

NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER-I)

CLASS: BSC I YR (CBCS) SECTION: BIOTECHNOLOGY

COURSE/ PAPER: I (FUNDAMENTALS OF BIOTECHNOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: I	NO OF HOURS
Introduction to Biotechnology- History ,Nature, Scope and future prospectives	1
Cells as basic units of living organisms- Viruses, Bacteria, Fungi, Micro Algae, Plant and Animal cells	3
Ultra-Structure of prokaryotic cell (Cell membrane, Plasmids)	2
Ultra-structure of eukaryotic cell (Cell wall, Cell membrane, Mitochondria, Chloroplast, Endoplasmic reticulum, Golgi complex	4
Cell division and cell cycle	4
Significance of mitosis and meiosis	1

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COURSE/ PAPER: I (FUNDAMENTALS OF BIOTECHNOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: II

TOPICS TO BE COVERED	NO OF HOURS
Outlines of classification microorganisms-five kingdom classification	2
Growth requirements of bacteria, reproduction, growth curve, growth kinetics (Batch and Continuous)	4
Microbial techniques- media preparation, types of media(selective and differential media, enriched media, enrichment media, natural and synthetic media), sterilization, isolation of pure cultures, preservation (Bacteria)	6
Genetics of Bacteria and viruses – Transformation, Conjugation, Transduction	3

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COURSE/ PAPER: I (FUNDAMENTALS OF BIOTECHNOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: III

TOPICS TO BE COVERED	NO OF HOURS
DNA as the genetic material – Griffiths experiments on transformation in <i>Streptococcus pneumoniae</i> . Avery, McLeod and McCarty's experiments Hershey – Chase experiments with radio – labeled T2 bacteriophage	5
RNA as genetic material – Tobacco Mosaic Virus	1
Structure of DNA – Watson and Crick Model	2
Forms of DNA– A, B and Z forms of DNA, Super coiled and related DNA- Role of topoisomerases.	4
Types of RNA – mRNA, tRNA, rRNA	3

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CLASS: BSC I YR (CBCS) SECTION: BIOTECHNOLOGY

COURSE/ PAPER: I (FUNDAMENTALS OF BIOTECHNOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: IV

TOPICS TO BE COVERED	NO OF HOURS
Replication of DNA.	2
Modes of replication of DNA – Conservative, Semi conservative and Dispersive : Messelson and stahl experiment.	3
Models of DNA replication – Circular and linear DNA; Bi directional replication (leading and lagging strand synthesis).	2
Enzymes involved in DNA replication.	4
DNA damage and Repair mechanism.	4

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LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (SEMESTER-II)

CLASS: BSC I YR (CBCS) SECTION: BIOTECHNOLOGY

COURSE/ PAPER: II (FUNDAMENTALS OF BIOTECHNOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: I

TOPICS TO BE COVERED	NO OF HOURS
Mendel's experiments – factors contributing to Mendel's experiments	1
Genotype, Phenotype, Dominance, Recessiveness, Homozygote, Heterozygote	1
Test cross, Back cross and Reciprocal crosses	1
Law of segregation – Monohybrid ratio	1
Law of Independent assortment- Dihybrid, Trihybrids	1
Deviation from Mendel Laws – partial or incomplete dominance, co-dominance Over dominance	1
Epistatic gene interaction- Modified dihybrid ratios (12:3:1, 9:7, 15:1, 9:3:4, 9:6:1, 13:3)	2
Penetrance and expressivity, pleiotropism, lethals and sublethals	1
Multiple alleles- ABO blood groups, coat color in Rabbit, Pseudo alleles- Rh factor	1
Genes and environment – Phenocopies	1
Pedigree analysis	1
Characteristics of Polygenes, Examples: skin colour in humans	1
Maternal inheritance- Chloroplasts (ex: variegation in four O clock plants), Mitochondria (ex: LHON)	2

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LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER-I)

CLASS: BSC I YR (CBCS) SECTION: BIOTECHNOLOGY

COURSE/ PAPER: I (FUNDAMENTALS OF BIOTECHNOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: II

TOPICS TO BE COVERED	NO OF HOURS
Linkage, crossing over and recombination-Discovery of linkage, cytological proof of crossing over	3
Recombination frequency and map distance, Two-point test cross and Three-point test cross	4
Interference& coincidence	1
Mitotic crossing over in Drosophila	1
Mechanism of sex determination- Genic balance theory- Drosophila, Barr bodies	1
Homogametic and hetero gametic theory (Human, Mammals, Birds and Plants)	1
Environmental control of sex determination- Bonellia	1
Sex linked inheritance- X- linkage, sex limited and sex influenced characters	2
Y- linkage – Holandric genes	1

