

NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

LESSON PLAN FOR THE ACADEMIC YEAR 2020-2021 (SEMESTER-I)

CLASS: BSC I YR (CBCS)

SECTION:BIOTECHNOLOGY

COURSE/ PAPER: I (CELL BIOLOGY AND GENETICS)

UNIT: I No.of Hours Allotted: 15

TOPICS TO BE COVERED	NO OF HOURS
Cells as basic units of living organisms- Viruses, Bacteria, Fungi, Micro Algae, Plant and Animal cells	1
Ultra-Structure of prokaryotic cell- Cell membrane	1
Ultra-Structure of prokaryotic cell -Plasmids	1
Ultra-structure of eukaryotic cell -Cell wall, Cell membrane,	1
Ultra-structure of eukaryotic cell -Nucleus	1
Ultra-structure of eukaryotic cell -Mitochondria,	1
Ultra-structure of eukaryotic cell -Chloroplast,	1
Ultra-structure of eukaryotic cell -Endoplasmic reticulum, Golgi complex, Vacuoles	1
Fluid mosaic model,Sandwich model,	1
cell membrane permeability	1
Structure of chromosome-morphology,Centromere,Telomere	1
components of chromosomes (histones and non histones),karyotype and functions of chromosomes	1
Specialized chromosomes(polytene, lamp brush)	1
Chromosomal abberations- numerical	1
Chromosomal abberations-numerical	1

NAME OF THE FACULTY: B. Deepika

UNIT: II No.of Hours Allotted: 15

TOPICS TO BE COVERED	NO OF HOURS
Bacterial Cell Division	1
Eukaryotic Cell Cycle-Phases	1
Introduction to Mitosis	1
Mitosis-Stages(Spindle Assembly)	1
Significance of mitosis	1
Introduction to Meiosis	1
Meiosis-Stages(Synaptonemal Complex)	1
Significance of Meiosis	1
Differences between Mitosis and Meiosis	1
Introduction to Senescence and Necrosis	1
Senescence	1
Necrosis	1
Role of Senescence and Necrosis	1
Introduction to Apoptosis	1
Apoptosis and its Significance	1

NAME OF THE FACULTY: B. Deepika

UNIT: III No. of Hours Allotted: 15

TOPICS TO BE COVERED	NO OF HOURS
Mendel's Experiments-Factors contributing to success of Mendel's Experiments	1
Law of Segregation- Monohybrid Ratio	1
Law of Independent Assortment- Dihybrid Ratio	1
Law of Independent Assortment- Trihybrid Ratio	1
Deviation from Mendel Laws- Partial or Incomplete Dominance	1
Codominance-MN blood groups	1
Non allelic Interactions- Epistasis	1
Penetrance and Expressivity- Polydactyly	1
Pleiotropism	1
Phenocopy	1
Multiple Alleles- Coat colour in Rabbits	1
Multiple Alleles- Eye colour in Drosophila, ABO blood groups	1
Sex determination in Drosophila	1
X linked Inheritance- Hemophilia and Color blindness	1
X inactivation	1

NAME OF THE FACULTY: Dr. Sambashiva

UNIT: IV No. of Hours Allotted: 15

TOPICS TO BE COVERED	NO OF HOURS
Linkage, crossing over	1
Discovery of linkage-Phases of Linkage	1
cytological proof of crossing over	1
Recombination-Recombination frequency and map distance,	1
Recombination- Two-point test cross and Three-point test cross	1
Interference & coincidence	1
Gene mapping and Map Distance	1
Non Mendelian inheritance- Maternal effect (Shell coiling in Snail)	1
Non Mendelian inheritance- Variegation of leaves in <i>Mirabilis jalapa</i>	1
Cytoplasmic Male sterility in Maize	1
Mitochondrial inheritance in Human and Poky in <i>Neurospora</i>	1
Mitochondrial inheritance-Poky in <i>Neurospora</i>	1
Chloroplast inheritance in <i>Chlamydomonas</i>	1
Introduction to Hardy - Weinberg Equilibrium	1
Hardy - Weinberg Equilibrium	1

NAME OF THE FACULTY: Dr. Sambashiva

NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

LESSON PLAN FOR THE ACADEMIC YEAR 2020-2021 (SEMESTER-II)

