KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.Sc. Biotechnology Semester – II
Subject- Principles of Genetic Engineering
Paper- BT-107

2nd Week 9Feb -11Feb	Introduction and scope of Genetic Engineering, Miles stones in Genetic engineering, Central role of *E.coli*.
12Feb, 2023	**Sunday**
3rd Week 13Feb -17 Feb	Purification of total cell DNA, plasmid DNA, phage DNA, Yield Analysis, Nucleic acid blotting and hybridization
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week 20Feb -25 Feb	DNA modifying enzymes- Terminal deoxynucleotidyl transferase, Polynucleotide kinase, Alkaline phosphatase, Nucleases, Methylases Restriction Endonucleases- Host controlled restriction and modification, Nomenclature, types, Recognition sequence, blunt and sticky ends, applications.
26 Feb, 2023	**Sunday**
5th Week 27 Feb -28 Feb	Ligases- *E. coli* and T4 DNA ligases, Linker, Adaptor, Homopolymer tailing **Gene Cloning Vectors** General features, Types of cloning vectors- Plasmid,bacteriophage,phagemid,cosmid, artificial chromosomes (YAC, BAC, PAC)

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.Sc. Biotechnology Semester – II
Subject- Principles of Genetic Engineering
Paper- BT-107

March, 2023 **1st Week** **1March -4 March**	Concept, Selection of transformed cells, Identification of recombinants (bacteria and phages) **Cloning of Specific Gene-** Direct selection, Identification from a gene library-genomic library
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rdWeek **13 March-18 March**	cDNA synthesis and cloning-Properties of cDNA, mRNA enrichment, cDNA library.
19 March,2023	**Sunday**
4thWeek **20March-25 March**	Screening strategies- Colony and plaque hybridization, Abundancy probing, Heterologus probing, Immunological screening, Differential screening,
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **27 March- 31 March**	Subtractive hybridization. **Protein-Protein interactions-**Phage display, Yeast two hybrid system, Yeast three hybrid system. DNA Sequencing: Rapid DNA sequencing techniques

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.Sc. Biotechnology Semester – II
Subject- Principles of Genetic Engineering
Paper- BT-107

April, 2023 **1st Week** **1 April, 2023**	and strategic details of range of methodologies eg. Dideoxyribonucleotide, Chemical degadation, Automated DNA sequencing, Thermal cycle sequencing, Pyrosequencing. Concept, Basic PCR reaction, Factors affecting the PCR, Types of PCR: RT-PCR,
2 April, 2023	**Sunday**
2nd Week **3 April -8 April**	Real time PCR, Allele specific PCR, Multiplex PCR) , Applications of PCR **Site Directed Mutagenesis** Oligonucleotide directed mutagenesis, PCR amplified oligonucleotide directed mutagenesis, Random mutagenesis with degenerate oligonucleotide primers / nucleotide analogs.
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April - 15April**	Primer extension, S1 mapping, RNase protection assay, Gel retardation assay, Deletion analysis, Reporter genes, DNA foot printing, Modification interference assays, HRT, HART
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -21 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -29 April**	Optimizing expression of foreign genes in *E.coli*- Strong and regulatory promoters, Codon usage, Fusion proteins, Increasing protein stability and secretion, Translation expression vectors, Protease deficient host strains.
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.Sc. Biotechnology Semester – II
Subject- Principles of Genetic Engineering
Paper- BT-107

May, 2023 **1st Week** **1 May -6 May**	*Saccharomyces cerevisiae* and *Pistia pastoris* expression systems Bacuolovirus Insect cell expression systems Mammalian cell expression system.
7 May, 2023	**Sunday**
2nd Week **8 May -13 May**	TEST + REVISION
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject-Bioinformatics
Paper- 108

February,2023 **1st Week** **1Feb-4 Feb**	**Bioinformatics and Biological Databases** **Bioinformatics**: Introduction**,** Goal, Scope, Applications, Limitations, and New themes
5Feb, 2023	**Guru RavidasJayanti, Sunday**
2nd Week **6Feb -11Feb**	**Biological Databases:** Introduction**,** Types of Databases, Biological Databases, Pitfalls of Biological Databases, Information Retrieval from Biological Databases
12Feb, 2023	**Sunday**
3rd Week **13Feb -17 Feb**	**Sequence Alignment** **Pairwise Sequence Alignment:** Evolutionary Basis, Sequence Homology versus Sequence Similarity, Sequence Similarity versus Sequence Identity, Methods, Scoring Matrices, Statistical Significance of Sequence Alignment
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -25 Feb**	**Database Similarity Searching:** Unique Requirements of Database Searching, Heuristic Database Searching, Basic Local Alignment Search Tool (BLAST),
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	Comparison of FASTA and BLAST, Database Searching with the Smith–Waterman Method