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COURSE/ PAPER: I (FUNDAMENTALS OF BIOTECHNOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: III

TOPICS TO BE COVERED	NO OF HOURS
Measures of central values.	2
Measures of dispersion. . Kurtosis and skewness	2
Probability, basic laws and application to Mendelian segregation	2
Concepts of probability distributions. Binomial and poisson distributions, Normal distribution and their application to biology	2
Concepts of sampling and sampling distribution.	1
Statistical inference: test of significance – null and alternative hypothesis, type I and type II errors, level of significance	3
Hypothesis testing: One sample inference – chi-square test, Two sample inference – paired t test, Multiple sample inference – one way ANOVA	2
Simple regression and Correlation.	1

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NO OF HOURS ALLOTTED: 15

UNIT: IV

TOPICS TO BE COVERED	NO OF HOURS
Biological databases – introduction to databases – sequence and structure databases, specialized databases.	3
Major bioinformatics resources – NCBI, EBI, ExPASy.	2
Sequence analysis and phyogeny: sequence alignment; introduction to scoring matrices PAM and BLOSSUM; similarity and database searching tools – FASTA, BLAST; introduction to phylogenetic trees.	6
Drug discovery-ligabd designing and optimization, docking, applications in drug discovery.	4

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
Semester III

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (Semester III)

Class: B.Sc

Section:

Paper: III (BIOCHEMISTRY & METABOLISM)

Unit: I (BIOMOLECULES)

No. of Hours Allotted: 15

Topics to be covered	No. of Hours
Introduction to carbohydrates- types and characteristics	1
Carbohydrates – general structure and properties of carbohydrates and their functions in the cell; stereo isomerism and mutarotation	1
Carbohydrates - Monosaccharides (glucose, fructose, mannose, galactose), ▪ Disaccharides (sucrose, lactose, maltose, cellobiose)	1
Carbohydrates- Homo and Hetero polysaccharides (starch, inulin, cellulose, chitin, hyaluronic acid)	1
Nucleic acids: General structure and properties of nucleic acids and their function in the cell; -Building blocks of nucleic acids - purines and pyrimidines, nucleosides, nucleotides, Chargaff's rules;	1
Nucleic acids -DNA - double helix structure, properties and function Watson - Crick Model (B-DNA),	1
Nucleic acids- deviations from Watson - Crick Model, Other DNA helices (A- & Z-DNA);	1
Nucleic acids: - RNA - types and functions of m-RNA, t-RNA and r-RNA.	1
Lipids – general structure and properties of lipids and phospholipids and their function in the cell.	1
Lipids- Fatty acids – classification, structure and properties of saturated and unsaturated fatty acids; saponifiable and non saponifiable lipids	1
Lipids - Structure and functions of phospholipids (esp. lecithin cephalin, phosphatidyl inositol and phosphatidyl serine) sphingomyelin.	1
Lipids - Structure and functions of cholesterol.	1
Introduction to Vitamins and coenzymes: classification of vitamins	1
vitamins- fat soluble and water soluble vitamins	1
Vitamins- Biological role and importance of vitamins and their deficiencies.	1

Dr. Sambashiva. Daravath

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
Semester III

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (Semester III)

Class: B.Sc

Section:

Paper:III (BIOCHEMISTRY & METABOLISM)

Unit II: Biomolecules –Proteins and Enzymes

No of Hours allotted: 15

Topics to be covered	No. of Hours
Introduction to Amino acids and Proteins	1
Amino acids – different types of classification and structure of amino acids.	1
Amino acids -Properties of amino acids, zwitter ion, and stereoisomerism)	1
Proteins - Primary, secondary, tertiary, quaternary levels of protein structure: types of bonds and forces that stabilize each level– alpha helix and beta sheets;	2
Enzymes: classification and nomenclature of enzymes; General properties of enzymes.	1
Enzymes - Kinetics and Mechanism of enzyme action: Specificity of enzyme action	1
Enzymes - Kinetics of single substrate reactions, Michaelis –Menten’s equation	2
Regulation of enzyme activity: Allosteric regulation of enzymes	1
Enzymes - Factors influencing enzymatic reactions- ph, temperature, substrate conc, enzyme concentration	2
Enzyme inhibitions: introduction and types	1
Enzyme inhibition -competitive, non-competitive & uncompetitive inhibitions;	2

