

**M.G. Science Institute, Autonomous**

**Affiliated to Gujarat University,**

**Ahmedabad (Managed by The Ahmedabad**

**Education Society)**

**Department of Biotechnology**

**Programme: Bachelor of Science (Hons.) in Biotechnology**

**SYLLABUS**

**(Effective from Academic Year 26-27)**

|                         |                                 |           |
|-------------------------|---------------------------------|-----------|
| Semester: V             | Title: Biotechnology Practicals | Credit: 4 |
| Course Code: BTM353 (P) |                                 | 8hr/week  |

- **CO1** – Demonstrate bacterial conjugation and study gene transfer mechanisms in *E. coli*.
- **CO2** – Perform and understand plasmid isolation and GFP-based gene expression.
- **CO3** – Generate and isolate bacterial mutants through physical and chemical mutagenesis.
- **CO4** – Apply techniques like gradient plates and replica plating to study antibiotic resistance.
- **CO5** – Isolate and characterize enzyme-producing microbes using screening and assay techniques.
- **CO6** – Identify and characterize petite mutants in yeast to study mitochondrial genetics.

#### CO-PO Mapping

| CO / PO    | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------------|-----|-----|-----|-----|-----|-----|
| <b>CO1</b> | 3   | 2   | 2   | 2   |     |     |
| <b>CO2</b> | 3   | 2   | 3   | 3   | 2   |     |
| <b>CO3</b> | 3   | 3   | 2   | 3   |     |     |
| <b>CO4</b> | 3   | 2   | 3   | 2   |     | 2   |
| <b>CO5</b> | 3   | 3   | 3   | 3   | 2   | 2   |
| <b>CO6</b> | 2   | 2   |     | 3   |     |     |

1. Conjugation in *E. coli* by plate method
2. Isolation of plasmid (only demonstration experiment)
3. Isolation of Lactose non fermenter mutant of *E. coli* by UV
4. Isolation of antibiotic resistant bacteria population by gradient-plate method.
5. Isolation of streptomycin resistant mutants by Replica plating technique.
6. Assay of Alpha – Amylase by iodometric method
7. Screening of enzyme producers
8. Isolation of petite yeast mutant
9. Phosphatase assay from natural samples
  - a) Effect of Substrate concentration on enzyme activity
  - b) Effect of pH and temperature on enzyme activity
  - c) Effect of Enzyme inhibitors on enzyme activity

#### References

**1. *Experiments in Microbiology, Plant Pathology and Biotechnology***

Author(s): K.R. Aneja Publisher: New Age International Publishers

**2. *Molecular Biology of the Gene***

Author(s): James D. Watson et al. Publisher: Pearson Education

**3. *Microbial Genetics***

Author(s): Stanley Maloy, John Cronan, David Freifelder Publisher: Jones and Bartlett

**4. *Molecular Cloning: A Laboratory Manual***

Author(s): Sambrook & Russell Publisher: Cold Spring Harbor Laboratory Press

**5. *Biochemical Methods***

Author(s): Sadasivam & Manickam Publisher: New Age International Publishers

**6. *Manual of Industrial Microbiology and Biotechnology***

Author(s): Arnold Demain, Julian Davies Publisher: ASM Press

**7. *Principles of Genetics***

Author(s): Snustad & Simmons Publisher: Wiley