

LESSON PLAN

Session: 2025-2026

Class: BSc I Biotechnology

Nomenclature of the paper: Introduction of Biotechnology

Name of the faculty: Ms. Reetu Kamboj

Paper code: B23-BTY-101

Month	Week	Topics to be covered
July	22.07.25-26.07.25	Introduction of biotechnology paper
	28.07.25-31.07.25	Interdisciplinary pursuit, main areas of application of biotechnology, Introduction of genetic engineering.
August	01.08.25- 02.08.25	Biotechnology research in India & Developing world, Genes and genomes.
	04.08.25-08.08.25	Public perception of biotechnological products, proteins and proteome.
	11.08.25-14.08.25	Safety Guidelines & risk assessment in biotechnology, Revision of basic steps of genetic engineering. Assignment-1.
	18.08.25-23.08.25	Intellectual property rights, History of genetic manipulation. Class test-1
	25.08.25-30.08.25	Substrates & future of biotechnology. Class test -2
September	01.09.25-06.09.25	Scope & techniques of preservation, Fermentation technology. Genetic manipulation topic completed Assignment -2
	08.09.25-13.09.25	Animal tissue culture (history, culture media, surfaces, culture procedures), Dna fingerprinting.
	15.09.25-20.09.25	Cell lines, Organ culture and tissue engineering, Forensic analysis. Class Test-3
	22.09.25-30.09.25	Plant tissue culture, (history, culture media, explant) Class test-4
October	01.10.25-04.10.25	Scope & Application of Animal & plant biotechnology, Brief account of Immune technology, Industrial Genetics.
	06.10.25-11.10.25	Hybridoma Technology and Monoclonal antibodies, Biohazards of genetic engineering. Sessional exam.
	13.10.25-15.10.25	Invitro fertilization and Embryo transfer technology, Molecular markers, Genetic mapping. Biological control of Environment, bioremediation and waste treatment.
	20.10.25-25.10.25	Diwali Vacation
	27.10.25-31.10.25	Introduction of enzyme technology. Microbial insecticides, Biofertilizers,
November	03.11.25-08.11.25	oil recovery & bioleaching. Class Test - 5 Applications of Biotechnology. Class Test -6
	10.11.25- 15.11.25	Revision

LESSON PLAN

Session:2025-2026

Class: BSc I Biotech. Minor

Nomenclature of the paper: Laboratory Techniques and Practices

Name of the faculty: Ms. Reetu Kamboj

Paper code: B23-BTY -103

Month	Week	Topics to be covered
July	22.07.25-26.07.25	Laboratory rules and Safety Measures
	28.07.25-31.07.25	Common use equipment - Laminar air flow, Centrifuge, Sterilization techniques.
August	01.08.25- 02.08.25	pH meter, Incubator, Fermenter, Dry and Wet sterilization.
	04.08.25-08.08.25	Colony counter, autoclave, inoculating loop, needle, preferred method of sterilization for different materials.
	11.08.25-14.08.25	Microscope, colorimeter & spectrophotometer, biological indicators. Class test -1
	18.08.25-23.08.25	Qualitative estimation of sugars. Class test- 2
	25.08.25-30.08.25	Qualitative estimation of Sugars, checking the efficiency of sterilization process.
September	01.09.25-06.09.25	Qualitative and Quantitative estimation of Proteins.
	08.09.25-13.09.25	Determination of various metabolites, Class test -3
	15.09.25-20.09.25	Preparation of Standard curve buffers, Evaluation of different disinfectants.
	22.09.25-30.09.25	Preparation of normal, molar, Percent solution. Class test-4.
October	01.10.25-04-10.25	Thin layer& paper Chromatography, Evaluation of Different Antiseptics.
	06.10.25-11.10.25	Two-dimensional chromatography, Sessional exam.
	13.10.25-15.10.25	Paper electrophoresis, preparation of cotton plugs under microbiology.
Vacations	20.10.25-25.10.25	Diwali Vacations
	27.10.25-31.10.25	Types of culture Media, Animal and Plant cell culture Media.
November	03.11.25-08.11.25	Preparation of Dilutions. Picking of Technique.
	10.11.25- 15.11.25	Revision of syllabus.

LESSON PLAN

Session: 2025-2026

Class: BSc II Biotechnology

Paper Name: Cell Biology

Paper code: B23-BTY-301

Name of the faculty: Ms. Reetu Kamboj

Month	Week	Topics to be covered
July	21.07.25-26.07.25	Discovery of cell and Cell Theory; Comparison between plant and animal cells; Structure and function of Protoplasm
	28.07.25-31.07.25	Cell wall, Plasma membrane, Modification of plasma membrane and intracellular junctions,
August	01.08.25- 02.08.25	Cytoskeleton, Mitochondria, Chloroplast, ER, Golgi complex.
	04.08.25-08.08.25	Short question answer test Structure and function of Lysosome, endosome and microbodies, Ribosome, Centriole, Nucleus
	11.08.25-14.08.25	Test Quiz on one-word short questions.
	18.08.25-23.08.25	Chromosomes, Chemical components of a cell, Catalysis and use of energy by cells.
	25.08.25-30.08.25	Biogenesis of Cellular organelles – Biogenesis of mitochondria, chloroplast,
September	01.09.25-06.09.25	Test ER, Golgi complex
	15.09.25-20.09.25	Biosynthetic process in ER and Golgi apparatus,
	08.09.25-13.09.25	Protein synthesis and folding in the cytoplasm, Degradation of cellular components. Structure and function of Prokaryotic cell and its components - The Slime and the cell wall of bacteria containing peptidoglycan and related molecules;
	22.09.25-30.09.25	the outer membrane of Gram-negative bacteria, the cytoplasmic membrane. Test
	01.10.25-04-10.25	Water and ion transport, mesosomes, flagella, Pilus,

