BASIC FORMAT FOR PREPARAING INTERNSHIP PROGRAMME BY AN IPO

VISVA-BHARATI

INTERNSHIP PROGRAMME

✓

Name of the Centres/Schools/Offices/Bhavanas/Library: Department of Statistics

Name of the Bhavana (if any): Siksha Bhavana

1. Title of the UG internship programme (IP): Algebraic Statistics for Design of Experiments: Theoretical Foundations and Applications in Natural Sciences

2. Nature of Internship Programme: Skill based for enhancing employability/Research based for developing research aptitude

3. Description of the internship programme (200 words): (Attached)

4. Objective (Bulleted form): (Attached)

5. Duration: Days _____ / Hours _____ 120 hours

6. Mode of Internship Programme (Offline/Virtual/Blended): ✓ Online

7. Minimum Eligibility criteria: Background in Mathematics/Statistics

8. Date of start and closure of Internship Programme: Negotiable

9. Total intake of Interns/slot: 2 (max)

10. Selection process (If any): Based on Eligibility & academic performances /or viva-voce.

11. Place of internship: Online

12. Logistics (minimum) to be provided, if any: As applicable.

13. Fee to be paid: As applicable for data collection, software/tools requirem etc.

14. Contact details of Nodal officer:
Intern supervisor: Dr. Debashis Chatterjee
Dept. of Statistics
Visva Bharati
email: debashis.chatterjee@visva-bharati.ac.in
contact: 9674121629

Signature of IPO

Title: Algebraic Statistics for Design of Experiments: Theoretical Foundations and Applications in Natural Sciences

Department of Statistics
Visva-Bharati University

Offered by: Dr. Debashis Chatterjee
Assistant Professor, Department of Statistics
Visva-Bharati University

Internship Programme Details

Title of Internship: Algebraic Design of Experiments: Theoretical Foundations and Applications in Natural Sciences

Number of Positions: max 2

Mode of Internship: Online

Duration: To be decided based on mutual agreement/as per UGC rule

Description

This internship offers undergraduate and postgraduate students an opportunity to engage in theoretical and computational aspects of Algebraic Design of Experiments (ADOE). Participants will explore how algebraic and combinatorial techniques are used to structure experimental designs optimally in the context of biological, physical, and chemical sciences. Through this programme, students will learn how to analyze factorial designs, explore confounding structures, and use polynomial representations for understanding aliasing. The internship will expose students to tools from computational algebra and statistical computing, including Gröbner bases and software like R, Python, or MATLAB. Emphasis will be placed on both the theoretical underpinnings and practical implementation. Students will work on projects and case studies related to real-life scientific experiments, providing a hands-on understanding of designing efficient experiments that can reveal subtle but critical effects in natural processes.

Key References

- Pistone, G., Riccomagno, E., & Wynn, H. P. (2001). *Algebraic Statistics: Computational Commutative Algebra in Statistics*. Chapman & Hall/CRC.

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- Diaconis, P., & Sturmfels, B. (1998). *Algebraic algorithms for sampling from conditional distributions.* Annals of Statistics, 26(1), 363–397.

- Groebner basis applications: Cox, D., Little, J., & O'Shea, D. (2007). *Ideals, Varieties, and Algorithms* (3rd ed.). Springer.

Objectives

- To introduce students to the fundamentals of algebraic experimental design
- To apply algebraic techniques in real-world scientific experimentation
- To enhance computational skills using statistical software
- To cultivate independent research skills in statistical theory and applications

Eligibility Criteria

- Strong background in statistics, preferably in experimental design or related fields
- Proficiency in statistical software and programming languages such as R, or Python, or MATLAB
- Ability to work independently and in a team
- A genuine interest in the applications of algebraic design in natural sciences

Learning Outcomes

- Gain practical experience in applying algebraic design techniques to real-world problems
- Work on case studies related to natural sciences, enhancing understanding of experimental methods
- Exposure to research methodologies in statistics and their applications across diverse fields

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Call for Internship Applications
Department of Statistics, Siksha Bhavana
Internship Programme 2025

1. Title of the UG Internship Programme (IP) **Applied Data Insights for Social and Environmental Impact**

2. Nature of the Programme **Skill-Based for Enhancing the Employability**

3. **Programme Description**

   This 120-hour internship programme is designed to introduce undergraduate students from diverse disciplines to applied data analytics, focusing on social and environmental themes. Interns will work on publicly available real-world datasets to derive insights that address essential issues such as health disparities, environmental pollution, education gaps, and public access to services etc.