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject-Bioinformatics
Paper- 108

March, 2023 **1st Week** **1March -4 March**	**Multiple Sequence Alignment:** Scoring Function, Exhaustive Algorithms, Heuristic Algorithms, Practical Issues
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rd Week **13 March-18 March**	**Profiles and Hidden Markov Models:** Position-Specific Scoring Matrices, Profiles, Markov Model and Hidden Markov Model
19 March,2023	**Sunday**
4th Week **20March-25 March**	**Protein Motifs and Domain Prediction:** Identification of Motifs and Domains in Multiple Sequence Alignment, Motif and Domain Databases Using Regular Expressions, Motif and Domain Databases Using Statistical Models, Protein Family Databases, Motif Discovery in Unaligned Sequences, Sequence Logos.
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **27 March- 31 March**	**Gene and Promoter Prediction** **Gene Prediction:** Categories of Gene Prediction Programs, Gene Prediction in Prokaryotes, Gene Prediction in Eukaryotes.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject-Bioinformatics
Paper- 108

April, 2023 **1st Week** **1 April, 2023**	**Promoter and Regulatory Element Prediction:** Promoter and Regulatory Elements in Prokaryotes, Promoter and Regulatory Elements in Eukaryotes, Prediction Algorithms
2 April, 2023	**Sunday**
2nd Week **3 April -8 April**	**Molecular Phylogenetics** **Phylogenetics Basics:** Molecular Evolution and Molecular Phylogenetics, Terminology, Gene Phylogeny versus Species Phylogeny, Forms of Tree Representation, Why Finding a True Tree Is Difficult,
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April -15April**	**Phylogenetic Tree Construction Methods and Programs:** Distance-BasedMethods, Character-Based Methods, Phylogenetic Tree Evaluation, Phylogenetic programe. **Genomics and Proteomics** **Genome Mapping, Assembly, and Comparison:** Genome Mapping, GenomeSequence Assembly, Genome Annotation, Comparative Genomics **Functional Genomics:** Sequence-Based Approaches, Microarray-Based Approaches,Comparison of SAGE and DNA Microarrays **Proteomics:** Technology of Protein Expression Analysis, Posttranslational Modification, Protein Sorting, Protein–Protein Interactions
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -21 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -29 April**	**Structural Bioinformatics** **Protein Structure Basics:** Amino Acids, Peptide Formation, Dihedral Angles, Hierarchy, Secondary Structures, Tertiary Structures, Determination of Protein Three-Dimensional Structure, Protein Structure Database
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject-Bioinformatics
Paper- 108

May, 2023 **1st Week** **1 May -6 May**	**Protein Structure Visualization, Comparison, and Classification:** Protein Structural Visualization, Protein Structure Comparison, Protein Structure Classification **Protein Tertiary Structure Prediction:** Methods, Homology Modeling, Threading and Fold Recognition, Ab Initio Protein Structural Prediction, CASP **RNA Structure Prediction:** Introduction, Types of RNA Structures, RNA Secondary Structure Prediction Methods, Ab Initio Approach, Comparative Approach, Performance Evaluation
7 May, 2023	**Sunday**
2nd Week **8 May -13 May**	**Protein Secondary Structure Prediction:** Secondary Structure Prediction for Globular Proteins, Secondary Structure Prediction for Transmembrane Proteins,Coiled Coil Prediction
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject- ATC
Paper- 109-A

February,2023 **1st Week** **1Feb-4 Feb**	**Animal cell and tissues culture**: Historical background, development, advantages and limitations of cell & tissue culture
5Feb, 2023	**Guru RavidasJayanti, Sunday**
2nd Week **6Feb -11Feb**	**Requirements of cell & tissue culture:** aseptic area, incubation, preparation and sterilization, storage, specialized equipment, consumable items
12Feb, 2023	**Sunday**
3rd Week **13Feb -17 Feb**	**Aseptic techniques:** elements of aseptic environment, sterile handling, laminar flow, standard procedure
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -25 Feb**	**Culture vessels and substrates:** the substrate, choice of culture vessel, treated surfaces
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	**Culture vessels and substrates:** the substrate, choice of culture vessel, treated surfaces