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
Semester III

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (Semester III)

Class: B.Sc

Section:

Paper:III (BIOCHEMISTRY & METABOLISM)

Unit: III

No of Hours allotted: 15

Topics to be covered	No. of Hours
Introduction to Bioenergetics	1
Types of energetic reactions: catabolism and anabolism	1
Energy generating pathways – Glycolysis and its significance	2
Energy generating pathways – TCA cycle and metabolics	2
Energy generating pathways –ETC (chemiosmotic theory of ATP synthesis)	2
Energy generating pathways -Photosynthesis: light reaction, dark reaction	2
Energy generating pathways- calvin/C ₃ cycle	2
Energy generating pathways - C ₄ cycle	1
Energy generating pathways -Gluconeogenesis and its significance	2

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Semester III

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (Semester III)

Class: B.Sc

Section:

Paper:III (BIOCHEMISTRY & METABOLISM)

Unit – IV

No of Hours allotted: 15

Topics to be covered	No. of Hours
Introduction to Lipid metabolism:	1
Degradation of fatty acids by β - oxidation (even and odd chain saturated fatty acids).	2
Protein Metabolism: transamination, deamination and decarboxylation of amino acids	2
Catabolism of amino acids: phenylalanine	1
Catabolism of amino acids: tyrosine (phenylketoneuria and albinism respectively)	2
HORMONES : introduction to hormones and biological significance.	1
HORMONES: Classification based on chemical nature(peptide, steroid hormones and amino acid derivatives.	2
HORMONES - Hypothalamic and pituitary hormones,	2
Hormones - thyroid hormones and adrenal hormones,	1
Hormones of gonads, gastrointestinal hormones	1

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Semester IV

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (Semester IV)

Class: B.Sc

Section:

Paper:IV (BIOPHYSICAL CHEMISTRY AND INSTRUMENTATION)

Unit: I

No. of Hours Allotted: 15

Topics to be covered	No. of Hours
Introduction to P ^H and Buffers	1
Molecules and Interactions- Strong and Weak interactions in Biomolecules: Ionic, Covalent, Hydrogen bond, Vanderwaals forces.	2
Laws of Thermodynamics- types of thermodynamics.	2
Introduction to Microscopy- Principles and applications.	1
Light and Electron microscopy - Dark field, Bright field,	1
Phase contrast, Fluorescent Microscope,	1
Scanning and Transmission Electron microscopy.	2
Introduction to Spectroscopy- Principles and applications	1
UV and Visible Spectroscopy	2
Colorimetry- Principles and applications of colorimetry	2

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Semester IV

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (Semester IV)

Class: B.Sc

Section:

Paper:IV (BIOPHYSICAL CHEMISTRY AND INSTRUMENTATION)

Unit II:

No of Hours allotted: 15

Topics to be covered	No. of Hours
Introduction to chromatographic techniques	1
Chromatography- Principles and applications of Chromatography.	1
Chromatography- paper, Thin Layer,	2
Ion Exchange Chromatography	2
Gel Filtration and Affinity chromatography	2
Chromatography - HPLC.	2
Electrophoresis- Principle of Electrophoresis, support media, Agarose, polyacrylamide.	2
Types of Electrophoresis- SDS-PAGE,	1
AGE (Agarose gel Electrophoresis), Immuno Electrophoresis.	2

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Semester IV

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Class: B.Sc

Section:

Paper:IV (BIOPHYSICAL CHEMISTRY AND INSTRUMENTATION)

Unit: III

No of Hours allotted: 13

Topics to be covered	No. of Hours
Introduction to centrifugation technique and its importance	1
Centrifugation- Basic Principles and applications of Centrifugation.	1
Types of Centrifuges- Differential Centrifugation,	1
Types of Centrifuges -Density Gradient Centrifugation (Rate zonal, isopycnic centrifugation),	2
Types of Centrifuges -Ultra Centrifugation and its mechanism	2
Radioactive isotopes and their types, measures of Radioactivity,	2
GM Counter and Scintillation Counter.	2
Applications of Radio isotopes in medicine and diagnosis.	2

