ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

ACADEMIC YEAR 2024-25

DEPARTMENT: BIOTECHNOLOGY

SUBJECT: BIOTECHNOLOGY **CLASS: II SEM (SEP)**

PAPER 2: MICROBIOLOGICAL METHODS

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
March 2025	1	1	Syllabus. Introduction to microbiological Methods.	BMA
		2	**Unit 3**: Microbiological techniques: Introduction & concepts.	GK
		3	**Unit 1:** Principles of Microscopy: Light microscope.	BMA
		4	Principles of Microscopy: Compound microscope.	BMA
	2	1	Principles of Microscopy: Dark field microscope.	BMA
		2	Principles of Microscopy: Phase contrast microscope.	BMA
		3	Principles of Microscopy: Fluorescence & Confocal microscope.	BMA
	3	1	Principles of Microscopy: Electron microscopes – TEM & SEM	BMA
		2	Microbiological techniques: Culture media – Introduction & concepts.	GK
		3	Analytical techniques: Working principles & applications of centrifuge & ultracentrifuge.	BMA
		4	Working principles applications of spectrophotometer.	BMA
	4	1	. Working principles applications of Chromatography- Paper & TLC.	BMA
		2	Culture media –Components of natural media.	GK
		3	**Unit 2:** Sterilization techniques: Definition of terms sterilization, disinfectant, antiseptic, etc..	BMA
		4	Definition of terms microbicidal, microbiostatic and antimicrobial agents.	BMA
April 2025	1	1	Physical methods of sterilization: Moist heat sterilization methods.	BMA
		2	Culture media –Components of Synthetic media.	GK

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
April 2025		3	Physical methods of sterilization: Dry heat sterilization methods.	BMA
		4	Physical methods of sterilization: Filtration & radiation methods.	BMA
	2	1	IA TEST	
		2		
		3		
		4		
	3	1	Chemical methods of sterilization: Alcohols, aldehydes, phenols, halogen, etc.	BMA
		2	Culture media – Complex, selective, differential and enriched media.	GK
		3	Quaternary compounds & sterilizing gases as antimicrobial agents.	BMA
		4	Unit 4: Modes of action of antimicrobial agents: Antifungal agents.	BMA
	4	1	Unit 4: Antiviral agents.	BMA
		2	Unit 3.2: Pure culture methods: Introduction. Serial dilution method.	GK
		3	Unit 4: Antibacterial agents.	BMA
		4	Unit 4: Challenges in antimicrobial therapy.	BMA
May 2025	1	1	Assessment of antibacterial activity.	BMA
		2	Pure culture methods: Plating techniques.	GK
		3	Assessment of antibacterial activity –contd.	BMA
		4	Assessment of antifungal activity.	BMA
	2	1	Assessment of antifungal activity: contd.	BMA
		2	Cultivation of anaerobic bacteria.	GK
		3	Assessment of antiviral activity.	BMA
		4	Assessment of antiviral activity: contd.	BMA
	3	1	Assessment of antiviral activity: contd.	BMA
		2	Unit 3.3: Stains and staining techniques: Principles of staining.	GK
		3	Assessment of antiviral activity: complete.	BMA

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
		4	Revision.	BMA
	4	1	Unit 3.3: Types of stains- simple stains, structural stains & differential stains.	GK
		2	Revision.	GK
		3	Revision.	BMA
		4	Discussion of Question bank	BMA

SUBJECT: BIOTECHNOLOGY **CLASS: IV SEM (NEP)**

PAPER 4: MOLECULAR BIOLOGY

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
March 2025	1	1	Syllabus. Introduction to Molecular biology.	BMA
		2	Unit 1: Experimental proof of DNA as genetic material.	BMA
		3	Unit 3: Transcription - introduction	GK
		4	Unit 3: Transcription – Central Dogma	GK
	2	1	Unit 1: Experimental proof of RNA as genetic material.	BMA
		2	Unit 3: Transcription – RNA & types	GK
	3	1	Unit 1: Nucleic acids – Introduction to DNA and RNA	BMA
		2	Unit 1: Structure of DNA – Watson & Crick model.	BMA
		3	Unit 3: Transcription in prokaryotes – RNA polymerase.	GK
		4	Unit 3: Transcription in prokaryotes – Role of promoters	GK
	4	1	Unit 1: Structure of DNA – Forms & functions of DNA.	BMA
		2	Unit 1: Structure of RNA.	BMA
		3	Unit 3: Transcription in prokaryotes – mechanism- initiation & elongation.	GK
		4	Unit 3: Transcription in prokaryotes – mechanism- termination of RNA chain.	GK
April 2025	1	1	Unit 1: Functions of RNA & ribozymes.	BMA
		2	Unit 2: DNA Replication & repair – introduction.	BMA
		3	Unit 3: Transcription in Eukaryotes –RNA polymerases.	GK
		4	Unit 3: Transcription in Eukaryotes –RNA polymerases, promoters, enhancers & factors.	GK
	2			