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject- ATC
Paper- 109-A

March, 2023 **1st Week** **1March -4 March**	**Defined media and supplements:** physicochemical properties, balanced salt solutions, complete media, role of serum and supplements
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rd Week **13 March-18 March**	**serum free media**: advantages and disadvantages of serum and serum free media, replacement of serum, development of serum free media.
19 March,2023	**Sunday**
4th Week **20March-25 March**	**Primary culture:** types of primary cell culture, isolation of the tissue, primary culture. .
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **27 March- 31 March**	**Sub-culturing of animal cells:** Subculture and propagation, Criteria for subculture, Subculture of monolayer cells, growth cycle and split ratio, propagation and subculture in suspension

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject- ATC
Paper- 109-A

April, 2023 **1st Week** **1 April, 2023**	**Cloning and selection:** dilution and suspension cloning, scaling up in suspension and monolayer .
2 April, 2023	**Sunday**
2nd Week **3 April -8 April**	**Cell line characterization**: need for characterization, authentication, cell morphology, chromosome content, DNA content, RNA and protein expression,
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April -** **15April**	large scale production of cells using bioreactors, microcarriers and perfusion techniques
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -21** **April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**ld-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -29** **April**	enzyme activity, antigen markers.
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – SONIKA
Class- M.sc I Semester II
Subject- ATC
Paper- 109-A

May, 2023 **1st Week** **1 May -6 May**	growth cycle and split ratio,
7 May, 2023	**Sunday**
2nd Week **8 May -13 May**	large scale production of cells using bioreactors
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.sc I Semester II
Subject- PTC
Paper- 109-B

2nd Week 9Feb -11Feb	Introduction to plant cell and tissue culture and historical perspective. Laboratory organization, aseptic manipulations and culture media – composition, preparation and development.
12Feb, 2023	**Sunday**
3rd Week 16Feb -18 Feb	Callus culture; Initiation and maintenance of suspension culture- batch and continuous culture, assessment of growth and viability;
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week 23Feb -25 Feb	Static techniques of single cell culture. Organogenesis, somatic embryogenesis and synthetic seeds.
26 Feb, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.sc I Semester II
Subject- PTC
Paper- 109-B

1st Week **2 March -4 March**	Micropropagation – technique, factors affecting *in vitro* culture of plants (physical, chemical, genotypic and others), applications and limitations of micropropagation.
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rdWeek **16 March-18 March**	Meristem, shoot tip culture and production of virus free plants. Somaclonal variations, molecular basis of variation and their significance in plant breeding.
19 March,2023	**Sunday**
4thWeek **23March-25 March**	*In vitro* production of haploid plants – Androgenesis (anther and pollen culture) and Gynogenesis (ovary and ovule culture)..
23 March, 2023 **26 March, 2023**	**ShaheediDiwas / Martyrdom Day of Bhagat Singh, Rajguru & Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **30 March-1 April**	Significance and uses of haploids in agriculture. Wide hybridization and embryo rescue technique. Subculture of monolayer cells, growth cycle and split ratio, propagation and subculture in suspension

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.sc I Semester II
Subject- PTC
Paper- 109-B

4 April, 2023	**MahavirJayanti**
April, 2023 **2nd Week** **6 April-8 April , 2023**	Isolation, culture and fusion of protoplast, selection of fusion products.
9 April, 2023	**Sunday**
3rd Week **13April -15 April**	plant regeneration, assessment of somatic hybrid plants,
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -21 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**ld-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **247April -29 April**	production of cybrids, applications of protoplast culture and somatic hybridization in the improvement of crop plants
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- M.sc I Semester II
Subject- PTC
Paper- 109-B

May, 2023 **1st Week** **4 May -6 May**	*In vitro* germplasm conservation and cryopreservation.
7 May, 2023	**Sunday**
2nd Week **11 May -13 May**	To finish any remaining topic, revesion
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- M.Sc. Biotechnology Semester – II
Subject- Enzyme Technology
Paper- BT-110

February,2023 **1st Week** **1Feb-4 Feb**	History of enzymology, advantages of enzymes over chemical catalysts, Nomenclature and classification of enzymes;
5Feb, 2023	**Guru Ravidas Jayanti, Sunday**
2nd Week **6Feb -11Feb**	Determination of three dimensional structure of enzyme by X-ray crystallography and NMR spectrometry, importance of 3-D structure of an enzyme; Classification of enzyme structures, structures adopted by enzymes, principles that govern the 3-D structure adopted by enzymes;
12Feb, 2023	**Sunday**
3rd Week **13Feb -17 Feb**	Forces for stability of 3-D structure; Denaturation and renaturation;Isoenzymes, enzyme specificity, monomeric and oligomeric enzymes, multienzyme complex,
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -25 Feb**	holoenzyme, apo-enzyme, cofactor, coenzyme, prosthetic group; enzyme activity unit, turn over number and specific activity, Ribozymes and Abzymes – A brief account.
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	Enzyme action; effect of enzyme on the rate and equilibrium of a reaction;