   Participants will be trained to handle data using user-friendly tools such as Google Sheets, Excel, and other commonly available open-source tools, interpret patterns, and present findings visually and verbally. No prior background in statistics or programming is required, making this internship ideal for students from non-STEM backgrounds.

   The programme includes mentor interactions and hands-on assignments, culminating in a final report and presentation. This initiative bridges the gap between academic learning and real-world data-driven decision-making.

4. Objectives

   - To build foundational data handling, analysis, and interpretation skills.
   - To introduce students to applied data use in social and environmental domains.
   - To enhance employability through analytical thinking and communication training.
   - To provide an opportunity for interdisciplinary exploration of data-driven challenges.

5. **Duration:** 120 hours

6. **Mode of Internship:** Blended (Online + Limited In-person sessions if feasible)

7. **Minimum Eligibility Criteria:** Undergraduate students from any recognized university. Knowledge of Mathematics/Statistics,/Computer Programming will be a plus.

8. Start Date and Closure Date of the programme: Negotiable

9. **Total Intake:** 3 interns

10. **Selection Process:** Based on academic profile

11. **Place of Internship:** Department of Statistics, Siksha Bhavana, Visva-Bharati

12. **Logistics Provided:** Sitting Desk, as per availability in the department and mentorship support.

13. **Internship Fee:** As per university rate.

14. Contact Information Dr. Tirthankar Ghosh
    Internship Mentor, Department of Statistics
    Email: `tirthankar.ghosh@visva-bharati.ac.in`

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INTERNSHIP PROGRAMME

Name of the Centres/Schools/Offices/Bhavanas/Library: Statistics

Name of the Bhavana (if any): Siksha Bhavana

1. Title of the UG internship programme (IP): **Statistical Quality Management**.

2. Nature of Internship Programme: **Skill-based for enhancing employability/Research-based for developing research aptitude**

3. Description of the internship programme (200 words):
The Undergraduate Internship Programme in Statistical Quality Management is designed to give students a strong foundation in the principles and practical applications of quality control and improvement using statistical methods. This programme bridges academic knowledge with real-world industry practices, equipping interns with tools to analyze, monitor, and enhance process quality across various sectors.

During the internship, students will gain hands-on experience applying statistical techniques such as control charts, process capability analysis, design of experiments (DOE), and root cause analysis. Interns will work on live projects or simulated industrial problems, using software tools like Minitab, R, or Python for statistical analysis and visualization.

The programme also emphasizes problem-solving, teamwork, and data-driven decision-making in quality management contexts. Interns will collaborate with mentors and industry professionals to understand quality standards such as Six Sigma, ISO, and lean methodologies.

By the end of the internship, participants will be capable of identifying quality issues, interpreting statistical data, and recommending actionable improvements. This internship is a valuable stepping stone for quality assurance, operations, data analytics, and industrial engineering careers.

This program offers a well-rounded introduction to statistical quality management, ideal for students pursuing statistics, engineering, data science, or related fields.

4. Objective (Bulleted form):

- To provide foundational knowledge of statistical tools and techniques used in quality management.
- To develop practical skills in analyzing and interpreting quality-related data.
- To familiarize students with key concepts such as control charts, process capability, and design of experiments (DOE).
- To introduce industry-relevant software tools for statistical analysis (e.g., Minitab, R, Python).
- To enable students to identify, monitor, and solve real-world quality issues using data-driven approaches.
- To foster understanding of quality standards and methodologies like Six Sigma, ISO, and Lean principles.
- To enhance problem-solving, teamwork, and communication skills professionally.
- To prepare students for future roles in quality assurance, operations, and process improvement.

5. Duration: Days: **8 Weeks** / Hours: **120 hours**

6. Mode of Internship Programme (Offline/Virtual/Blended): **Blended**

7. Minimum Eligibility criteria: **Statistics/Mathematics/Economics/Engineering with knowledge of Probability theory and at least one computer application software.**

8. Date of start and closure of Internship Programme: **Negotiable.**

9. Total intake of Interns/slot: **Three (3)**

10. Selection process (If any): **Written test and /or Viva-voce.**

11. Place of internship: **Department of Statistics, Visva-Bharati University**

12. Logistics (minimum) to be provided, if any: **Departmental Logistic support available.**

13. Fee to be paid: INR 2000.00

14. Contact details of Nodal officer: **Prof. Sudhansu S. Maiti, Department of Statistics, Visva-Bharati University, Santiniketan-731235, Phone Number: 9434013574, email id: sudhansu.maiti@gmail.com**