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
April 2025			IA TEST	
	3	1	Unit 2: DNA Replication in Prokaryotes- Enzymes & Proteins involved.	BMA
		2	Unit 2: DNA Replication in Prokaryotes- Theta model.	BMA
		3	Unit 3: Transcription in Eukaryotes – mechanism.	GK
		4	Unit 3: Transcription in Eukaryotes –Post transcriptional modifications of mRNA.	GK
	4	1	Unit 2: DNA Replication in Prokaryotes- Linear and rolling circle model.	BMA
		2	Unit 2: DNA Replication in Eukaryotes- DNA polymerases.	BMA
		3	Unit 3: Transcription in Eukaryotes –Post transcriptional modifications of tRNA & rRNA.	GK
		4	Unit 4: Translation: Genetic Code & its characteristics.	GK
May 2025	1	1	Unit 2: DNA Replication in Eukaryotes- Replication complex.	BMA
		2	Unit 2: DNA Replication in Eukaryotes- Replication complex –contd.	BMA
		3	Unit 4: Genetic Code – wobble hypothesis	GK
		4	Unit 4: Translation in prokaryotes & eukaryotes: Ribosomes, enzymes & factors involved.	GK
	2	1	Unit 2: Unique aspects of eukaryotic DNA replication.	BMA
		2	Unit 2: Fidelity of replication.	BMA
		3	Unit 4: Mechanism of Translation: aa activation and aminoacyl tRNA synthesis.	GK
		4	Unit 4: Mechanism of translation: initiation, elongation & termination of polypeptide chain.	GK
	3	1	Unit 2: DNA damage – causes.	BMA
	3	2	Unit 2: DNA repair – photo reactivation.	BMA

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
		3	Unit 4: Fidelity of translation & inhibitors of translation.	GK
		4	Unit 4: Post translational modification of proteins.	GK
	4	1	Unit 2: DNA repair – Excision repair	BMA
		2	Unit 2: DNA repair- mismatch repair & SOS repair.	BMA
		3	Unit 4: Operon concept: Lac Operon & Trp Operon.	GK
		4	Discussion of Question bank.	GK

SUBJECT: BIOTECHNOLOGY **CLASS: VI SEM (NEP)**

PAPER 7: IMMUNOLOGY

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
March 2025	1	1	Syllabus and Introduction & history.	GK
		2	**Unit 1: Cells and organs of Immune system:** Introduction to immune system.	GK
		3	Types of immunity: First and second line of defense.	GK
		4	Innate and acquired/adaptive immunity. Specificity and diversity.	GK
	2	1	Cells of immune system: B & T lymphocytes, APCs, plasma cells, etc..	GK
		2	Role of B & T lymphocytes in humoral and cell mediated immunity.	GK
		3	Role of B & T lymphocytes in Primary & secondary immune response. Immunization and memory.	GK
	3	1	Organs of immune system: Thymus and bone marrow.	GK
		2	Organs of immune system: Spleen and lymph nodes.	GK
		3	Organs of immune system: Peripheral lymphoid organs.	GK
		4	**Unit 2: Molecules of Imune system:** Antigens – properties.	GK
	4	1	Haptens, adjuvants. Antigenicity & immunogenicity. Affinity and avidity.	GK
		2	B and T cell epitopes. Super antigens.	GK
		3	Immunoglobulins: Classification, structure & function.	GK
		4	Antibody diversity. Monoclonal & polyclonal antibodies.	GK
April 2025	1	1	Major histocompatibility complexes: Classification, structure & function.	GK
		2	Major histocompatibility complexes: Classification, structure & function-contd.	GK
		3	Antigen processing pathways – cytosolic & endocytic.	GK
		4	Complement pathways.	GK
	2			