CLASS: BSC I YR (CBCS)

SECTION: BIOTECHNOLOGY

COURSE/ PAPER: II (BIOLOGICAL CHEMISTRY AND MICROBIOLOGY)

NO OF HOURS ALLOTTED: 15

UNIT: I

TOPICS TO BE COVERED	NO OF HOURS
Carbohydrates-Importance, classification and monosaccharides(glucose and fructose)	1
Disaccharides(sucrose ,lactose, maltose) polysaccharides(starch, glycogen , inulin)	1
Amino acids- importance and classification ; peptide bond formation	1
Physical and chemical properties of amino acids	1
Proteins- importance ; structure- primary and secondary	1
Proteins- tertiary and quaternary	1
Lipids- importance and classification	1
Lipids-Simple lipids(triacylglycerides and waxes); complex lipids(phosphor lipids)	1
Lipids-Complex lipids(glycol lipids) ; derived lipids(terpenes ,steroids, carotenoids)	1
Nucleic acids- structure and chemistry of DNA(Watson and Crick)	1
Nucleic acids-RNA(TMV); structure and forms of DNA	1
Enzymes- importance and nomenclature	1
Enzymes- classification	1
Enzymes- michaelis –Menton equation ; factors influencing enzyme reaction	1
Enzymes- enzyme inhibition(competitive, uncompetitive and mixed) and co-enzymes	1

NAME OF THE FACULTY: TEJASWINI

UNIT-II

TOPICS TO BE COVERED	NO OF HOURS
Glycolysis-introduction and importance	1
Glycolysis cycle	1
Tricarboxylic acid (TCA) cycle – introduction and importance	1
Tricarboxylic acid(TCA) cycle	1
Electron transport chain- introduction	1
Electron transport chain	1
Oxidative phosphorylation- introduction	1
Oxidative phosphorylation	1
Gluconeogenesis	1
Gluconeogenesis-significance	1
Transamination reactions of amino acids	1
Oxidative deamination reactions of amino acids	1
B-oxidation of even chain fatty acids	1
B-oxidation of odd chain fatty acids	1
Glyoxalate cycle	1

NAME OF THE FACULTY: TEJASWINI

UNIT: III No. Of Hours Allotted: 15

Fundamentals of Microbiology	NO OF HOUR
Historical development of microbiology	1
contributors of microbiology	1
Microscopy: Bright field microscopy	1
Dark field microscopy,	1
Fluorescent microscopy	1
Scanning microscopy	1
Transmission electron	1
Phase contrast microscopy	1
Outlines of classification of microorganisms	1
Structure and general characteristics of bacteria	1
Structure and general characteristics of virus	1
Disease causing pathogens and symptoms (Eg: <i>Mycobacterium</i> , <i>Hepatitis</i>) cont...	1
(Eg: <i>Mycobacterium</i> , <i>Hepatitis</i>)	1
Structure and general characteristics of micro-algae	1
Structure and general characteristics of fungi	1

NAME OF THE FACULTY: M.MADHAVI

Unit IV No.of Hours Allotted: 15

Culture and identification of microorganisms	No. of Hours
Methods of sterilization- physical methods	1
Methods of sterilization- chemical methods	1
Bacterial nutrition nutritional types of bacteria	1
essential macro micro nutrients	1
growth factors	1
Bacterial growth curve	1
batch and continuous cultures	1
synchronous cultures	1
measurement of bacterial growth	1
measurement of cell number	1
measurement of cell mass	1
Factors affecting bacterial growth	1
Culturing of anaerobic bacteria	1
Culturing of viruses	1
Pure cultures and its characteristics	1

NAME OF THE FACULTY: M.MADHAVI

Semester III
LESSON PLAN FOR THE ACADEMIC YEAR 2020-2021
Paper:III(MOLECULAR BIOLOGY AND r-DNA TECHNOLOGY)

NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

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Unit: I Genome organization & DNA replication

