Internship in Botany (2025-2026)
Credit:4
Duration: 120 hours

Organized by

Department of Botany (UGC-DRS &DST-FIST Sponsored),
Siksha Bhavana (Institute of Science),
Visva-Bharati (A Central University), Santiniketan – 731235, W.B.

Courses Offered:

IPBOT-1	**Fundamental OMICS: Tools and Application**	**Intake capacity: 8 students**
IPBOT-2	**Hands-On Training in Plant Biology and Conservation: From Lab Techniques to Field Studies**	**Intake capacity: 12 students**
IPBOT-3	**Algal culture techniques**	**Intake capacity: 2 students**

Total intake capacity: 22 students

- **Eligibility:** Studying Four-Year Undergraduate Program (NEP) in Life Sciences and allied subjects/related disciplines.

- **Enrollment:** Applicants should be enrolled by filling up the Google Form Link: https://forms.gle/PHHhdSXJsuBM4fjcA by **5th June 2025**.

- **Short-listing:** Candidates will be short-listed on the basis of their obtained marks in **Biology at 10+2 or equivalent level**. Short-listed candidates will be communicated with the payment link by **10th June 2025.**

Coordinators:

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Internship in Botany-1 (IPBOT-1)

1. **Title of the UG internship programme:** Fundamental OMICS: Tools and Application
2. **Nature of Internship Programme:** Research-based for developing research aptitude
3. **Description of the internship programme:**

The course will provide a hands-on skill development and research-aptitude development platform that allows the student to acquire the knowledge for understanding, analysing, and interpreting the biological databases, current computational tools, online servers related to *in silico* studies on biological macromolecules and different group of organisms.

Course structure: (Total duration: 120 hrs)

I. Introduction to biological macromolecules and their role in cellular function (Theory) 10 hrs

a. Cellular structures
b. Nucleic acids: DNA & RNA structure
c. Proteins: Structure and properties

II. Fundamental genomics and biological sequence data analysis (Theory& Hands-on) 10 hrs

a. Exploring database like NCBI and understanding related tools
b. Biological sequence data retrieval from NCBI.
c. Understanding different sequence formats.
d. BLAST
e. Multiple Sequence Alignment
f. Phylogenetic tree preparation and its interpretation.

III. Cloning, gene amplification and oligonucleotide primer designing (Theory& Hands-on) 10 hrs

a. DNA replication
b. Molecular cloning
c. Polymerase chain reaction
d. Primer designing and optimization
e. Sequence Manipulation Suite, Primer3, Oligocalculator, Gene runner

IV. *In silico* protein sequence analysis and structure prediction (Theory& Hands-on) 10 hrs

a. Exploring database like NCBI, EMBL, UnitProt, and understanding related tools.
b. Different protein BLAST
c. Primary structure analysis with ExPasy Proparam tool.
d. Secondary structure prediction with PSIPRED, JPRED, SOPMA.
e. Tertiary structure prediction with SWISS-MODEL, AlphaFold.
f. Visualization of the 3D models with Pymol.

g. Preparation of Ramachandran plot and validation of the 3D structure.

V. A hands-on dissertation on how to address a scientific question related to one of the above three OMICS modules. 80 hrs

4. **Objective:**
   - Providing a fundamental concept about working with biological macromolecules *in silico* platform.
   - Hands-on learning and skill development in basic bioinformatics tools and biological databases used in modern day research.
   - A dissertation addressing a scientific question would provide the interns a platform for applying the skill for troubleshooting a real time research problem.
5. A cumulative skill development in computational biology can create opportunity in future academic and research-oriented accomplishments, and employability.
6. **Duration:** Days: **20 days. /**Hours:**120 hrs (6 hrs/day)**
7. **Mode of Internship Programme (Offline/Virtual/Blended):** Blended
8. **Minimum Eligibility criteria:** Studying Four-Year Undergraduate Program (NEP2020) in Life Sciences and allied subjects/related disciplines.
9. **Date of start and closure:** 16/06/2025 to 14/7/2025 (20 working days; Saturday, Sunday and public holidays excluded)
10. **Total intake of Interns/slot:** 8 students
11. **Selection process:** On the basis of the obtained marks in Biology at 10+2 or equivalent level.
12. **Place of internship:** Department of Botany, Siksha Bhavana (Institute of Science), Visva-Bharati (A Central University), Santiniketan – 731235, West Bengal, India
13. **Logistics (minimum) to be provided, if any:** No, Interns should bring their practical notebook and have laptop/desktop with good internet connectivity during online sessions.
14. **Fee to be paid:** Rs. 1000/- per student
15. **Contact details of Co-ordinator:**
    - Dr. Hema Gupta Joshi, Email: hema.gupta@visva-bharati.ac.in
    - Dr. Anindya Biswas, E-mail: anindya.biswas@visva-bharati.ac.in