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
April 2025			IA TEST	
	3	1	Cytokines: classification & function.	GK
		2	Hypersensitivity: Type I, II & III.	GK
		3	Delayed hypersensitivity response.	GK
		4	**Unit 3: Immunotechniques & vaccines**: Antigen-antibody reactions-introduction.	GK
	4	1	Precipitation & agglutination.	GK
		2	Immunodiffusion reactions-RID, ODD.	GK
		3	Immunoelectrophoresis- ELISA, RIA	GK
		4	Immunocytochemistry & Fluorescent techniques.	GK
May 2025	1	1	Vaccines: Conventional, peptide & subunit vaccines.	GK
		2	DNA vaccines, Toxoids and antisera.	GK
		3	Edible vaccines, plantibodies & cancer vaccines.	GK
		4	**P-8, Unit 2**: Airlift fermenter & Tower fermenter.	GK
	2	1	**Unit 4:** Transplantation immunology: introduction. Graft.	GK
		2	Phases in graft rejection & immuno-suppressors.	GK
		3	Autoimmune disorders.	GK
		4	**P-8, Unit 2**: Fluidized bed & Packed bed bioreactors.	GK
	3 3	1	Immunodeficiemcies: Primary & secondary.	GK
		2	AIDS.	GK
		3	Cancer & Immune system.	GK
		4	Revision	GK

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
	4	1	Microbial diseases in humans: Hepatitis-B & Typhoid.	GK
		2	Aspergillosis & Maleria.	GK
		3	Revision	GK
		4	Revision & Discussion of Question bank.	GK

SUBJECT: BIOTECHNOLOGY **CLASS: VI SEM (NEP)**

PAPER 8: Bioprocess and Environmental Biotechnology

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
March 2025	1	1	Syllabus and Introduction & history.	BMA
		2	**Unit 3: Fundamentals of Environmental biotechnology:** Introduction.	BMA
		3	Principles of environmental science.	BMA
		4	**Unit 1:Introduction to bioprocess technology:** Introduction & history.	GK
	2	1	Role of biotechnology in environmental conservation.	BMA
		2	Microbial processes in environmental biotechnology.	BMA
		3	**Unit 1**: Basic principles and components of fermentation technology	GK
	3	1	Pollution and Biotechnology.	BMA
		2	Major issues in environmental pollution & the role of biotechnology in addressing them.	BMA
		3	Microbial methods for assessing pollution levels.	BMA
		4	**Unit 1**: Isolation of industrially important microorganisms.	GK
	4	1	Use of biosensors in pollution monitoring.	BMA
		2	Biotechnological methods in pollution abatement – reduction of CO2 emission.	BMA
		3	Addressing eutrophication through biotechnological intervention.	BMA
		4	**Unit 1**: Strain improvement of industrially important microorganisms.	GK
April 2025	1	1	**Unit 4: Bioremediation & Waste management:** Introduction.	BMA
		2	Importance of bioremediation in environmental cleanup.	BMA
		3	Types of contaminants suitable for bioremediation.	BMA
		4	**Unit 1**: Types of microbial culture – batch, fed-batch & continuous culture.	GK

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
April 2025	2		IA TEST	
	3	1	Microorganisms used in bioremediation.	BMA
		2	In-situ bioremediation methods-bioaugmentation.	BMA
		3	In-situ bioremediation methods-biostimulation.	BMA
		4	**Unit 1**: Principles of upstream processing.	GK
	4	1	In-situ bioremediation methods-bioventing & phytoremediation.	BMA
		2	Ex-situ bioremediation methods-composting & land farming.	BMA
		3	Xenobiotics & bioleaching.	BMA
		4	**Unit 2**: Bioreactors –STBR – design & functions.	GK
May 2025	1	1	Waste water characterisation & composition.	BMA
		2	Biological processes in waste water treatment.	BMA
		3	Activated sludge method.	BMA
		4	Membrane & tubular bioreactors.	GK
	2	1	Biological nutrient removal.	BMA
		2	Anaerobic digestion.	BMA
		3	Downstream processing- Cell disruption.	GK
		4	Extraction of product:- solid-liquid separation.	GK
	3 3	1	Revision	BMA
		2	Revision	BMA
		3	Revision	GK
		4	Revision	GK
		1	Revision	BMA

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
	4	2	Revision	BMA
		3	Revision	GK
		4	Revision & Discussion of Question bank.	GK