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- M.Sc. Biotechnology Semester – II
Subject- Enzyme Technology
Paper- BT-110

March, 2023 **1st Week** **1March -4 March**	Principles that explain catalytic power and substrate specificity of enzymes; enzyme substrate complex, factors responsible for catalytic efficiency of enzyme; proximity and orientation effect, acid-base catalysis, covalent catalysis, strain and distortion theory;
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rdWeek **13 March-18 March**	Nature of active site, identification of functional groups at active sites; regulatory enzymes- covalently modulated enzymes, allosteric enzymes and their mode of action; regulation of enzyme activity in the living system.
19 March,2023	**Sunday**
4thWeek **20March-25 March**	An introduction to enzyme kinetics and its importance, Methods used for investigating the kinetics of enzyme catalyzed reactions; factors affecting the velocity of enzyme catalysed reaction; Michaelis-Menten equation, Vmax, Km and its significance; Lineweaver Burk plot- its advantages and limitations, Eadie- Hofstee and Hanes plots;
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- M.Sc. Biotechnology Semester – II
Subject- Enzyme Technology
Paper- BT-110

April, 2023 **1st Week** **1 April, 2023**	Strategies used for enzyme production, isolation and purification,
2 April, 2023	**Sunday**
2nd Week **3 April -8 April**	method of calculating the purification fold; estimation of enzyme activity; characterization of an enzyme, criteria of enzyme purity,
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April - 15April**	determination of the molecular weight (Mr) and the number of sub-units of an enzyme; enzyme immobilization and its importance;
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -21 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -29 April**	protein engineering; enzyme therapy, enzyme inhibitors and drug design; enzymes as biosensors, enzyme reactors;
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- M.Sc. Biotechnology Semester – II
Subject- Enzyme Technology
Paper- BT-110

May, 2023 **1st Week** **1 May -6 May**	Applications of enzymes in medicine, textile, leather, detergent, paper, bakery, dairy industry, beverage and fruit processing, food processing and preservation, clinical applications of enzyme estimation.
7 May, 2023	**Sunday**
2nd Week **8 May -13 May**	TEST + REVISION
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- Semester – IV
Subject- Environmental Biotechnology
Paper- BT-120

February,2023 **1st Week** **1Feb-4 Feb**	**Environmental Biotechnology :** An overview, concept, scope and market Biological control of air pollution. Bacterial examination of water for potability.
5Feb, 2023	**Guru RavidasJayanti, Sunday**
2ndWeek **6Feb -11Feb**	Testing of water for physiochemical parameters including BOD & COD. Solid waste : Sources and management (composting, wormicomposting and methane production).
12Feb, 2023	**Sunday**
3rd Week **13Feb -17 Feb**	**Waste water :** origin, composition and treatment. Physical, chemical and biological treatment of waste water. Aerobic processes : activated sludge, oxidation ponds, trickling filter towers, and rotating discs.
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -25 Feb**	Anaerobic processes: anaerobic digesters, anaerobic filters and upflow sludge blanket reactors. Microbiology and biochemistry of aerobic and anaerobic waste water treatment processes.
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	**Environmental Monitoring:** Biosensors for environalmenal applications, BOD sensor, ammonia sensor, Nitrite sensor and sulphite ion sensor.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- Semester – IV
Subject- Environmental Biotechnology
Paper- BT-120

March, 2023 **1st Week** **1March -4 March**	**Treatment of industrial effluents:** distillery effluent, paper and pulp mill effluent, tannary effluent, textile dye effluent, removal of heavy metals from waste waters.
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rdWeek **13 March-18 March**	**Bioremediation :** Bioremediation of fuel oils and lubricants in soil and water. Degradation of sulphur compounds present in coal and petroleum.
19 March,2023	**Sunday**
4thWeek **20March-25 March**	Indicator organisms: Safety indicators and Quality indicators
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **27 March- 31 March**	**Microbial Insecticides :** Bacteria, fugi and viruses. Use of R-DNA technology to enhance the efficacy microbial insecticides.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- Semester – IV
Subject- Environmental Biotechnology
Paper- BT-120

