Department of Biochemistry

Interdisciplinary Experiments conducted by the department:

1. Preparation of Haemin and Hemochromogen crystals
2. To evaluate soap and alcohol and sanitizer as an antiseptic
3. Study of Genetic Variation in human populations and applications of Hardy-Weinberg Law
4. Use of various resources on the National Centre for Biotechnology Information (NCBI) (introduced in 2020-21)
5. Utilize ProtParam for computation of various physical and chemical parameters for a given protein (introduced in 2020-21)
6. Navigate UniProt to access high-quality and freely accessible resource of protein sequence and functional information (introduced in 2020-21)
7. Design primers of chosen gene for amplification by Polymerase Chain Reaction
8. Isolation of genomic DNA from blood
9. Use of Bioinformatics tools in sequence analysis: DNA and protein using BLAST, Multiple sequence alignment and phylogenetic analysis

Additional practicals/ techniques conducted by the department:

1. Separation of plasma proteins using SDS PAGE (Interdisciplinary)
2. To determine the purity of DNA by UV spectrophotometry
3. Immunoblotting (Interdisciplinary)
4. Bio-informatics Software: Comparison of sequences
5. Stereomicroscopy: Various aspects of *Drosophila* genetics
6. Density Gradient Centrifugation: RNA analysis
7. Design primers of chosen gene for amplification by Polymerase Chain Reaction (introduced in 2020-21)

Department of Botany

Interdisciplinary Experiments conducted by the department:

1. Development of conducting strand in different groups of plants (algae, bryophytes, pteridophytes, gymnosperms and angiosperms)
2. Comparative study of water loss from a xerophyte and mesophyte using $CoCl_2$ method.
3. Spectroscopic measurement of the total capsaicin content as an indicator of pungency in chilli powder.
4. To understand Hardy-Weinberg's Law/ Population Genetics using PTC taster-non tasters test.
5. To study the stigma receptivity of different plants through stigma surface esterase activity *in vitro*.
6. To ascertain percentage ovule receptivity of different plants and compute the seed to ovule ratio.
7. To perform gene annotation using ORF finder (introduced in 2020-21)
8. (A) To study the Classification of databases (introduced in 2020-21)

(B) To retrieve nucleotide sequence of a given gene from the GenBank, National Centre for Biotechnology Information Database. (introduced in 2020-21)

9. To prepare agar-based Murashige and Skoog (MS) Medium and inoculate explants from available plant species for tissue culture. (introduced in 2021-22)

10. To design specific DNA primers and amplify known DNA sequence using Polymerase Chain Reaction (PCR technique). (introduced in 2021-22)

Additional practicals/ techniques conducted by the department:

1. ORF finder
2. Nucleotide Sequence Retrieval
3. Herbarium Techniques
4. Microscopy
5. PCR
6. Tissue Culture

Department of Chemistry

Interdisciplinary Experiments conducted by the department:

1. Comparative study of presence of Na, Ca, K in cold drinks and coconut water using flame photometric techniques.
2. Separation of anions by Dowex 21K exchange resin.
3. To synthesize Dibenzalacetone by Claisen-Schmidt condensation reaction
4. To perform a rearrangement reaction of Benzyl into benzilic acid.
5. To estimate the concentration of Ca/Mg ions in the commercially available supplement tablets complexometrically by using EDTA as complexing agent.
6. Complexometric estimation of Al^{3+} using Eriochrome black-T as indicator.
7. Estimation of Vitamin C in different brands of packed juices.

Additional practicals/ techniques conducted by the department:

1. Determination of cholesterol using Liebermann-Burchard reaction.
2. Preparation of nail polish
3. To construct the standard curve of the maltose using DNSA method and determine the activity of α-amylase.
4. Separation of a mixture of o- and p-nitrophenol or o- and p-aminophenol by Thin Layer Chromatography (TLC).
5. Distillation
6. Solvent Extraction
7. Column Chromatography
8. Online Softwares (ChemDraw, MolView, JMol, Praxi Lab etc.) (introduced in 2020-21)

Department of Zoologys

Interdisciplinary Experiments conducted by the department:

1. Detection of a protein of interest by Dot-ELISA method.
2. Amplification of 16s rRNA gene

3. Effect of differential distribution of sex-chromosomes on gender probability
4. To study the effect of Genetic Drift on allele frequencies of small population using simulation set up
5. To demonstrate diffusion of proteins of different sizes across the semi-permeable membrane/ dialysis tubing of different molecular weight cut off limits and detection by SDS-PAGE
6. To learn in-silico ligand based drug design using bioinformatics software tool.
7. Study of polyploidy in onion root tip by Colchicine treatment
8. Preparation of DNA Model using wire and differential color beads
9. Preparation of structures of common amino acids using differential colour beads and sticks.
10. To document the Habit and Habitat of the fauna of Shivaji College.
11. A Cost-Effective and Efficient egg windowing method to teach early embryonic development in chick (*Gallus gallus domesticus*) to under-graduate students

Additional practicals conducted by the department:

1. Polymerase chain Reaction:To amplify 16S rRNA gene.
2. ELISA: Quantifying a given antibody (Sandwich ELISA)
3. Microbiology: Studying antibiotic resistance
4. Manipulating chick (*Gallus gallus domesticus*) embryo to study early osteogenesis and apoptosis
5. Primer designing
6. Immunoelectrophoresis
7. Restriction digestion of DNA