Contact details of Internship Supervisors:

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Internship in Botany-2 (IPBOT-2)

1. **Title of the UG Internship programme:** Hands-On Training in Plant Biology and Conservation: From Lab Techniques to Field Studies
2. **Nature of Internship Programme:** Research based for developing research aptitude
3. **Description of Internship Programme:**

- **Introduction to Plant Sciences and Biodiversity:**

  This internship program is designed to introduce participants to the fundamental methods and techniques used in plant sciences. Interns will gain a conceptual understanding of biodiversity, its significance, methods for measuring biodiversity at the community level, and an overview of plant conservation strategies.

- **Vegetation Analysis and Species Diversity:**

  Practical skills will be developed through hands-on training in vegetation analysis of natural plant communities using the quadrat method, along with the estimation of phytosociological parameters and species diversity indices.

- **Identification of plants and Herbarium Techniques:**

  Interns will be trained in plant species identification, herbarium preparation techniques.

- **Palynology and Flower-Visitor Interactions:**

  The program also includes foundational training in palynology and its applications and methods of pollen germination, as well as studies on flower-visitor interactions, pollen viability and stigma receptivity.

- **Basic Laboratory Techniques in Plant Sciences:**

  Theoretical instruction and practical demonstrations will cover essential laboratory techniques such as centrifugation, microscopy (Bright field microscopy, Fluorescence microscopy, Scanning Electron Microscopy); micrometry; staining procedures; preparation of wet samples (fixation, preservation, section cutting, maceration and microtomy); Pharmacognostic study (organoleptic, micromorphology, histochemical and microchemical study).

- **Plant Propagation and Conservation Methods:**

  Participants will also receive instruction and training in both in-vitro and in-vivo plant propagation and conservation methods, including media preparation, sterilization, inoculation, culture maintenance, cutting, grafting, gootie, rooting, and layering techniques.

- **Basics of Biostatistics:**

  Additionally, interns will explore the basic concepts of biostatistics, such as the meaning of population, sample, and data types (qualitative and quantitative). Preparation of frequency distribution table and graphical representation of data (bar diagram, Pie chart, histogram and Box plot), measures of central tendency and measures of dispersion, and examination of data distributions will help interns to summarize the biological data.

4. **Objective:**
   - To provide theoretical knowledge of fundamental methods and techniques in plant science
   - To offer hands-on training in key skills such as:
     - Plant identification and vegetation analysis
     - Pollen germination and plant propagation techniques
     - Basic biostatistics
   - To train interns in basic laboratory techniques and instrumentation including:
     - Microscopy and micrometry
     - Centrifugation
     - Tissue culture methods and related procedures
   - Report writing
5. **Duration:** Days: **20 days. /**Hours:**120 hrs**
   - 25 theory classes (2 hours each) = 50 hours (online/ offline)
   - Field visit to a nearby forest (2 days) =10 hours (offline)
   - 12 practical classes/ demonstrations (5 hours each) = 60 hours (offline)
6. **Mode of Internship programme (Offline/ Virtual/ Blended):** Blended
7. **Minimum eligibility criteria:** Studying Four-Year Undergraduate Program (NEP2020) in Life Sciences and allied subjects/related disciplines.
8. **Date of start and closure:** 16/06/2025 to 11/07/2025 (excluding weekly and other holidays)
9. **Total intake of interns/ slot:** 12
10. **Selection process:** On the basis of the obtained marks in Biology at 10+2 or equivalent level.
11. **Place of internship:** Department of Botany, Siksha Bhavana (Institute of Science), Visva-Bharati (A Central University), Santiniketan – 731235, West Bengal, India