April, 2023 **1st Week** **1 April, 2023**	Biofertilizers
2 April, 2023	**Sunday**
2nd Week **3 April -8 April**	Microbes in oil recovery and bioleaching
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April - 15April**	Biodeterioration of stored plant food materials, leather, wool, metals, textiles, stone & related building.
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -21 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -29 April**	Microbial degradation of xenobiotics, genetic engineering of biodegradation pathways.
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- Semester – IV
Subject- Environmental Biotechnology
Paper- BT-120

May, 2023 **1st Week** **1 May -6 May**	Control of microbial bideterioration
7 May, 2023	**Sunday**
2nd Week **8 May -13 May**	TESTS + REVISION
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Twinkle Sugla + Manpreet Kaur
Class- M.Sc. Biotechnology Semester - IV
Subject- Animal Biotechnology
Paper- BT-121

February,2023 **1st Week** **1Feb-4 Feb**	Animal Biotechnology- Scope, global perspective and new horizons, Historical perspective, and economically important livestock breeds,
5Feb, 2023	**Guru RavidasJayanti, Sunday**
2nd Week **6Feb -11Feb**	Model animals in animal biotechnology and genetic engineering
12Feb, 2023	**Sunday**
3rd Week **13Feb -17 Feb**	Somatic Cell Genetics: Production of hybrid cells, Properties of hybrids, Applications hybrid cells,
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -25 Feb**	Gene Transfer into Animal Cells: DNA transfer techniques into mammalian cells: calcium phosphate precipitation, DEAE-dextran procedure, polycation DMSO, microinjection, electroporation;
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	Selectable markers, viral vectors for gene transfer into mammalian cells: SV40, adenovirus, vaccinia, bovine papiloma virus, baculovirus, retrovirus

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Twinkle Sugla + Manpreet Kaur
Class- M.Sc. Biotechnology Semester - IV
Subject- Animal Biotechnology
Paper- BT-121

March, 2023 **1st Week** **1March -4 March**	Transgenic animals: Transgenic mice: Methodology and applications; Transgenic cattle
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rd Week **13 March-18 March**	Biotechnology in livestock assisted reproduction, biodiversity and conservation: Biotechnology in conservation of livestock diversity,
19 March,2023	**Sunday**
4th Week **20March-25 March**	Superovulation, Embryo biotechnology- Embryo collection, evaluation, and transfer, IVF and *in vitro* embryo production
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **27 March- 31 March**	Cryobanking of germplasm, oocytes and sperm, Somatic cell nuclear transfer, Stem cells technology in livestock

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Twinkle Sugla + Manpreet Kaur
Class- M.Sc. Biotechnology Semester - IV
Subject- Animal Biotechnology
Paper- BT-121

April, 2023 **1st Week** **1 April, 2023**	**TEST**
2 April, 2023	**Sunday**
2nd Week **3 April -8 April**	Animal cloning**:** Concepts of animal cloning, Principles and techniques of cloning, Applications of animal cloning.
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April - 15April**	Animal genomics: crucial role for health and biomedical sciences. Models used in animal genomics.
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -21 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -29 April**	Livestock transgenesis- production of drugs using animals
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Twinkle Sugla + Manpreet Kaur
Class- M.Sc. Biotechnology Semester - IV
Subject- Animal Biotechnology
Paper- BT-121

May, 2023 **1st Week** **1 May -6 May**	Functional genomics and livestock traits assessment, Livestock in the post genomic era of biology and medicine
7 May, 2023	**Sunday**
2nd Week **8 May -13 May**	TEST + REVISION
14 May, 2023	**Sunday**
17May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc Ist Biotechnology SEMESTER II
Subject- General Microbiology
Paper- III

February,2023 **1st Week** **1Feb**	Introduction and Scope of Microbiology Definition and history of microbiology, contributions of Antony van Leeuwenhoek, Louis Pasteur, Robert Koch, Importance and scope of Microbiology as a modern Science Branches of microbiology
5Feb, 2023	**Guru RavidasJayanti, Sunday**
2nd Week **6Feb -8Feb**	Microscope Construction and working principles of different types of microscopes – compound, dark field, Phase contrast, Fluorescence and Electron (Scanning and transmission
12Feb, 2023	**Sunday**
3rd Week **13Feb -15Feb**	Microbial techniques Sterilization: Principles and Applications of a. Physical Methods.Autoclave, Hot air oven, Laminar airflow, Seitz filter, Sintered glass filter,
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -22 Feb**	membrane filter.b. chemical Methods: Alcohol, Aldehydes, Phenols, Halogens and Gaseous agents.
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	Radiation Methods: UV rays and Gamma stains. Stains and staining techniques: Principles of staining, types of stains – simple stains, structural stains and Differential stains