No. of Hours Allotted: 15

S.No	Topics to be covered	No. of Hours
1	DNA as the genetic material – Griffiths experiments on transformation in <i>Streptococcus pneumoniae</i> .	1
2	DNA as the genetic material –Avery, McLeod and McCarty's experiment	1
3	DNA as the genetic material – Hershey – Chase experiments with radio	1
4	DNA as the genetic material – Hershey – Chase experiments	1
5	RNA as genetic material – Tobacco Mosaic Virus	1
6	Organization of Prokaryotic genome	1
7	Organization of Prokaryotic genome	1
8	Eukaryotic nuclear Genome	1
9	Eukaryotic nuclear Genome	1
10	Organization of mitochondrial genomes	1
11	Organization of Chloroplast genomes	1
12	DNA replication-enzymes involved in replication	1
13	Replication of Prokaryotic genome	1
14	Replication of eukaryotic genomes	1
15	Mutations- types of mutations	1

Name of the Teacher: Dr. Sambashiva. Daravath

Head Department of _____

Signature: 

Signature: _____

Unit:II Gene Expression in Prokaryotes and Eukaryotes


No. _____

of Hours Allotted: 15

S.No	Topics to be covered	No. of Hours
1	Structure of Prokaryotic gene	1
2	Structure of Eukaryotic gene	1
3	Structure and Function of RNA Polymerase sub units	1
4	Transcriptional Machinery in eukaryotes- Structure and Function	1
5	Transcriptional Machinery in eukaryotes- Structure and Function	1
6	Genetic Code - Properties	1
7	Genetic Code –Wobble Hypothesis	1
8	Transcription mechanism in Prokaryotes	1
9	Transcription mechanism in Prokaryotes	1
10	Transcription mechanism in Eukaryotes	1
11	Transcription mechanism in Eukaryotes	1
12	Translation Mechanism in Prokaryotes	1
13	Translation Mechanism in eukaryotes	1
14	Revision Class-1	1
15	Revision class-II	1

Name of the Teacher: Dr. Sambashiva. Daravath

Head Department of _____

Signature: 

Signature: _____

Unit: III Gene regulation in Prokaryotes and Eukaryotes

No. of Hours Allotted: 15

S.No	Topics to be covered	No. of Hours
1	Prokaryotic transcriptional regulation (inducible system)- Operon concept	1
2	Prokaryotic transcriptional regulation-Operon concept-Lac operon, Glucose effect	1
3	Eukaryotic transcriptional regulation (repressible system)- tryptophan concept	1
4	Eukaryotic transcriptional regulation (repressible system)- tryptophan concept	1
5	Post Transcriptional modifications _ capping and polyadenylation	1
6	Post Transcriptional modifications _ capping and polyadenylation	1
7	splicing	1
8	Alternate splicing	1
9	Post Translational Modifications-	1
10	Post Translational Modifications-	1
11	Post Translational Modifications-	1
12	Gal regulation in Yeast-mating type switching	1
13	Gal regulation in Yeast-mating type switching	1
14	Revision Class-1	1
15	Revision class-II	1

Name of the Teacher: Mrs. B. Deepika

Head Department of _____

Signature:

Signature:

Unit: IV Recombinant DNA technology No. of Hours Allotted: 15

S.No	Topics to be covered	No. of Hours
1	Enzymes used in Molecular cloning- Restriction endonucleases	1
2	Enzymes used in Molecular cloning-DNA Ligases	1
3	Enzymes used in Molecular cloning - Polynucleotide Kinases and DNA polymerases	1
4	Cloning Vectors-plasmid vectors (pBR322, pBR327, pUC)	1
5	Cloning Vectors- bacteriophages and Cosmids	1
6	Cloning Vectors- shuttle vectors	1
7	Vectors in library preparations(λ phage vectors and Cosmids)	1
8	Vectors in library preparations-BAC & YAC	1
9	Gene transfer techniques -	1
10	Gene transfer techniques -	1
11	Selection of recombinant clones- Colony hybridization	1
12	Selection of recombinant clones- library screening	1
13	Applications of rDNA technology in agriculture	1
14	Applications of rDNA technology in diagnosis and industrial	1
15	Applications of rDNA technology in pharma and medicine	1

Name of the Teacher: Mrs. B. Deepika

Head Department of _____

Signature:

Signature:

LESSON PLAN FOR THE ACADEMIC YEAR 2020-2021 (SEMESTER-IV)

