

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

ACADEMIC YEAR 2022-23

DEPARTMENT: BIOTECHNOLOGY

CLASS: I SEM (NEP)

SUBJECT: BIOTECHNOLOGY

PAPER: CELL BIOLOGY & GENETICS (NEP Core)

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
September 2022	3	1	Introduction to biotechnology: Definition and objectives.	GK
		2	Bridging the gap: Connecting PUC biology to degree biotechnology.	BMA
		3	Bridging the gap: Connecting PUC biology to degree biotechnology.	GK
		4	Bridging the gap: Connecting PUC biology to degree biotechnology.	GK
	4	1	Bridging the gap: Connecting PUC biology to degree biotechnology.	GK
		2	Introduction of the syllabus.	BMA
		3	Unit 1: Cell biology: Introduction.	BMA
		4	Unit 3: Genetics: Introduction, Mendel and his works.	GK
October 2022	2	1	Unit 3: Genetics: Principle of Dominance.	GK
		2	Unit 1: Cell biology: Discovery of cell.	BMA
		3	Unit 1: Cell biology: Cell theory.	BMA
		4	Unit 3: Genetics: Laws of inheritance- Law of Segregation, Incomplete dominance and co-dominance.	GK
	3	1	Unit 3: Law of independent assortment. Back cross & Test cross with examples.	GK
		2	Unit 1: Cell biology: Ultrastructure of eukaryotic cell- Plant & Animal cell	BMA
		3	Unit 1: Cell biology: Structural organization of plasma membrane.	BMA
		4	Unit 3: Gene interaction: Supplementary factors - comb pattern in fowls.	GK
	4	1	Unit 1: Cell biology: Structural organization of plasma membrane.	BMA
		2	Unit 3: Complementary genes-sweetpeas	GK

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY	
November 2022	1	1	Unit 3: Gene interaction: Multiple alleles- blood groups in man, multiple factors- skin colour in man.	GK	
		2	Unit 3: Gene interaction: Epistasis- plumage colour in poultry. Solving problems.	GK	
		3	Unit 1: Cell biology: Structural organization of plasma membrane-complete.	BMA	
		4	Unit 1: Functions of plasma membrane	BMA	
	2	1	Unit 3: Maternal inheritance: Kappa particle in <i>Paramecium</i>	GK	
		2	Unit 3: Maternal inheritance: Plastid inheritance in <i>Mirabilis</i> & Petite characters in yeast.	GK	
		3	Unit 2: Cell organelles: Structure and functions of Mitochondria	BMA	
		4	Unit 1: Structure and functions of endoplasmic reticulum.	BMA	
	3	1	Unit 3: Sex-linked inheritance.	GK	
		2	Unit 3: Chromosomal theory of inheritance	GK	
		3	Unit 1: Structure & functions of Golgi complex, peroxisomes & vacuole.	BMA	
		4	Unit 1: Structure & functions of Chloroplast.	BMA	
	4	1	Unit 4: Linkage: general introduction. Coupling & repulsion hypothesis.	GK	
		2	Unit 4: Linkage in Maize.	GK	
		3	Unit 1: Structure & functions of Cytosol, ribosomes and lysosome.	BMA	
		4	Unit 1: Structure & functions of Nucleus, nucleolus and cytoskeleton structures.	BMA	
	5	1	Unit 4: Linkage in <i>Drosophila</i> .	GK	
	December 2022	1	1	Unit 4: Mechanism of crossing over & its importance.	GK
			2	Unit 2: Chromosomes: General introduction, discovery & morphology	BMA
			3	Unit 2: Structural organization of metaphase chromosome.	BMA

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY	
December 2022	2		IA TEST		
	3	1	Unit 4: Chromosome mapping.	GK	
		2	Unit 4: Structural and numerical chromosomal aberrations.	GK	
		3	Unit 2: chromosome: chemical composition & karyotype.	BMA	
		4	Unit 2: Ultrastructure of chromosome-hypothesis.	BMA	
	4	1	Unit4: Sex determination in plants and animals- XX-XY, XX-XO, ZW-ZZ, ZO-ZZ types.	GK	
		2	Unit4: Mutations: Introduction. Types of mutations- spontaneous mutation.	GK	
		3	Unit 2: Ultrastructure of chromosome-folded-fibre model.	BMA	
		4	Unit 2: Ultrastructure of chromosome-nucleosome model.	BMA	
	5	1	Unit 4: Mutations: Induced mutation. Physical & chemical mutagens.	GK	
		2	Unit4: Mutations in plants, animals & microbes and their merits & demerits.	GK	
		3	Unit 2: Salivary gland chromosome & Lampbrush chromosomes.	BMA	
		4	Unit2: Cell cycle: phases of cell cycle & checkpoints of cell cycle.	BMA	
	JANUARY 2023	1	1	Revision and clearing doubts.	GK
			2	Unit 2: Cell cycle- enzymes involved, achromatic apparatus & significance.	BMA
			3	Unit2: Senescence & programmed cell death.	BMA
			4	Discussion of Question bank.	GK