October		fimbriae, ribosomes, carboximes, sulphur granules, glycogen, polyphosphate bodies, fat bodies, gas vesicles; endospores, exospores, cysts.
	06.10.25-11.10.25	Sessional Test Mycelia of fungi and Actinomycetes, Cytoskeleton filament, heterocyst's and akinetes of Cyanobacteria, Gliding and motility
	13.10.25-15.10.25	Models of membrane structure, Membrane lipids, proteins and carbohydrates Solute transport by Simple diffusion
Vacations	20.10.25-25.10.25	Diwali Vacations
	27.10.25-31.10.25	Facilitated diffusion and Active transport
November	03.11.25-08.11.25	Cell- cycle - An overview of cell cycle, Components of cell cycle control system, Intracellular and Extra-cellular control of cell division, Programmed cell death (Apoptosis)
	10.11.25- 15.11.25	Revision of syllabus.

LESSON PLAN

Session: 2025-2026

Class: BSc. III Biotechnology

Nomenclature of the paper: Immunology

Paper code: B23-BTY-501

Name of the faculty: Ms. Reetu Kamboj

Month	Week	Topics to be covered
July	22.07.25-26.07.25	History and Scope. Terminology of immune system
	28.07.25-31.07.25	Definition, types of Immunity- Innate, Adaptive/acquired (active, passive, natural/artificial.
August	01.08.25- 02.08.25	Humoral and Cell mediated immunity, Recognition of self and non-self.
	04.08.25-08.08.25	Cells of the Immune System – B and T cells
	11.08.25-14.08.25	Null cells, Monocytes, Polymorphs. Assignment.
	18.08.25-23.08.25	Organs of the Immune System Class test-1.
	25.08.25-30.08.25	Primary Lymphoid organs.
September	01.09.25-06.09.25	Secondary Lymphoid organs.
	08.09.25-13.09.25	Antigen – Antibodies.
	15.09.25-20.09.25	Antigen – Antibody Interactions. RIA, ELISA etc. techniques. Class test-2
	22.09.25-30.09.25	Immune Response: Introduction, Humoral Immunity – Primary and Secondary immune response – B cells in antibody formation.
October	01.10.25-04-10.25	Role of MHC molecules, Antigen presenting cells. Complement system. Sessional exam.
	06.10.25-11.10.25	Major Histocompatibility Complex- Class I and Class II MHC molecules.
	13.10.25-15.10.25	Hypersensitivity and allergic reactions, Autoimmunity
Vacations	20.10.25-25.10.25	Diwali Vacations
	27.10.25-31.10.25	immunological tolerance.
November	03.11.25-08.11.25	Vaccines: concept, types of vaccines- Inactivated, Attenuated and Recombinant vaccines
	10.11.25- 15.11.25	Revision

LESSON PLAN

Session: 2025-2026

Class: BSc II Biotechnology (Minor)

Nomenclature of the paper: Animal Tissue Culture

Paper code: B23-BTY-304

Name of the faculty: Ms. Reetu Kamboj

Month	Week	Topics to be covered
July	22.07.25-26.07.25	Introduction to Animal Cell Culture: -Historical development and milestones in cell culture; Basics of cell biology relevant to culture
	28.07.25-31.07.25	Laboratory setup and biosafety in cell culture; Culture media: Composition, types, and preparation.
August	01.08.25- 02.08.25	Techniques and Maintenance of Cell Cultures: - Aseptic techniques and sterilization
	04.08.25-08.08.25	Subculturing, cryopreservation, and thawing of cells. Assignment-1.
	11.08.25-14.08.25	Cell viability, growth kinetics, and characterization;
	18.08.25-23.08.25	Contamination: Sources, detection, and prevention;
	25.08.25-30.08.25	Serum and serum-free culture systems. Types of cell cultures: Primary, Secondary, and Continuous cell lines;
September	01.09.25-06.09.25	Specialized Cell Culture Techniques: - Stem cell culture (ESCs, iPSCs, MSCs) Class test-1
	08.09.25-13.09.25	3D culture and organoid technology (introductory);
	15.09.25-20.09.25	Co-culture and suspension culture techniques;
	22.09.25-30.09.25	Scaling up cell culture: Bioreactors and perfusion systems
October	01.10.25-04.10.25	Cytotoxicity and cell-based assays.
	06.10.25-11.10.25	Applications and Ethical Aspects, Applications in vaccine production
	13.10.25-15.10.25	Applications in vaccine production, toxicology, recombinant protein expression; Revision of syllabus.
Vacations	20.10.25-25.10.25	Diwali Vacations
	27.10.25-31.10.25	Animal biotechnology: Embryo culture, cloning, and gene editing;
November	03.11.25-08.11.25	Cell culture in cancer research and regenerative medicine; Ethical concerns and regulatory aspects in animal cell culture.
	10.11.25- 15.11.25	Revision of syllabus.