CLASS: BSC II YR (CBCS)

SECTION: BIOTECHNOLOGY

COURSE/ PAPER: IV (BIOINFORMATICS AND BIostatISTICS)

SUBJECT:

BIOTECHNOLOGY

UNIT- I (INTRODUCTION TO BIOINFORMATICS AND BIOLOGICAL DATABASES)

NO. OF HOURS ALLOTTED- 15

S.No	TOPICS TO BE COVERED	No. OF HOURS
1	Bioinformatics- definition, history	1
2	Bioinformatics- scope and applications	1
3	Bioinformatics tools and resources	1
4	Internet basics, role of internet, free online tools , free downloadable tools	1
5	Bioinformatics web portals- NCBI	1
6	Bioinformatics web portals- EBI	1
7	Bioinformatics web portals- ExpASy	1
8	Biological databases- classification of databases- introduction	1
9	Primary (Genbank); secondary (PIR)	1

10	Tertiary or composite (KEGG) Databases	1
11	Sequence databases – DNA databases – introduction	1
12	DNA databases – (ENA & DDBJ)	1
13	Protein sequence databases- introduction	1
14	Swissport	1
15	PROSITE	1

NAME OF THE FACULTY: TEJASWINI

Unit-II
15

(SEQUENCE ALIGNMENT)

NO. OF HOURS ALLOTTED-

SNo.	TOPICS TO BE COVERED	No. OF HOURS
1	Basics of sequence alignment- introduction	1
2	Basics of sequence alignment- match, mismatch, gaps	1
3	Basics of sequence alignment- gap penalties, scoring alignment	1
4	Types of sequence alignment- introduction	1
5	Pairwise alignment	1
6	Multiple alignment	1

7	Local and global alignment	1
8	Dot matrix comparison of sequences	1
9	Scoring matrices - PAM	1
10	Scoring matrices- BLOSUM	1
11	Pairwise sequence similarity search by BLAST	1
12	Pairwise sequence similarity search by FASTA	1
13	Concepts of phylogeny – introduction	1
14	Distance based (NJ method)	1
15	Character based(ML method) tree construction methods	1

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UNIT-III (DESCRIPTIVE BIOSTATISTICS AND PROBABILITY)

NO OF HOURS ALLOTTED-

15

S.No	TOPICS TO BE COVERED	No. OF HOURS
1	Introduction to biostatistics	1
2	Kinds of data and variables – based On nature (numerical- discrete and continuous; categorical- ordinal and nominal)	1
3	Kinds of data and variables- based on source (primary and secondary data)	1
4	Sample size, sampling methods and sampling errors	1

5	Data tabulation and representation methods- graphical methods- stem and leaf plot , line diagram, bar graphs, histogram, frequency polygon, frequency curves)	1
6	Diagrammatic method- pie diagram	1
7	Measures of central tendency- mean , median , mode: merits and demerits	1
8	Measures of dispersion- range, variance, standard deviation, standard error and coefficient of variation, merits and demerits	1
9	Concepts of probability- random experiment, events	1
10	Probability of an event, probability rules	1
11	Uses of permutations and combinations	1
12	Random variables- discrete and continuous	1
13	Probability distributions- introduction	1
14	Binomial and Poisson distribution for discrete variables	1
15	Normal distribution for continuous variables	1

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UNIT-IV (APPLICATIONS OF BIOSTATISTICS)

NO. OF HOURS

ALLOTTED-15

SNo.	TOPICS TO BE COVERED	No. OF HOURS
1	Hypothesis testing- steps in testing for statistical hypothesis	1

2	Null and alternative hypothesis	1
3	Level of significance- type-1 and type-2 errors	1
4	Test of significance for small samples – students t- test	1
5	Test of significance for large samples – Z- Test for means and proportions	1
6	Chi- square test- introduction	1
7	Chi- square test-application	1
8	Goodness of fit, test of independence	1
9	Analysis of variance- introduction	1
10	Analysis of variance (ANOVA) – ONE Way Analysis	1
11	Correlation- introduction	1
12	Correlation- definition, simple analysis	1
13	Correlation- linear analysis	1
14	Karl Pearson’s correlation coefficient	1
15	Application of biostatistics	1

