INTERNSHIP IN MATHEMATICS
FOR UG STUDENTS UNDER NEP-2020
(2025-2026)

DEPARTMENT OF MATHEMATICS
SIKSHA BHAVANA (INSTITUTE OF SCIENCE)
VISVA-BHARATI
SANTINIKETAN-731 235

1. Internship programme offered by the Department of Mathematics, Visva-Bharati

Programme Code	Title of the Programme	Internship Mentor
IP01	Knowledge System in Ancient Indian Mathematics	Prof. Prasanta Chatterjee
IP02	The Mathematics of Drug Transport	Prof. Prashanta Kumar Mandal
IP03	Differential Equations	Prof. Tapas Ray Mahapatra
IP04	Measure and Integration Theory	Prof. Subhasis Ray

IP05	Stereographic Projection of the Complex Plane	Prof. Dibyendu Banerjee
IP06	Topology of Real Line	Prof. Tarapada Bag
IP07	Geometric Linear Algebra	Dr. Anjan Kumar Bhuniya
IP08	Indigenous Astronomy: A Study of the Indian Knowledge System (IKS)	Dr. Amar Prasad Misra
IP09	Mathematical Modelling in Evolutionary Ecology	Dr. Lakshmi Narayan Guin
IP10	Introductory Applications of Matrices in Economics	Dr. Kalyan Hansda
IP11	Real-world Applications of Differential Equations	Dr. Nikhil Pal
IP12	Python Programming and its Applications in Differential Equations	Dr. Sougata Biswas
IP13	The Story of $\sqrt{(-1)}$ and Basic Complex Differentiability	Dr. Bipul Pal
IP14	Calculus: From Vectors to Curves	Dr. Jaitra Chattopadhyay

2. **Duration:** 120 hours as per the UGC Regulations
3. **Accommodation and travel:** No accommodation and travel assistance will be provided.
4. **Financial assistance:** There is no provision for any financial assistance
5. **Important dates:**
   Last date of application – *31.07.2025*
   Publication of the list of students selected for interview – *05.08.2025*
   Date of interview – *07.08.2025*
6. **Application:** Click on the following Google link, fill out, and submit the Google form.
   https://forms.gle/auLH4Eqne2GsqEZx9
7. **Selection process:** Interview (online mode)
8. **Internship fees:** Rs. 500 /- for internal students and Rs. 1000 /- for external students.

9. **Programme Co-ordinator:** *Dr. Anjan Kumar Bhuniya*

    anjankbhuniya@gmail.com

10. **Details of the programmes:**

IP01: Knowledge System in Ancient Indian Mathematics

1. **Internship Mentor:** *Prof. Prasanta Chatterjee*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** The development of Mathematics based Indian knowledge system starting from Harappan period (1500 B. C.) to Kerala period (1500 C. E.) will be explore chronologically. The concept of zero and infinity evolved from Hindu, Buddha and Jain religious system will also be explored.
4. **Objective:** To develop awareness about Indian Knowledge System in Mathematics among our students.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG students under NEP-2020
7. **Period of internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025*.
8. **Intake:** 05 (Five)
9. **Contact details of the mentor:** prasantacvb@gmail.com

IP02: The Mathematics of Drug Transport

1. **Internship Mentor:** *Prof. Prashanta Kumar Mandal*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** Numerous drug delivery methods are available, including subcutaneous, intramuscular, intravenous, oral, and implanted devices. All delivery procedures follow certain mathematical rules. The goal of this internship is to review these rules and the mathematical mechanisms behind these processes.
4. **Objective:** To have a first-hand knowledge on pharmacokinetics and pharmacodynamics.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Science) 3rd / 4th / 5th Semester students under NEP-2020
7. **Period of the internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025*.

8. **Intake:** 05 (Five)
9. **Contact details of the mentor:** prashantakumar.mandal@visva-bharati.ac.in

IP03: Differential Equations

1. **Internship Mentor:** *Prof. Tapas Ray Mahapatra*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** In mathematics, a differential equation is an equation that relates one or more unknown functions and their derivatives. In applications, the functions generally represent physical quantities, the derivatives represent their rates of change, and the differential equation defines a relationship between the two. Such relations are common in mathematical models and scientific laws; therefore, differential equations play a prominent role in many disciplines including engineering, physics, economics, and biology.
4. **Objective:** The Internship aims to train students to use ordinary differential equations to model some physical and real-world phenomena. The students will learn about phase planes and the different kinds of stabilities. They will start working with linear models and if time permits, they will explore non-linear models also.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Mathematics) 3 rd / 4 th / 5 th Semester students under NEP-2020.
7. **Period of internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 01 (One)
9. **Contact details of the mentor:** traymahapatra@gmail.com

IP04: Measure and Integration Theory

1. **Internship Mentor:** *Prof. Subhasis Ray*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** Introduction to Lebesgue measure and integration, with a focus on how it extends and refines Riemann integration. Applications in probability and analysis are discussed.
4. **Objective:** This internship programme will help students to
   (i) learn basics of σ-algebras, measurable functions,

     (ii)   understand Lebesgue's Dominated Convergence Theorem,

     (iii)   connect theory to real-world probability problems.