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc Ist Biotechnology SEMESTER II
Subject- General Microbiology
Paper- III

March, 2023 **1st Week** **1March -2 March**	Microbial Taxonomy Concept of microbial species and strains, classification of bacteria based on – morphology (shape and flagella
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rd Week **13 March-15 March**	Staining reaction, nutrition and extreme environment. General Account of Viruses and Bacteria
19 March,2023	**Sunday**
4th Week **20March-22March**	Bacteria – Ultrastructure of bacteria cell (both Gram positive and Gram negative) including endospore and capsule
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **27 March-29 March**	Viruses – Structure and classification Plant viruses – CaMV Animal viruses – Hepatitis B Bacterial Virus – Lamba Phage Pathogenic Microorganisms

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc Ist Biotechnology SEMESTER II
Subject- General Microbiology
Paper- III

April, 2023 **1st Week** **1 April, 2023**	Bacterial diseases of man – tetanus, Tuberculosis, Pneumonia and Cholera
2 April, 2023	**Sunday**
2nd Week **3 April -5 April**	Bacterial diseases of man – tetanus, Tuberculosis, Pneumonia and Cholera
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April -** **12April**	Viral diseases: AIDS (HIV)
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -19** **April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -26** **April**	Microbial Growth and Metabolism
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc Ist Biotechnology SEMESTER II
Subject- General Microbiology
Paper- III

May, 2023 **1st Week** **1 May -3 May**	Kinetics of microbial growth, growth curve, synchronous growth, factors affecting bacterial growth Respiration: EMP, HMP and ED Pathways,
7 May, 2023	**Sunday**
2nd Week **8 May -10 May**	Kreb's cycle, Oxidative Phosphorylation. Bacterial Photosynthesis: Photosynthetic apparatus in prokaryotes, Photophosphorylation & Dark reaction.
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc Ist Biotechnology SEMESTER II
Subject- Biochemistry II
Paper- IV

2nd Week **9Feb -11Feb**	Enzymes: Introduction, active site, energy of activation, transition state hypothesis
12Feb, 2023	**Sunday**
3rd Week **16Feb -18Feb**	lock and key hypothesis, induced fit hypothesis. Enzyme classification (Major classes only)
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **23Feb -25 Feb**	Enzyme Kinetics –substrate concentration, Km, Vmax, MM equation,
26 Feb, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc Ist Biotechnology SEMESTER II
Subject- Biochemistry II
Paper- IV

1st Week 2 March -4 March	Lineweaver Burk plot/Double reciprocal plot. Effect of pH, temperature on enzyme activity. Allosteric enzymes
2nd Week 5 March -12 March, 2023	Holi Break
3rd Week 16 March-18 March	Enzyme Inhibition – Competitive, non-competitive and uncompetitive inhibition.
2nd Week 5 March -12 March, 2023	**Holi Break**
3rd Week 16 March-18 March	Enzyme Inhibition – Competitive, non-competitive and uncompetitive inhibition.
19 March,2023	**Sunday**
4th Week 23 March-25 March	Vitamins and Hormones: Introduction. Types of vitamins – structure of water soluble vitamins and their coenzyme derivatives, Fat soluble vitamins Deficiency symptoms and dietary sources.
23 March, 2023 26 March, 2023	**ShaheediDiwas/Martyrdom Dayof Bhagat Singh, Rajguru&Sukhdev Sunday**
30 March, 2023	**Ram Navmi**
5th Week 31 March	Hormones: structure and importance, Peptide Hormones: structure and function of important peptide hormones.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc Ist Biotechnology SEMESTER II
Subject- Biochemistry II
Paper- IV

April, 2023 **1st Week** **1 April, 2023**	Metabolism: General introduction, catabolism and anabolism
2 April, 2023	**Sunday**
2nd Week **6 April - 8 April**	Glycolysis, Tricarboxylic acid cycle, Gluconeogenesis Glycogenolysis, glycogen synthesis and their regulation,
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **13April -15 April**	Lipid Metabolism: β-oxidation of fatty acids. Degradation of Triacylglycerols.
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -19 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
4thWeek **20 April -21 April**	Synthesis of Fatty acids
5thWeek **27 April -29 April**	Amino acid Metabolism: Transamination
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc Ist Biotechnology SEMESTER II
Subject- Biochemistry II
Paper- IV