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SEMESTER V

Class: B Sc III yr (CBCS)
 Section: Biotechnology
 Unit I

Paper V (MOLECULAR BIOLOGY)
 No. of Hours Allotted: 15

Topics to be covered	No. of Hours
Prokaryotic Genome organization	1
viral Genome organization	1
Eukaryotic Genome organization: Chemical composition of DNA- GC content, C-Value and C- Value paradox	1
Re-association kinetics of DNA- Denaturation and renaturation, Melting temperature (T _m values), Cot curves	1
DNA Kinetic classes of - Single copy sequences, repeated sequences	1
inverted, tandem and Palindromic repeats	1
Organellar Genomes: mitochondrial genome,	1
chloroplast genome	1
Molecular organization of chromosomes: Levels of chromosome organization in eukaryotes - chromatin, nucleosomes, 30nm fibre, looped domains, chromosome.	1
Levels of chromosome organization in eukaryotes - chromatin, nucleosomes, 30nm fibre, looped domains, chromosome.	1
Euchromatin and Heterochromatin; centromeres, telomeres	1
Specialized chromosomes: polytene and lampbrush Chromosomes	
Gene and gene numbers	1
Gene families and clusters- Globin, Ribosomal genes	1
Gene families and clusters- Ribosomal genes	1

NAME OF THE FACULTY: Dr. SAMBASHIVA

Unit II

Topics to be covered	No. of Hours
Exons	1
introns,	1
promoters	1
terminators	1
Transcription in Prokaryotes	1
Transcription in Prokaryotes	1
Transcription in Prokaryotes	1
Transcription in Prokaryotes	1
Transcription in Eukaryotes	1
Transcription in Eukaryotes	1
Transcription in Eukaryotes	1
Transcription in Eukaryotes	1
Post-transcriptional modifications (Capping, polyadenylation, splicing and alternate Splicing)	1
Post-transcriptional modifications (polyadenylation)	1
Post-transcriptional modifications (splicing and alternate Splicing)	1

NAME OF THE FACULTY: B.DEEPIKA

Unit III

Topics to be covered	No. of Hours
Genetic code and its features, single letter notation for amino acids,	1
Genetic code and its features, single letter notation for amino acids,	1
Genetic code and its features, single letter notation for amino acids,	1
Wobble Hypothesis	1
Translation: Synthesis of polypeptides- initiation, elongation and termination in prokaryotes	1
Translation: Synthesis of polypeptides- initiation, elongation and termination in prokaryotes	1
Translation: Synthesis of polypeptides- initiation, elongation and termination in Eukaryotes	1
Translation: Synthesis of polypeptides- initiation, elongation and termination in Eukaryotes	1
Translation: Synthesis of polypeptides- initiation, elongation and termination in Eukaryotes	1
Regulation of in gene expression prokaryotes-Lac operon	1
Regulation of in gene expression prokaryotes-Lac operon	1
Regulation of in gene expression prokaryotes-Lac operon	1
Regulation of in gene expression prokaryotes-Lac operon	1
Regulation of gene expression in eukaryotes- Mating types in yeasts	1
Regulation of gene expression in eukaryotes- Mating types in yeasts	1

NAME OF THE FACULTY: TEJASWINI

Paper VIA (MEDICAL BIOTECHNOLOGY)

Unit I

No.of Hours Allotted: 15

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

NAME OF THE FACULTY: M.MADHAVI

Unit II No.of Hours Allotted: 15

Topics to be covered	No.of Hours
Clinical management and metabolic manipulation –PKU.	1
Clinical management and metabolic manipulation –Familial Hypercholesterolemia.	1
Clinical management and metabolic manipulation-ADA	1
Gene therapy -Ex-vivo, In vivo	1
Gene therapy -Insitu gene therapy strategies	1
Gene augmentation-ADA deficiency	1
CFTR - cystic fibrosis	1
Vectors used in gene therapy- Role of vectors in Gene therapy.	1
Biological vectors -Retro viruses, Adenoviruses.	1
Herpes simplex vectors, Adeno retro associated vectors.	1
Synthetic Vectors- Liposomes, Receptor mediated gene transfer.	1
Stem cells - Introduction to stem cells	1
Totipotent, Pluripotent and Multipotent stem cells	1
Embryonic stem cells and adult stem cells	1
Applications of stem cells	1