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

ACADEMIC YEAR 2022-23

DEPARTMENT: BIOTECHNOLOGY

CLASS: III SEM (NEP)

SUBJECT: BIOTECHNOLOGY

PAPER: Biomolecules (NEP Core)

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
November 2022	3	1	Syllabus: Introduction. Definition and introduction of biochemistry	GK
		2	Unit 1 a) Carbohydrates: Introduction and Definition.	BMA
		3	Unit 1b) Aminoacids and proteins: Introduction and definition of amino acids.	GK
		4	Aminoacids: General formula and features.	GK
	4	1	Classification of carbohydrates	BMA
		2	Properties of carbohydrates.	BMA
		3	Amino acids: Names, three letter and single letter symbols.	GK
		4	Classification of Amino acids.	GK
December 2022	1	1	Structure of carbohydrates.	BMA
		2	Structure of carbohydrates- completed.	BMA
		3	Structure of Amino acids.	GK
		4	Properties of Amino acids.	GK
	2	1	Monosaccharides – Isomerism and ring structure. Fructose.	BMA
		2	Oligosaccharides: Sucrose.	BMA
		3	Amino acids: Isoelectric point and pK values.	GK
		4	Proteins: Properties and Classification.	GK
	3	1	IA Test	
		2		
		3		

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
December 2022	4	1	Polysaccharides: Classification, Starch and glycogen.	BMA
		2	Polysaccharides: Cellulose and chitin.	BMA
		3	Structural organization of proteins – primary structure.	GK
		4	Structural organization of proteins- secondary structure; alpha & beta sheet.	GK
January 2023	1	1	Polysaccharides: glycoproteins and peptidoglycans.	BMA
		2	Unit 2 b) Enzymes: Introduction, definition and nomenclature.	BMA
		3	Structural organization of proteins- secondary structure- complete.	GK
		4	Structural organization of proteins: tertiary and quaternary structure.	GK
	2	1	Unit 2 b) Enzymes: Enzyme kinetics.	BMA
		2	Factors influencing enzyme activity.	BMA
		3	Denaturation and renaturation of proteins.	GK
		4	Unit 3 a): Lipids: Introduction and classification.	GK
	3	1	Coenzymes and their functions. Metalloenzymes.	BMA
		2	Enzyme inhibition- types with example.	BMA
		3	Lipids: Properties- Saponification, iodine number and rancidity.	GK
		4	Lipids: Hydrogenation of fatty acids and oils.	GK
	4	1	Zymogens and Isozymes.	BMA
		2	Unit 4 a): Electrophoresis: Introduction. Principle, procedure and applications of Agarose gel electrophoresis.	BMA
		3	Saturated and unsaturated fatty acids.	GK
		4	General structure & Biological functions of phospho, sphingo and glycol lipids.	GK

MONTH/YEAR	WEEK	CLASS	PORTIONS	FACULTY
February 2023	1	1	Principle, procedure and applications of SDS-PAGE.	BMA
		2	Unit 4 b) UV Spectrometry	BMA
		3	General structure & Biological functions of lipoproteins, prostaglandins & cholesterol.	GK
		4	Unit 3 a) Vitamins: water soluble vitamins.	GK
	2	1	Visible spectrometry	BMA
		2	Mass spectroscopy	BMA
		3	Fat soluble vitamins.	GK
		4	Unit 3 b) Nucelic acids: structure of purines and pyrimidines. Nucleosides & nucleotides in DNA.	GK
	3	1	Atomic Spectroscopy	BMA
		2	Absorption spectroscopy	BMA
		3	Unit 3 c) Hormones: Introduction and classification based on chemical nature.	GK
		4	Structure & functions of Glucagon, Cortisone & Epinephrine.	GK
	4	1	Discussion of Question bank.	BMA
		2	Structure & functions of Testosterone & Estradiol.	GK
		3	Discussion of Question bank	GK
		4	Revision.	GK

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS**ACADEMIC YEAR 2022-23****DEPARTMENT: BIOTECHNOLOGY****CLASS: V SEM****SUBJECT: BIOTECHNOLOGY****PAPER: V – Environmental biotechnology & Immunotechnology****Faculty: Dr. GK**

MONTH/YEAR	WEEK	CLASS	PORTIONS
November 2022	3	1	Syllabus: Introduction.
		2	Unit 2.1 Immunology: Introduction, Definition & development.
		3	2.1: Organs of Immune system: Primary organs - Thymus , bone marrow & bursa of Fabricius.
	4	1	2.1: Organs of Immune system: secondary organs – Lymph nodes and Spleen.
		2	2.1: Organs of Immune system: secondary organs – Mucosa associated lymphoid tissue.
		3	Unit1: Environmental biotechnology: Introduction. 1.1 Renewable and non renewable sources of energy.
December 2022	1	1	2.1: Cells of Immune system: Development from stem cells.
		2	2.1: Cells of immune system- different types.
		3	1.1: Conventional fuels: fire wood and plant and their impact.
	2	1	2.1: Immunity: Types: Innate immunity
		2	2.1: Immunity: Acquired immunity.
		3	1.1: Conventional fuels: Coal & its impact.
	3		IA TEST
	4	1	2.1: Humoral & cell mediated immunity.
		2	2.1: 1.1: Modern fuels: And their environmental impact.
		3	1.1: Biogas & Microbial H ₂ production.