May, 2023 **1st Week** **4 May - 6 May**	Oxidative deamination, decarboxylation.
7 May, 2023	**Sunday**
2nd Week **11 May -13 May**	Urea cycle. Different classes of oxidation and synthesis of amino acids. Glycogenic and ketogenic amino acids.
14 May, 2023	**Sunday**
17 May, 2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- Recombinant DNA Technology
Paper- VIII

3rd Week **13Feb -15Feb**	Recombinant DNA Technology and Genetic Engineering: Introduction, history, scope and applications..
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -22 Feb**	Tools of Recombinant DNA technology: Steps in gene cloning. Gene cloning tools – Restriction enzymes- class I, II and class III restriction enzymes, their features. Ligases,
26 Feb, 2023	**Sunday**
5th Week **27 Feb -1 March**	polymerases, alkaline phosphatases, kinases, transferases and other DNA engineering enzymes. Gene Cloning Vectors: Introduction, nomenclature of vectors, properties of a suitable vector.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- Recombinant DNA Technology
Paper- VIII

March, 2023 **1stWeek** **6March -8 March**	Plasmid vectors, bacteriophage, cosmids and phagemids. Properties of host. M13 vectors. Expression vectors, shuttle vectors.
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rdWeek **13 March-15 March**	Vectors for cloning in eukaryotic cells, YACs and BACs. Isolation of gene of interest and vector DNA cohesive and blunt ends, modification of cut ends, linkers and adaptors.
19 March,2023	**Sunday**
23 March, 2023 **25 March, 2023**	**ShaheediDiwas/Martyrdom Dayof Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- Recombinant DNA Technology
Paper- VIII

2 April, 2023	**Sunday**
2nd Week **3April -5April**	Construction of Genomic and cDNA library, advantages and limitations, screening of gene libraries. Basic features and applications of PCR. PCR types and modifications.
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April -12 April**	Site directed mutagenesis. Restriction enzyme digestion and restriction mapping Southern and Northern analysis DNA finger printing. PAGE, Western blotting, dot blots and slot blots.
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -19 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**ld-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -26 April**	RFLP, RAPD (brief only), microarrays. Gilbert's method, Sanger's dideoxy chain termination method, Automated DNA sequencing.
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Dr. Twinkle Sugla
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- Recombinant DNA Technology
Paper- VIII

May, 2023 **1st Week** **1 May – 3 May**	Promoters- tissue specific promoters, wound inducible promoters, strong and regulated promoters. Increasing protein yield-factors affecting level of recombinant protein production. Production of recombinant proteins in E. coli, translational and transcriptional fusion- advantages and disadvantages.
7 May, 2023	**Sunday**
2nd Week **8 May -10 May**	Production of recombinant proteins of pharmaceutical importance- insulin, human growth hormone, recombinant vaccines (hepatitis B) etc. Transgenic plants and animals.
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- BIOINFORMATICS
Paper- IX

February,2023 **2st Week** **4Feb**	History, scope and importance of bioinformatics.
5Feb, 2023	**Guru RavidasJayanti, Sunday**
2ndWeek **9Feb -11Feb**	Introduction to Genomics – information flow in Biology, DNA sequence database.
12Feb, 2023	**Sunday**
3rd Week **15Feb -17Feb**	experimental approach to genome sequence data, genome information resources.
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **22Feb -24 Feb**	Functional Proteomics – protein sequence and structural data, protein information resources and secondary data bases
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	Computational Genomics - Internet basics, biological data analysis and application, sequence data bases, NCBI model, File format.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- BIOINFORMATICS
Paper- IX

March, 2023 **1st Week** **2March -4 March**	Sequence alignment and data base search – protein primary sequence analysis, algorithm BLAST, multiple sequence alignment.
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rd Week **9 March-11 March**	DATA base searching using BLAST and FASTA
19 March,2023	**Sunday**
23 March, 2023 **25 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **30March-**31 **March**	NCBI model, File format

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- BIOINFORMATICS
Paper- IX

April, 2023 **1st Week** **1 April, 2023**	Predictive methods using DNA and protein sequences
2 April, 2023	**Sunday**
2nd Week **7 April -8 April**	Predictive methods using DNA and protein sequences
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **13April - 15April**	Synthesis of Fatty acids. Amino acid Metabolism: Transamination
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -19 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**ld-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **27 April -29 April**	Oxidative deamination, decarboxylation. Urea cycle.
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Sonika
Class- B.sc IInd Biotechnology SEMESTER IV
Subject- BIOINFORMATICS
Paper- IX

