SARDAR PATEL UNIVERSITY
Biotechnology Core Paper I
4 credits(4 lecture/wk)
(Semester---IV Code:US04CBIT21
(Title: Molecular Biology)

Unit I--Replication- definition, property and features of prokaryotic DNA replication. Unidirectional and bidirectional replication. Initiation, elongation and termination of replication. Enzymes and proteins involved in replication. Closed clamp and rolling circle model of replication.Regulation of prokaryotic replication.

Unit II--Transcription- Definition, concept of gene, promoter. Initiation, elongation, termination and anti termination of transcription. Operon concept- lac and trp operon. Translation- An overview of translation in prokaryotes. Initiation , elongation and termination of translation.

Unit III---DNA modifying enzymes-- Restriction enzymes source, Classes of restriction enzymes. Nomenclature, properties. Application of restriction enzymes. Host controlled restriction and modification system in bacteria. Ligation properties, types and function of DNA ligase, Linkers, adaptors, homoploymer tailing, and exonucleases,.

UNIT IV-- Principle and methods for isolation of chromosomal DNA from bacteria, plant and animal (phenol extraction, CTAB, and Nonidet methods) and plasmid DNA(alkali-lysis,). Measuring nucleic acid concentration & purity, Cot curve, Denaturation & renaturation of DNA.Separation of nucleic acid by centrifugation, chromatograhic methods and electrophoretic methods

References:

Biotechnology – Expanding Horizon – B D Singh (1st Edition)
Biochemistry – Harper
Molecular Biology of gene – Watson, Hopkins & Roberts (4th Edition)
Genomics – T A Brown (3rd Edition)
Principles of Biochemistry – Lehninger and Cocks (4th Edition)
Elements of biotechnology – P.K. Gupta
Text book of Biotechnology—R C Dubey

SARDAR PATEL UNIVERSITY
BSc Biotechnology core paper--II
4 credits(4 lecture/wk)
(Semester---IV Code:US04CBIT22
(Title: Plant and animal Biotechnology)

Unit I --- Plant tissue culture -- Sterilization techniques used in plant tissue culture. Preparation and Composition of MS medium and role of ingredients. Introduction to various terms used in plant tissue culture. Somatic organogenesis and somatic embryogenesis- introduction, process, factors affecting , and significance. Synthetic seeds preparation and significance.

Unit-II--Organ culture- embryo, anther, pollen and meristem culture in detail. Protoplast culture- isolation, and culture of protoplast. Protoplast fusion methods, screening and selection of somatic hybrids, cytoplasmic hybrids- methods of fusion and significance of cybrid.

Unit-III Animal cell and tissue culture-basic concepts. Historical landmarks. Laboratory facility. Media-natural and artificial. General steps for culture of any animal cell. Process of sub-culturing. Concept of cell line- finite and continuous. Application of animal cell and tissue culture.

Unit-IV- Introduction to stem cells its types and applications. Introduction to gene cloning, preparation of competent cells. Construction of recombinant DNA and gene transfer methods in animals. Visual selection by markers (selectable and scorable), insertional inactivation.

References:

Plant tissue culture – Kalyan Kumar De (1st Edition)
Plant tissue culture and organ culture – Reinert and Bajaj (1st Edition)
Animal Cell Culture – Freshney
Biotechnology in crop improvement – Harvinder Singh Chawla (1st Edition)
Plant Tissue culture- Rajdhan
Biotechnology – B D Singh
Genetics – P K Gupta
Cell biology, genetics, molecular biology, evolution and ecology- P.S. Verma and R.S. Agarwal

SARDAR PATEL UNIVERSITY
BSc Biotechnology Practical Syllabus
Course-US04CBIT23
(Two credit course;4 hours per week)
(Effective from June, 2019)

1. Study of lab instruments (centrifuge, spectrophotometer, electrophoresis apparatus, transilluminator,)
2. Isolation of genomic DNA from *E coli* by phenol extraction
3. Isolation of genomic DNA from plant by CTAB method
4. UV absorption of isolated DNA and spot test
5. Plasmid DNA isolation by alkali lysis method
6. DNA isolation from blood by Nonibet method

BSc Biotechnology Practical Syllabus
(Two credit course;4 hours per week)
(Effective from June, 2019)

1. Study of laboratory instruments(autoclave, microscope, laminar air Flow ,pH meter, incubator, hot air oven)
2. Preparation of MS medium
3. embryo culture
4. Callus culture
5. stem culture
6. Isolation of serum
7. Differential count of Leucocytes
8. Blood grouping
9. Encapsulation of embryo to prepare synthetic seed.