to fully master the theoretical and methodological concepts of the subject, the ability to correctly present the results, the ability to independently observe objects and study the processes associated with the subject, draw the right conclusions, complete the task of current, intermediate forms of control, and pass the exam in writing. final control When drawing up IC questions, deviations from the content of the discipline program are not allowed. The bank of IC questions for each subject is discussed at the meeting and approved by the head of the department. When compiling IR tickets, the IR question bank is used; the number (3-5 questions) of questions in the ticket should be in a 50/50 ratio, depending on the content of classroom and independent learning. No later than 1 week before the start of the final control, tickets signed by the head of the department, enclosed in an envelope, are sealed by the dean's office and opened 5 minutes before the start of the exam in the presence of students. IR duration is 80 minutes. Answers to IR questions are recorded in notebooks with the seal of the dean's office. After completion of the IR work, the work is immediately encrypted by a representative of the dean's office, and the notebooks are handed over to the commission for verification. From the moment of completion of the IC, a period of 72 hours is allotted for checking and posting the results on the electronic platform. The teacher who taught the students in this subject is not involved in the process of conducting the exam and checking the students' answers. Student(s) who are dissatisfied with the IC results may submit a written or oral appeal within 24 hours of the publication of the IR results. Complaints submitted after 24 hours from the publication of the EC results will not be accepted.
References	1.P.Mirkhamidova, D.Babakhanova, G.Umarova, D.Kadirova. Biological chemistry. Publishing house Navruz. – Tashkent, 2018 2. P. Mirkhamidova, D. B. Babakhanova, G. I. Mukhamedov. "Biochemistry (Practical training) study guide. Trusted partner publisher. - Tashkent, 2021 3. Zikiryayev A., Mirhamidova P. "Biochemistry". - T.: "Boston of Thought", 2013 4. M.N. Valiksonov, S.N. Dolimova, G.B. Umarova, P. Mirkhamidova "Biological chemistry and Molecular Biology" (Molecular biology part 2). - T.; "Navroz" 2016. 5. Mirkhamidova P, Bobokhonova D, Zikiryaev A. Biological chemistry and molecular biology (part 1). - Tashkent, Nowruz. 2018 6. Lehninger. "Fundamentals of Biochemistry." – M.: "Mir", 2015. 1.2.3 – vol. 7.David Klark, Nanette, Pasdernik, Michelle Megchee – Molecular biology, Trird Edition, Academic Cell. – USA: 2018. pp 1006. 8. B. Alberts, D. Bray, K. Hopkin, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter. Fundamentals of molecular cell biology. – M.: "Knowledge Laboratory", 2018 9. Mirkhamidova P., Shakhmurova G.A., Tuychieva D.Kh., Makhmudova K.Kh. Molecular biology. Laboratory workshop. – Tashkent, 2023.
Scope of assessment criteria and procedure	**CURRENT CONTROL** **Purpose:** Determining and assessing the student's level of knowledge, practical skills, and competencies on course topics. **Instructions:** The student's activity in daily classes is assessed through the student's mastery of course topics, as well as constructively interpreting and

	analyzing the educational material, developing module-specific skills, acquiring practical skills (in terms of quality and the specified number) and competencies, solving problem situations aimed at applying professional practical skills, working in a team, preparing presentations, etc. **Current control form:** Activity in lessons Preparing educational materials Working with sources within the subject Using educational technologies Working in a team Preparing presentations Working with projects **INTERMEDIATE CONTROL** **Purpose:** Assessing the student's knowledge and practical skills and level of mastery of lecture material after completing the relevant section of the course. **Form and procedure of intermediate control:** Midterm examination is held during the semester during the training sessions after the completion of the relevant module of the curriculum of the subject. Midterm examination is held once in written form within the framework of this subject. Midterm examination questions cover all topics of the subject. **Independent learning:** **Purpose:** Independent learning is aimed at fully covering the content of this course, expanding the theoretical knowledge acquired, and establishing independent learning activities for students. **Form and procedure of independent education:** ndependent work assignments are completed in the form of an educational project, presentation, case study, problem solving, information search, digest, colloquium, essay, article, abstract, etc. Completed assignments for independent study are placed in the electronic system and checked based on the anti-plagiarism program and evaluated by the subject teacher. In this case, the uniqueness of the completed assignment should not be less than 60%, otherwise the assignment will not be accepted for assessment. The number of independent work assignments, depending on the nature of the subject, should not be less than 3 for one subject (module). Independent work assignments account for 60% of the points allocated for current and intermediate control. Independent learning task 1: Preparation of project work based on independent learning topics Independent learning task 2: Preparing sample video lessons based on specialized subject topics. Independent learning task 3: Preparation of open lesson plans in specialized subjects using interactive methods. Independent learning task 4: Analysis of educational normative documents for specialized subjects and preparation of presentations. **FINAL CONTROL** **Purpose:** The final examination is held at the end of the semester to determine the level of mastery of the student's theoretical knowledge and practical skills in the relevant subject. The final examination is held at a specified time according to the examination schedule created by the Registrar's Office on the electronic platform. **Requirements:** The student must have passed the current control,

intermediate control and independent learning assignments by the deadline for the final control type in the relevant subject.

A student who has not passed the current control, intermediate control and independent learning assignments, as well as who has received a score in the range of "0-29.9" for these assignments and control types, is not included in the final control type.

Also, a student who has missed 25 percent or more of the classroom hours allocated to a subject without a reason is excluded from this subject and is not included in the final control type and is considered not to have mastered the relevant credits in this subject.

A student who has not passed or was not included in the final control type and has received a score in the range of "0-29.9" for this type of control is considered to be an academic debtor.

Final control form: The final examination in this subject will be conducted in written form.

If the final examination is conducted in written form, the requirements for assessment must also be reflected.

Criteria for assessing student knowledge

5 stars	**100 points**		**Evaluation criteria**
5	90-100	Excel lent	When a student is considered to be able to make independent conclusions and decisions, think creatively, observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject (subject), and have an idea about the subject (subject)
4	70-89,9	Good	When the student is considered to be able to observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject (subject), and has an idea about the subject (subject)
3	60-69,9	Satisfactory	When the student is found to be able to apply the knowledge he has gained in practice, understands, knows, can express, and narrate the essence of the subject (subject), and has an idea about the subject (subject)
2	0-59,9	Unsatisfactory	When it is determined that the student has not mastered the science program, does not understand the essence of the science (subject), and does not have an idea about the science (subject)

Course evaluation criteria and procedure

Control type	**Total points allocated**	**Control (task) form**	**Distribution of points**	**Qualifying score**
Current control	30 points	System tasks	20 points (divided by the number of tasks)	18 points

			Student activity (in seminars, practical, laboratory classes)	10 points	
	Intermediate control	20 points	Supervision: Written work	10 points	12 points
			System tasks	10 points (divided by the number of tasks)	
	Final inspection	50 points	Written assignment (5 questions)	50 points (10 points per question)	30 points
	** **Note:** 60% of the points allocated for current and intermediate control are allocated to independent work assignments. Independent work assignments are evaluated as system assignments through the electronic platform.*				