NAME OF THE FACULTY: B. DEEPIKA

Unit III No. of Hours Allotted: 15

Topics to be covered	No. of Hours
Prenatal diagnosis- Introduction and types of prenatal diagnosis techniques	1
Prenatal diagnosis-1). invasive techniques-Aminocentesis and it's advantages	1
Prenatal diagnosis-1). invasive techniques-Chorionic villi sampling (CVS) and it's advantages	1
Prenatal diagnosis-2). Non-invasive techniques-Ultrasonography and it's advantages	1
Prenatal diagnosis-2). Non-invasive techniques-TIFA and it's advantages	1
Microarray technology-Introduction and types of arrays	1
Microarray technology-Genomic microarrays and it's application to diseases	1
Microarray technology-cDNA arrays and it's application to diseases	1
Gene products in medicine-Humulin (Human insulin) and it's production	1
Gene products in medicine-Erythropoietin,	1
Gene products in medicine-Growth Hormone (Somatostatin)	1
Gene products in medicine-tPA, Interferon gama	1
DNA based vaccines-Subunit vaccines-herpes simplex virus.	1
DNA based vaccines- Attenuated Vaccines-Cholera	1
DNA based vaccines- Vector Vaccines-Cholera and salmonella	1

NAME OF THE FACULTY: M.MADHAVI

Paper VIB (BIOPROCESS TECHNOLOGY)

Unit I No.of Hours Alloted:15

Topics to be covered	No. of hours
Introduction to Bioprocess technology	1
Introduction to fermentation-fermentation technology	1
Historical perspectives of Fermentation Technology and its applications	1
An overview of Upstream processing	1
An overview of Down stream processing	1
Design of Fermentor	1
Components of Fermentor and their functions	1
Functions	1
Introduction of Bioreactors and its types	1
Types of Bioreactors-1). Stirred tank Fermenter	1
Types of Bioreactors-2). Air lift Fermenter	1
Types of Bioreactors-3). Bubble Column Fermenter	1
Types of Bioreactors-4). Fluidized Bed Bioreactor	1
Types of Bioreactors-5). Packed Bed Bioreactor	1
Applications of fermentor for large scale production at industrial level	1

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Unit II No. of Hours Allotted: 15

Topics to be covered	No. of Hours
Media composition	1
Media formulation-substrates used as carbon and Nitrogen sources	1
Bioprocess control	1
Instrumentation for controlling Bioreactors– types of sensors	1
Instrumentation for controlling Bioreactors- Temperature, pH	1
Instrumentation for controlling Bioreactors- Anti-foam,	1
Instrumentation for controlling Bioreactors-gas flow rate and liquid flow rate	1
Instrumentation for controlling Bioreactors- agitation , dissolved Oxygen	1
Instrumentation for controlling Bioreactors-	1
Online analysis	1
Offline analysis	1
Manual control systems	1
Automatic control system	1
PID control computer systems	1
DSC control computer systems	1

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Unit III No. of Hours Allotted: 15

Topics to be covered	No. of Hours
Down stream processing- foam separation	1
Primary separation-removal of insoluble products/cells	1
Primary separation- centrifugation	1
Primary separation- filtration	1
Primary separation- sedimentation	1
Cell disruption(Mechanical, enzymatic and chemical)	1
Product isolation-solvent extraction	1
Product isolation- adsorption	1
Product isolation- aqueous two phase system	1
Product isolation- precipitation	1
Purification techniques-a. chromatography(Ion exchange, gel permeation and affinity)	1
Purification techniques- b. Membrane separation (Micro filtration, ultra filtration)	1
Purification techniques- reverse phase electrophoresis	1
Product polishing – drying, diafiltration and crystallization	1

NAME OF THE FACULTY: Dr. SAMBASHIVA

NIZAM COLLEGE: DEPARTMENT OF BIOTECHNOLOGY

SEMESTER- VI

SUBJECT- BIOTECHNOLOGY PAPER- VII (GENETIC ENGINEERING AND IMMUNOLOGY)