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
Semester IV

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018 (Semester IV)

Class: B.Sc

Section:

Paper:IV (BIOPHYSICAL CHEMISTRY AND INSTRUMENTATION)

Unit – IV

No of Hours allotted: 10

Topics to be covered	No. of Hours
Introduction to Autoradiography and its mechanism	2
Dialysis types and medical importance	2
Ultrafiltration.	2
Lyophilization.	2
Biosensors-principles and applications in Medical diagnosis, industrial, agriculture, Environmental monitoring.	2

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
SEMESTER V

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER V)

Class: BSc III yr (CBCS)

Paper V (MOLECULAR BIOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit I

Topics to be covered	No. of Hours
Prokaryotic And viral Genome organization	2
Eukaryotic Genome organization: <ul style="list-style-type: none"> • Chemical composition of DNA- GC content, C-Value and C- Value paradox • Re-association kinetics of DNA- Denaturation and renaturation, Melting temperature (T_m values), Cot curves Kinetic classes of DNA- Single copy sequences, repeated sequences, inverted, tandem and Palindromic repeats	4
Organellar Genomes: mitochondrial genome, chloroplast genome	2
Molecular organization of chromosomes: <ul style="list-style-type: none"> • Levels of chromosome organization in eukaryotes - chromatin, nucleosomes, 30nm fibre, looped domains, chromosome. • Euchromatin and Heterochromatin; centromeres, telomeres; Specialized chromosomes: polytene and lampbrush Chromosomes	4
Gene and gene numbers	1
Gene families and clusters- Globin, Ribosomal genes	2

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
SEMESTER V

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER V)

Class: BSc III yr (CBCS)

Paper V (MOLECULAR BIOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit II

Topics to be covered	No. of Hours
Exons, introns, promoters and terminators	4
Transcription in Prokaryotes	4
Transcription in Eukaryotes	4
Post-transcriptional modifications (Capping, polyadenylation, splicing and alternate Splicing)	3

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SEMESTER V

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER V)

Class: BSc III yr (CBCS)

Paper V (MOLECULAR BIOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit III

Topics to be covered	No. of Hours
Genetic code and its features, single letter notation for amino acids, Wobble Hypothesis	4
Translation: Synthesis of polypeptides- initiation, elongation and termination in prokaryotes and Eukaryotes	5
Regulation of gene expression in prokaryotes- Lac operon	4
Regulation of gene expression in eukaryotes- Mating types in yeasts	2

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER V

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc IIIyr (CBCS)

Paper VIA (MEDICAL BIOTECHNOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit I

Topics to be covered	No. of Hours
Classification of chromosomes-karyotype	1
Chromosomal disorders-Numerical disorders e.g. trisomies & monosomies, structural disorders e.g. deletions, duplications, translocations & inversions, chromosomal instability syndromes	4
Gain of function mutations: Huntington's disease	1
Loss of function – Tumor suppressor genes	1
Dynamic mutations – Fragile X syndrome	1
Mitochondrial disease: MELAS, LHON, MERRF	3
Immunopathology, Hepatitis, HIV, Autoimmune disorders-SLE, RA	4

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SEMESTER V

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)

Paper VIA (MEDICAL BIOTECHNOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit II

Topics to be covered	No. of Hours
Clinical management and metabolic manipulation – PKU, Familial Hypercholesterolemia, ADA	4
Gene therapy – Ex-vivo, In vivo, In situ gene therapy, strategies of gene therapy, Gene augmentation- ADA deficiency, CFTR	4
Vectors used in gene therapy- Biological vectors- retro virus, adenovirus, synthetic vectors- liposomes, receptor mediated gene transfer	4
Stem cells- Embryonic and adult stem cells, Totipotent, Pluripotent and Multipotent	3

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SEMESTER V

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)

Paper VIA (MEDICAL BIOTECHNOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit III

Topics to be covered	No. of Hours
Prenatal diagnosis-invasive techniques- Aminocentesis, Chronic villi sampling (CVS), Non-invasive techniques-Ultrasonography, TIFA	4
Microarray technology-genomic and Cdna arrays, application to diseases	3
Gene products in medicine-Humulin, Erythropoietin, Growth Hormone (Somatostatin)	3

