APPROVED
Head of the Department
of Pharmaceutical Technology with a
Course in Biotechnology – Basic
Department "Ozone Pharmaceutics",
Professor
_____ A.V. Kurkina
29 August 2026

TOPIC LECTURE PLAN
IN BIOTECHNOLOGY
FOR 5TH-YEAR STUDENTS IN THE 9TH SEMESTER 2026 - 2027 acad. yr.

No.	Lecture topic
1.	Modern biotechnology as a science and field of production.
2.	Bioobjects as a means of producing medicinal, prophylactic, and diagnostic agents.
3.	Genetic and cellular engineering as applied to microbial, plant, and animal cells. Improvement of bioobjects by methods of cell and genetic engineering.
4.	Recombinant proteins and polypeptides. Peptide growth factors. Interferons, erythropoietin. Species specificity.
5.	Engineering enzymology. Methods of enzyme immobilization. Carriers. Immobilization of microorganism and plant cells.
6.	Components of the biotechnological process. Structure of biotechnological production of medicinal products. Technological parameters of biosynthesis.
7.	Molecular mechanisms regulating the biosynthesis of primary and secondary metabolites used as medicinal agents. Process control.
8.	Plant and animal cell and tissue cultures. Callus and suspension cultures of medicinal plants.
9.	Use of plant meristematic tissue in biotechnology. Conditions and factors affecting the process of cultivation of plant cells and tissues. Microclonal propagation of plants. Technique for obtaining plant cell cultures in vitro.
10.	Biotechnological methods for obtaining phytosubstances.
11.	Methods of animal cell cultivation. Embryonic and other cells for obtaining viral preparations. Interferons. Transgenic animals. Immunomodulators.
12.	Genomics, proteomics, and bionics. Their importance for the search for new medicinal agents.

Head of Academic Affairs, Associate Professor Klimova L.D.
29.08.2026

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TOPIC PLAN
PRACTICAL CLASSES
IN THE COURSE OF BIOTECHNOLOGY
FOR 5TH-YEAR STUDENTS OF THE 9TH SEMESTER, 2026 – 2027 academic year

No.	Number of hours	Date	Class topic
1.	6	01.09-06.09.26	Stages of biotechnology development. Branches of biotechnology. Priority areas. Interrelationship with fundamental disciplines. Basic terminology.
2.	6	07.09-13.09.26	Bioobjects as means of production of medicinal, prophylactic, and diagnostic preparations. Screening of antibiotic producers from soil microorganisms.
3.	6	14.09-20.09.26	Immobilization of cells and enzymes. Conditions required for the operation of bioobjects in biotechnological production processes.
4.	6	21.09-27.09.26	Types of bioreactors. Equipment design of biotechnological processes. Test No. 1.
5.	6	28.09-04.10.26	Features of cultivation of the microalga Spirulina platensis. The effect of various factors on its growth and development.
6.	6	05.10-11.10.26	Use of meristematic plant tissue in biotechnology. Callus and suspension plant cultures in biotechnology.
7.	6	12.10-18.10.26	Microclonal propagation of plants. Defense of reports.
8.	6	19.10-25.10.26	Technology for isolating stem cells from umbilical cord blood. Use of blood components in the technology of medicinal products. Test No. 2.

Head of Academic Affairs, Associate Professor
29.08.2026 Klimova L.D.