UNIT-I-No.of Hours Allotted: 15

Enzymes used in Gene cloning - Restriction Endonucleases	1
Enzymes used in Gene cloning- ligases, Phosphatases, Polymerases.	1
Enzymes used in Gene cloning- Kinases, Methylases.	1
Properties of Vectors	1
Cloning vectors	1
Expression vectors	1
Plasmids- Classification, basic features, size, copy number, Plasmid incompatibility.	1
Plasmid vectors- PBR322, PBR327,	1
Plasmid vector- PUC.	1
Introduction to phage vectors	1
Insertional vectors- Lamda vectors.	1
Replacement vectors- EMBL	1
M13 vectors	1
Cosmids	1
Shuttle vectors	1

NAME OF THE FACULTY: Dr. SAMBASHIVA

UNIT-II

No.of Hours Alloted:15

Construction of Genomic Libraries.	1
Construction of c-DNA libraries.	1
Cloning process- Ligation and Transformation	1
Selection of Recombinant clones- Genetic selection.	1
Blotting Techniques- Southern , Northern.	1
Blotting Techniques- Western blotting.	1
Hybrid Released Translation, Hybrid arrested Translation.	1
Principles and applications of PCR Technology.	1
Types of PCR- Arms PCR, RT,	1
Types of PCR - Real time PCR	1
Introduction to DNA Finger printing technique.	1
Introduction to VNTR Marker.	1
Applications in different fields.	1
Applications of Genetic Engineering- Transgenic Plants	1
Transgenic Animals.	1

NAME OF THE FACULTY: Dr. SAMBASHIVA

UNIT-III No. of Hours Alloted: 15

Introduction to Immunity	1
Innate immunity	1
Acquired immunity	1
Introduction to immune system- cell of immune system.	1
Organs of immune system.	1
Antigens, Haptens- Physico chemical characteristics	1
Basic structure of immunoglobulin	1
Functions of different immunoglobulins	1
Primary and secondary immune responses	1
Antigen- Antibody Reactions- Agglutination reactions	1
Antigen – Antibody Reactions- Precipitation Reactions.	1
Monoclonal Antibodies- Hybridoma technology	1
Major histocompatibility complex and role in organ transplantation.	1
Hypersensitivity- types of Hypersensitivity	1
Autoimmune diseases – Mechanism of Auto immunity.	1

NAME OF THE FACULTY: Dr. SAMBASHIVA

LESSON PLAN FOR THE ACADEMIC YEAR 2020-20201

PaperVIII A (ANIMAL AND INDUSTRIAL BIOTECHNOLOGY)

Class: B Sc IIIyr (CBCS)

Subject: Biotechnology

Unit I

No. of Hours Allotted: 15

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

NAME OF THE FACULTY: M.Madhavi

Unit II

No. of Hours Alloted:15

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

NAME OF THE FACULTY: M.Madhavi

Unit III

No. of Hours Alloted:15

Topics to be covered	No. of Hours
Introduction to Production of Alcoholic Beverages	1
Production of Alcoholic Beverages- Wine	1
Production of Alcoholic Beverages- Alcohol/ Ethanol	1
Introduction to Production of chemicals	1
Production of chemicals- Citric acid	1
Production of chemicals- Glutamic acid	1
Introduction to Production of therapeutic proteins	1
Production of therapeutic proteins: Antibiotics- Pencillin	1
Production of therapeutic proteins: vitamins- Riboflavin	1
Introduction to Production of Enzymes	1
Production of Enzymes- Amylases	1
Production of Enzymes- Proteases	1
Applications of immobilized Enzymes and Whole cells.	1
Applications of immobilized Enzymes and Whole cells.	1

NAME OF THE FACULTY: M.Madhavi

Paper- VIIIIB(PLANT AND ENVIRONMENTAL BIOTECHNOLOGY)

Subject:Biotechnology

Unit I No.of Hours Alloted:15

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

NAME OF THE FACULTY: B.Deepika

Unit II No.of Hours Alloted:15

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

NAME OF THE FACULTY: B.Deepika

Unit III No. of Hours Alloted: 15

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

NAME OF THE FACULTY: B. DEEPIKA