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)
Section: Biotechnology

Paper VI B (BIOPROCESS TECHNOLOGY)
No. of Hours Alloted: 15

Unit I

Topics to be covered	No. of hours
Introduction to fermentation	1
Historical perspectives of Fermentation Technology and its applications	1
An overview of Upstream and Down stream processing	5
Design of Fermentor-Components of Fermentor and their functions	3
Types of Bioreactors-Stirred tank Fermenter, Air lift Fermenter, Bubble Column Fermenter, Fluidized Bed Bioreactor, Packed Bed Bioreactor.	5

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)
Section: Biotechnology

Paper VI B (BIOPROCESS TECHNOLOGY)
No. of Hours Alloted: 15

Unit II

Topics to be covered	No. of Hours
Media composition and formulation-substrates used as carbon and Nitrogen sources	3
Bioprocess control	2
Instrumentation for controlling Bioreactors	3
Online and off-line analysis	2
Manual and automatic control systems	2
PID and DSC control computer systems	3

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY
SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)
Section: Biotechnology

Paper VI B (BIOPROCESS TECHNOLOGY)
No. of Hours Alloted: 15

Unit iii

Topics to be covered	No. of Hours
Down stream processing- foam separation	2
Primary separation-removal of insoluble products/cell (centrifugation, filtration and sedimentation)	3
Cell disruption (Mechanical, enzymatic and chemical)	2
Product isolation-solvent extraction, adsorption, aqueous two phase system and precipitation	2
Purification techniques-a. chromatography (Ion exchange, gel permeation and affinity) b. Membrane separation (Micro filtration, ultra filtration and reverse phase electrophoresis)	4

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER VI)

Class: BScIIIyr(CBCS)
IMMUNOLOGY)

Paper VII(GENETIC ENGINEERING AND

Section: Biotechnology

No.of Hours Alloted:15

Unit I

Topics to be covered	No. of Hours
Enzymes used in gene cloning a) Restriction endonucleases b) Polymerases c) Ligases d) Phosphatases e) Kinases f) Methylases	3
Properties of vectors cloning and expression vectors- Baculovirus vector system	3
Plasmids: Classification, basic features, size and copy number plasmid incompatibility, plasmid vectors (pBR322, pBR327, pUC)	4
Phage vectors: Insertional vectors (λ gt), Replacement vectors (EMBL) m-13 vectors	3
Cosmids	1
Shuttle vectors	1

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER VI)

Class: BScIIIyr(CBCS)
IMMUNOLOGY)

Paper VII(GENETIC ENGINEERING AND

Section: Biotechnology

No.of Hours Alloted:15

Unit ii

Topics to be covered	No. of Hours
Construction of Genomic and c-DNA libraries,cloning process-ligation and transformation	3
Selection of recombinant clones a) Genetic selection b) Blotting techniques- Southern, Northern and Western c) Hybrid released translation (HRT), Hybrid arrested translation (HART)	3
Principles and applications of PCR Technology, types of PCR (ARMS, RT and REAL TIME PCR)	3
DNA Finger printing technique and its applications	2
2.5 Applications of genetic engineering – Transgenic plants and transgenic animals	4

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SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018(SEMESTER VI)

Class: BSc IIIyr (CBCS)
IMMUNOLOGY)

Paper VII (GENETIC ENGINEERING AND

Section: Biotechnology

No. of Hours Alloted: 15

Unit iii

Topics to be covered	No. of Hours
Immunity- Innate and Acquired immunity	1
Introduction to immune system – Organs and cells of the immune system	2
Antigens, Haptens: Physico-chemical characteristics	1
Structure of different immunoglobulins and their function Primary and secondary immune response	2
Antigen – antibody reaction	1
Monoclonal antibodies – Hybridoma technology	2
The Major Histocompatibility gene complex and its role in organ transplantation Generation of antibody diversity	2
Hypersensitivity – Coombs classification, types of hypersensitivity	2
Autoimmune diseases – mechanism of autoimmunity	2

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER VI

ELECTIVE-1

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)

Paper VIII A (ANIMAL AND INDUSTRIAL BIOTECHNOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit I

