

**Dibrugarh University**  
**ডিব্ৰুগড় বিশ্ববিদ্যালয়**



**Board of Studies**  
**Centre for Biotechnology and Bioinformatics**  
**জৈৱপ্ৰযুক্তি আৰু জৈৱতথ্যপ্ৰযুক্তি কেন্দ্ৰ**

**Syllabus**  
**for**  
**One-Year Post Graduate Diploma**  
**in**  
**Bioinformatics**

Approved by BoS, Biotechnology and Bioinformatics,

Dibrugarh University

Dated:20/03/2026

## Programme Details

### 1. Scope

The one-year Post Graduate Diploma in Bioinformatics is designed to bridge the gap between biological sciences and computational technologies. With the rapid expansion of high-throughput biological data such as genomics, proteomics, and metabolomics, there is an increasing demand for skilled professionals capable of analyzing, interpreting, and managing large-scale biological datasets.

This programme equips learners with interdisciplinary knowledge in biology, statistics, computer science, and data analytics. Graduates of this programme can pursue careers in:

- Bioinformatics and computational biology industries
- Pharmaceutical and biotechnology companies
- Clinical research and healthcare analytics
- Genomics and proteomics research laboratories
- Agricultural and environmental biotechnology sectors
- Academic research and higher studies (M.Sc., Ph.D.)

The programme also prepares students for emerging domains such as AI-driven drug discovery, precision medicine, systems biology, and Big Data analytics in life sciences.

### 2. Programme Objectives (POs)

The programme aims to:

**PO1:** Provide foundational and advanced knowledge in bioinformatics, molecular biology, and computational biology.

**PO2:** Develop proficiency in biological data analysis using bioinformatics tools, databases, and algorithms.

**PO3:** Equip students with programming, Linux environment, and data science skills for handling large-scale biological data.

**PO4:** Build competence in statistical analysis and interpretation of biological datasets.

**PO5:** Introduce structural bioinformatics, molecular modelling, and computer-aided drug design approaches.

**PO6:** Enable students to apply machine learning and Big Data technologies in biological and biomedical research.

**PO7:** Develop problem-solving, analytical thinking, and interdisciplinary research skills.

**PO8:** Promote ethical practices, reproducibility, and collaborative research in computational biology.

### 3. Programme Specific Outcomes (PSOs)

Upon successful completion of the programme, students will be able to:

**PSO1:** Retrieve, analyze, and interpret biological data from major databases using bioinformatics tools.

**PSO2:** Perform sequence analysis, alignment, and structural analysis of biomolecules using computational approaches.

**PSO3:** Operate effectively in Linux-based environments and develop scripts for automating bioinformatics workflows.

**PSO4:** Apply statistical methods and data science techniques to analyze biological datasets.

**PSO5:** Develop and apply machine learning models for biological data interpretation and prediction.

**PSO6:** Perform molecular modelling, QSAR analysis, and molecular dynamics simulations for drug discovery.

**PSO7:** Handle large-scale biological datasets using programming (Python/R) and Big Data tools.

**PSO8:** Design and execute independent research projects, demonstrating scientific reasoning and technical expertise.

### 4. Programme Structure

The programme is of one-year duration, divided into two semesters, with a total of 45 credits.

#### Semester I

- **PGDB-I:** Bioinformatics Fundamentals and Biological Databases (4 Theory + 1 Practical)
- **PGDB-II:** Linux and System Development (4 Theory + 1 Practical)
- **PGDB-III:** Biostatistics, Biomolecules, Cell Biology and Molecular Biology (4 Theory + 1 Practical)
- **PGDB-IV:** Structural Bioinformatics and Proteome-based Technology (4 Theory + 1 Practical)
- **PGDB-V:** Data Science (4 Theory + 1 Practical)

**Total Semester I Credits: 25**

#### Semester II

- **PGDB-VI:** Introduction to Big Data Analytics (4 Theory + 1 Practical)

- **PGDB-VII:** Molecular Modeling and Drug Design (4 Theory + 1 Practical)
- **PGDB-VIII:** Project / Dissertation (10 Credits)

**Total Semester II Credits: 20**

### **Minimum Eligibility Criteria**

Candidates seeking admission to the Post Graduate Diploma in Bioinformatics must possess a Bachelor's degree in an appropriate field of science or technology from a recognized university/institution.

#### **Eligible qualifications include:**

- B.Sc. / B.Tech. in Biomedical Sciences, Microbiology, Life Sciences, Botany, Zoology, Chemistry, Food Science, Food Technology, Biotechnology, or related disciplines
- B.E. (Bachelor of Engineering)
- B. Pharma (Bachelor of Pharmacy)
- MBBS / BDS / BAMS / BUMS / BHS
- Any other equivalent qualification in a relevant discipline recognized by the competent authority

Students who are currently pursuing or have already completed a **Postgraduate (PG) degree** in relevant disciplines may also apply for the programme.

Candidates from allied and interdisciplinary backgrounds with a strong foundation in biological sciences and/or computational skills may be considered, subject to approval by the competent authority.