

SEMESTER-VI

BTC DSM 351P

GENETICS AND MOLECULAR BIOLOGY

Contact Hours: 60

Full Marks = 100

Two Experiments are to be performed – one from each part

Course Objective: *The practical course aims to develop essential laboratory skills in genetics and bioprocess technology. Students will learn to prepare and analyze mitosis and meiosis mounts, perform karyotyping, construct pedigree charts, and induce polyploidy in plants. In bioprocess technology, they will isolate and screen microorganisms, construct bacterial growth curves, calculate TDP, and observe ethanol production.*

Part A: Genetics

1. Permanent and temporary mount of mitosis.
2. Permanent and temporary mount of meiosis.
3. Karyotyping with the help of photographs
4. Pedigree charts of some common characters like blood group, color blindness etc.
5. Study of polyploidy in onion root tip by colchicine treatment.

Part B: Molecular Biology

1. Preparation of solutions for Molecular Biology experiments
2. Isolation of genomic DNA from plant or animal tissue.
3. Isolation of chromosomal DNA from bacterial cells.
4. Isolation of Plasmid DNA by alkaline lysis method.
5. Agarose gel electrophoresis of genomic DNA.
6. Agarose gel electrophoresis of plasmid DNA.
7. Preparation of restriction enzyme digests of DNA samples.

Course Outcome: *By the end of this course, students will have acquired knowledge of mitosis and meiosis, as well as the technique of karyotyping and pedigree analysis. Students will also acquire practical knowledge on molecular biology, including DNA isolation and agarose gel electrophoresis. This comprehensive understanding of genetics and molecular biology will prepare students for further studies or careers in genetics, biotechnology, and related fields.*

SUGGESTED READING

1. Thompson, E. A. (1986). Pedigree Analysis in Human Genetics. United Kingdom: Johns Hopkins University Press.
2. Jones, R. N., Rickards, G. K. (1991). Practical Genetics. United Kingdom: Open University Press.
3. Sambrook J, Fritsch EF and Maniatis T. (2001). Molecular Cloning-A Laboratory Manual. 3rd edition. Cold Spring Harbor Laboratory Press.