Topics to be covered	No. of Hours
1.1 Introduction and scope of animal biotechnology.	1
1.2 Animal cell culture- Culture Vessels, Growth media components and types of media- Natural and Artificial.	2
Primary cell culture Techniques- Explant, Cell disaggregation (Mechanical, Enzymatic), Separation of Viable and non-viable cells	3
1.3 Establishment and preservation of cell lines- Maintenance and types of cell lines- Finite and Continuous cell lines, preservation of Cell lines.	3
1.4 Methods of Gene transfer in Animal cells- Microinjection, Electroporation, Lipofection, Viral mediated Gene Transfer Techniques.	2
1.5 Production of Transgenic Animals and Molecular Pharming.	2
1.6 Animal Transgenic Models for studying diseases- Knock out, Alzheimer's disease.	2

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER VI

ELECTIVE-1

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)

Paper VIII A (ANIMAL AND INDUSTRIAL BIOTECHNOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit ii

Topics to be covered	No. of Hours
Introduction and Scope of Industrial Biotechnology	1
Primary and Secondary Metabolic products of microorganisms	2
Screening – Primary and secondary Screening Techniques, introduction to strain improvement.	3
Types of fermentation- Classification of Fermentation based on availability of oxygen, media type (aerobic and anaerobic fermentation, solid state and submerged fermentation), Batch and Continuous Fermentation.	6
Methods of immobilization- Adsorption, Covalent binding, Entrapping and Encapsulation.	3

Name of the teacher

Head, department of Biotechnology

Signature

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER VI

ELECTIVE-1

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc III yr (CBCS)

Paper VIII A (ANIMAL AND INDUSTRIAL BIOTECHNOLOGY)

Section: Biotechnology

No. of Hours Alloted: 15

Unit iii

Topics to be covered	No. of Hours
Production of Alcoholic Beverages- Wine, Alcohol/ Ethanol	3
Production of chemicals- Citric acid, Glutamic acid	3
Production of therapeutic proteins: Antibiotics- Pencillin, vitamins- Riboflavin	3
Production of Enzymes- Amylases, Proteases	3
Applications of immobilized Enzymes and Whole cells.	3

Name of the teacher

Head, department of Biotechnology

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NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BScIIIyr (CBCS)
BIOTECHNOLOGY)

Paper VIIIIB(PLANT AND ENVIRONMENTAL

Section: Biotechnology No. of Hours Alloted: 15

Unit I

Topics to be covered	No. of Hours
Introduction and scope of Plant Biotechnology	1
Composition of media (MS MEDIA, Gamborg's media), Preparation of media and sterilization methods (Explant sterilisation)	3
Types of plant tissue culture - Embryo culture, Callus culture, Meristem culture, Protoplast culture	4
Role of Micronutrients and plant growth regulators in differentiation.	2
Methods of gene transfer techniques in plants - particle bombardment, microinjection, electroporation, agrobacterium mediated gene transfer, lipofection	5

B. Ashok Reddy

Name of the teacher

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SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BScIIIyr (CBCS)
BIOTECHNOLOGY)

Paper VIIIIB(PLANT AND ENVIRONMENTAL

Section: Biotechnology No. of Hours Alloted: 15

Unit ii

Topics to be covered	No. of Hours
Clonal propagation of plants on commercial scale(somatic embryogenesis)	3
Meristem culture and production of virus free plants.	3
Somatic hybridization	2
Somaclonal variation	2
Production of secondary metabolites by plant cells(shikonin)	1
Production of therapeutic proteins from transgenic plants	1
Applications of recombinant DNA technology in agriculture	3

B.Deepika

Name of the teacher

Signature

Head, department of Biotechnology

Signature

NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER VI

LESSON PLAN FOR THE ACADEMIC YEAR 2017-2018

Class: BSc IIIyr (CBCS)
BIOTECHNOLOGY)

Paper VIII B (PLANT AND ENVIRONMENTAL

Section: Biotechnology No. of Hours Alloted: 15

Unit iii

Topics to be covered	No. of Hours
Introduction and scope of Environmental biotechnology	1
Renewable and non- renewable energy resources	2
Conventional, non-conventional energy sources and their impact on environment	3
Microbiological quality of milk, food and water	3
Microbiological treatment of municipal and industrial effluents.	3
Biofertilizers, biopesticides, bioremediation, phytoremediation, biomineralization, biomonitoring And biodeterioration	3

B. Ashok Reddy

Name of the teacher

Signature

Head, department of biotechnology

Signature