May, 2023 **1st Week** **4 May -6 May**	Glycogenic and ketogenic amino acids
7 May, 2023	**Sunday**
2nd Week **11 May -13 May**	Secondary database and Ravision
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- B.Sc. Biotechnology SEMESTER VI
Subject- Microbial Biotechnology
Paper- XIII

February,2023 **1st Week** **1Feb-**	Microbial Biotechnology: Historical landmarks, General concept.
5Feb, 2023	**Guru RavidasJayanti, Sunday**
2ndWeek **6Feb -8Feb**	Screening and Isolation of Micro organisms: Industrially important microbes, their screening and isolation, enrichment culture. Strain improvement-bacterial genetics, mutant selection, recombination,
12Feb, 2023	**Sunday**
3rd Week **13Feb -15 Feb**	Recombinant DNA technology, Strain preservation and maintenance.
18 Feb, 2023 **19 Feb,2023**	**MahaShivaratri** **Sunday**
4th Week **20Feb -22 Feb**	Nutrition and cultivation of microorganisms: Basic nutrition and metabolism, Natural and Synthetic media, Sterilization techniques,
26 Feb, 2023	**Sunday**
5th Week **27 Feb -28 Feb**	Microbial growth kinetics. Fermentation types – Continuous, Batch fed culture, Solid state and Submerged.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- B.Sc. Biotechnology SEMESTER VI
Subject- Microbial Biotechnology
Paper- XIII

March, 2023 **1st Week** **1March**	Quantification of growth, thermodynamics of growth, effect of different factors on growth. Fermentation concepts and types.
2nd Week **5 March -12 March, 2023**	**Holi Break**
3rd Week **13 March-15 March**	Microbial Fermenters/Bioreactors: Basic design of fermenters. Physco-chemical standards used in bioreactors (agitation, aeration, ph, temp., dissolved oxygen etc.). Types of fermenters stirred tank, bubble column, airlift etc
19 March,2023	**Sunday**
4th Week **20March-22 March**	Genetically engineered microbes: concept and technique; use of GEM in Agriculture, Industry and Medicine
23 March, 2023 **26 March, 2023**	**ShaheediDiwas/Martyrdom Day of Bhagat Singh, Rajguru&Sukhdev** **Sunday**
30 March, 2023	**Ram Navmi**
5th Week **27 March- 29 March**	Process Development and Downstream Processing: Shake flask fermentation, scale up of the process. Downstream processing – Separation of particles, disintegration of cells, extraction, concentration, purification and drying of the products.

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- B.Sc. Biotechnology SEMESTER VI
Subject- Microbial Biotechnology
Paper- XIII

April, 2023 **1st Week** **1 April, 2023**	Microbial Products: a brief discussion about production of certain industrial products such as – Alcohol, Alcoholic beverage (Beer),
2 April, 2023	**Sunday**
2nd Week **3 April -5 April**	Organic acids (citric acid), Antibiotics (penicillin), Amino acids (glutamic acid0, Vitamin (B12), enzymes (protease, alpha-amylase)
4 April, 2023 **9 April, 2023**	**MahavirJayanti** **Sunday**
3rd Week **10April - 12April**	brief account of Steroid Biotransformation. Microbial Foods: Single Cell Proteins. Sewage waste water treatment technique and plants. Biodegradation of xenobiotic compounds.
14 April, 2023 **16 April, 2023**	**Vaisakhi/Dr. B.R. AmbedkarJayanti** **Sunday**
4thWeek **17 April -19 April**	**Sessional Exams**
22 April, 2023 **23 April, 2023**	**Id-Ul-Fitr/ParshuramJayanti** **Sunday**
5thWeek **24 April -26 April**	Microbial polysaccharides and polyesters; production of xanthan gum and polyhydroxyalkanoides (PHA).
30 April, 2023	**Sunday**

KVA DAV College for Women, Karnal

Lesson Plan For The Even Semester
(February to May, 2023)

Name of the Teacher – Manpreet Kaur
Class- B.Sc. Biotechnology SEMESTER VI
Subject- Microbial Biotechnology
Paper- XIII

May, 2023 **1st Week** **1 May -3 May**	Bioconversions – Biomining and bioleaching. Biogas production
7 May, 2023	**Sunday**
2nd Week **8 May -10 May**	Microbial technology in agriculture- Bioinsecticides, bioherbicides, biocontrol agents for disease control, advantages over chemical methods. Biofertilizers.
14 May, 2023	**Sunday**
17 May,2023 Onwards	**University Examinations**