MONTH/YEAR	WEEK	CLASS	PORTIONS
January 2023	1	1	2.2: Antigens & their types, epitopes & haptens.
		2	2.2: Factors influencing antigenicity
		3	1.1: Conversion sugars to alcohol & gasohol.
	2	1	2.2: Antibodies: Types, properties & functions.
		2	2.2: Monoclonal antibody production.
		3	1.2: Biofertilizers: Introduction, N ₂ cycle.
	3	1	2.3: Antigen-antibody reactions: Precipitation, agglutination, ABO blood typing & Rh typing.
		2	2.3: Immuno electrophoresis: RIA, ELISA & SRID.
		3	1.2: Symbiotic & Non-symbiotic N ₂ fixing bacteria in enrichment of soil.
	4	1	2.3: Immuno electrophoresis: ODD, RIEP & immunofluorescent techniques.
		2	Unit 3.1: Complement system: Introduction, components, MHC types.
		3	1.2: Algal & fungal biofertilizers. Vermi composting.
February 2023	1	1	3.1: Complement system: Types, properties and functions.
		2	3.1: Hyper sensitivity: Introduction. Type I & II
		3	1.3: Bioremediation of lignin
	2	1	3.1: Hyper sensitivity: Type III , IV & V
		2	3.2: Organ transplantation: Introduction, types & grat rejection.
		3	1.3: Bioremediation of cellulose
	3	1	3.2: Immuno suppressors & auto immune diseases.
		2	3.3: Vaccine & Immunization: Active & passive immunization. Types of vaccines- inactive & attenuated.
		3	1.3: Treatment of municipal wastes.
	4	1	Recombinant vaccines & interferon.
		2	Treatment of industrial effluents.
		3	Discussion of Question bank.

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS**ACADEMIC YEAR 2022-23****DEPARTMENT: BIOTECHNOLOGY****CLASS: V SEM****SUBJECT: BIOTECHNOLOGY****PAPER: V - Plant and Animal biotechnology****Faculty: Mr. Bharath M A**

MONTH/YEAR	WEEK	CLASS	PORTIONS
November 2022	3	1	Syllabus: Introduction to Plant biotechnology.
		2	1.1: Invitro methods in plant tissue culture.
		3	1.1: Aseptic techniques.
	4	1	1.1: Nutrient media & use of plant growth regulators.
		2	2.1: Animal biotechnology: Introduction
		3	2.1: Animal biotechnology: Culture media-natural media.
December 2022	1	1	1.2: Micropropagation of elite species: selection of explants, sterilization & inoculation.
		2	1.2: Culture maintenance, transferring to shooting and rooting media.
		3	2.1: Importance of serum in media. Chemically defined media & examples.
	2	1	1.2: Cell suspension culture for production of safranin & capsaicin.
		2	1.3: Organ culture: Introduction Ovary culture.
		3	2.1: Growth factors.
	3		IA TEST
	4	1	1.3: Ovule & anther culture.
		2	1.3: Embryo & endosperm culture.
		3	2.2: Primary explantation techniques: Slide or coverslip culture.

MONTH/YEAR	WEEK	CLASS	PORTIONS
January 2023	1	1	1.3: Somatic embryogenesis: techniques & application.
		2	1.3: Somaclonal variations & their significance.
		3	2.2: Carrel flask & roller test tube culture.
	2	1	2.2: Primary cell culture: Isolation & disintegration of tissue- mechanical methods.
		2	2.2: Primary cell culture: Isolation & disintegration of tissue- enzymatic methods.
		3	2.2: Culture of cells: Monolayer culture.
	3	1	3.1: Protoplast culture: Isolation – mechanical methods.
		2	3.1: Protoplast culture: Isolation – enzymatic methods.
		3	2.2: Culture of cells: suspension culture & immobilized cell systems.
	4	1	3.1: Culturing & regeneration of protoplasts.
		2	3.1: Protoplast fusion methods. Selection of somatic hybrids & cybrids.
		3	2.3: Organ or Embryo culture: plasma clot, raft & grid methods.
February 2023	1	1	3.1: Cryopreservation of plant cultures.
		2	2.3: Whole embryo culture & its applications.
		3	2.3: Secondary culture.
	2	1	3.2: Edible vaccines from plants:
		2	3.2: Synthetic seed preparation & their applications.
		3	3.2: Applications of micropropagation in forestry.
	3	1	3.2: Invitro fertilization methods.
		2	3.2: Cloning of Dolly.
		3	3.3: Stem cells: characteristic features & types.
	4	1	3.3: Stem cell: Applications
		2	3.3: transgenic animals & their significance.
		3	Discussion of Question bank.