12. **Logistics (minimum) to be provided, if any:** No, Interns should bring their practical notebook and have laptop/desktop with good internet connectivity during online sessions.
13. **Fee to be paid:** Rs. 1500/- per student
14. **Contact details of Co-ordinator:**
    - Dr. Hema Gupta Joshi, Email: hema.gupta@visva-bharati.ac.in
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Internship in Botany-3 (IPBOT-3)

1. **Title of the UG Internship programme:** Algal culture techniques
2. **Nature of Internship Programme:** Skill development for Industrial applications
3. **Description of the Internship programme:**

   The internship on **"Algal Culture Techniques"** offers practical experience in the cultivation, maintenance, and optimisation of algae for various industrial applications. Interns will learn how to develop scalable cultivation systems, understand algal growth requirements, and implement harvesting and processing methods. This internship aims to equip participants with hands-on skills in biotechnological processes and sustainable practices in algal industries such as biofuel production, pharmaceuticals and food supplements.

   Course structure: (Total duration: 24 days/120 hours)

   I. **12 days of virtual learning** (theoretical knowledge, principles and applications in detail) **(4 hrs/day; 48 hrs)**
      - Need of Algal Culture, Isolation sources and basic uses Algal culture (6days)
      - Algal Culture Methodology and Mass Culture Technology (6days)

   II. **12 days Offline hands-on training (6 hrs/day; 72hrs)**
      - Preparation of Culture Media, Isolation and Culture of Algae (3days)
      - Batch culture of Algae (9days)

4. **Objectives:**
   - The internship programme will provide hands-on training for learning basic research laboratory skills in culturing different algal species.
   - The students will also get an idea how to prepare culture media, inoculation of algae and monitoring growth parameters
   - By the end of the programme, the interns will have gained hands-on experience algal culture techniques and scaling up laboratory techniques for Industrial applications.
   - Upon successful completion of the programme, the interns will have acquired basic skills and understanding the role of algae in sustainable industrial applications.

5. **Duration:** 24 Days/120 hours
6. **Mode of Internship programme (Offline/ Virtual/ Blended):** Blended mode

7. **Minimum eligibility criteria:** Studying Four-Year Undergraduate Program (NEP2020) in Life Sciences and allied subjects/related disciplines.
8. **Date of start and closure:** 16/06/2025 to 12/07/2025

- From 16/06/2025 to 21/06/2025---Need of Algal Culture, Isolation sources and basic uses of Algal culture Theory and applications (4 hrs/day) Virtual mode
- From 23/06/2025 to 28/06/2025---Algal Culture Methodology and mass culture technology Theory and applications (4 hrs/day) Virtual mode
- From 01/07/2025 to 03/07/2025---3 days Preparation of Culture Media, Isolation and Culture of Algae (6 hrs/day) Offline Hands-on training
- From 04/07/2025 to 12/07/2025---9 days Batch culture of Algae (6 hrs/ day) Offline Hands-on training

9. **Total intake of Interns/ slot:** Maximum 2 interns
10. **Selection process:** On the basis of the obtained marks in Biology at 10+2 or equivalent level.
11. **Place of internship:** Department of Botany, Siksha Bhavana (Institute of Science), Visva-Bharati (A Central University), Santiniketan – 731235, West Bengal, India
12. **Logistics (minimum) to be provided, if any:** No, Interns should bring their practical notebook and have laptop/desktop with good internet connectivity during online sessions.
13. **Fee to be paid:** Rs. 1000/- per student
14. **Contact details of Co-ordinator:**

- Dr. Hema Gupta Joshi, Email: hema.gupta@visva-bharati.ac.in
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