5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Science) 3rd / 4th / 5th Semester students under NEP-2020.
7. **Period of internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 02 (Two)
9. **Contact details of the mentor:** subhasis.ray@visva-bharati.ac.in

IP05 : Stereographic Projection of the Complex Plane

1. **Internship Mentor:** *Prof. Dibyendu Banerjee*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** In complex analysis, stereographic projection maps the extended complex plane (including point at infinity) onto a sphere, known as Riemann Sphere. This projection gives a simple way to visualize and analyze complex functions by representing the complex plane as a sphere.
4. **Objective:** A way to visualize and work with the extended complex plane, which includes the point at infinity, as a Riemann sphere.
5. **Mode of the programme:** Online**.**
6. **Eligibility:** UG (Science) 4th Semester students under NEP-2020.
7. **Period of internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 01 (One)
9. **Contact details of the mentor:** dibyendu.banerjee@visva-bharati.ac.in

IP06 : Topology of Real Line

1. **Internship Mentor:** *Prof. Tarapada Bag*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** This internship introduces students to the foundational topological structure of the real number system. Topics include open and closed sets in $\mathbb{R}$, interior, closure, boundary, limit points, compactness, connectedness, and continuity—all explored in the context of the standard topology on $\mathbb{R}$. The programme aims to strengthen students' conceptual understanding and develop their ability to apply topological reasoning in real analysis and beyond.

4. **Objective:** (i) Understand the topology induced by the Euclidean metric.
   (ii) Explore topological properties such as openness, closedness, and compactness.
   (iii) Develop the ability to interpret analytical results through topological language.
   (iv) Prepare for further studies in general topology and real analysis.
5. **Mode of the programme:** Hybrid**.**
6. **Eligibility:** UG (Science) 5th Semester students under NEP-2020.
7. **Period of internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 01 (One)
9. **Contact details of the mentor:** tarapadavb@gmail.com

IP07 : Geometric Linear Algebra

1. **Internship Mentor:** *Dr. Anjan Kumar Bhuniya*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** Geometric linear algebra is a way of understanding linear algebraic concepts through geometric intuition and visualizations. This provides an intuitive approach to abstract notions of linear algebra. It emphasizes how linear algebraic concepts are related to geometric ideas like lines, planes, distance, angles and rotations.
4. **Objective:** This particular internship programme is designed with the following objectives :
   (i) Visualizations of abstract linear algebraic concepts through geometric ideas.
   (ii) Enhance conceptual clarity beyond symbolic manipulation.
   (iii) Development of geometric insights to solve problems more intuitively.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Mathematics/Statistics) 3rd / 4th / 5th Semester students under NEP-2020.
7. **Period of Internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 03 (Three)
9. **Contact details of the mentor:** anjankbhuniya@gmail.com

IP08: Indigenous Astronomy: A Study of the Indian Knowledge System (IKS)

1. **Internship Mentor:** *Dr. Amar Prasad Misra*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** This graduate-level internship offers an interdisciplinary training course to develop cultural and philosophical aptitudes on IKS, as well as basic concepts of ancient Indian astronomy and modern science.
4. **Objective:** To study the devlopments of Indian astronomical knowledge, including Vedas, Vedangas, and Siddhantas, the basic knowledge on Solar and Lunar eclipses, the cultural and philosophical contexts of astronomy within the IKS, the contributions of key Indian astronomers, and to compare the traditional Indian astronomical concepts with modern astronomical science.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Science) students under NEP-2020
7. **Period of Internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 03 (Three)
9. **Contact details of the mentor:** apmisra@visva-bharati.ac.in

IP09: Mathematical Modelling in Evolutionary Ecology

1. **Internship Mentor:** *Dr. Lakshmi Narayan Guin*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** Mathematical modelling is one of the most effective techniques for researching ecological and epidemiological systems. These models offer a structured framework for characterizing and examining the relationships between populations / species, infections, and ecosystems. Models specifically capture species interaction, competition, disease transmission, and predator-prey complex dynamics. Precise modelling of ecological and eco-epidemiological systems requires understanding the consequences of ecological elements such as fear effect, harvesting, hunting co-operation, prey refuge, alternative food source, the Allee effect, disease transmission, etc.
4. **Objective:** During the internship, students will aim to achieve the following goals possibly:

(i)   Advanced research in ecological modelling.
(ii) Interdisciplinary collaboration.
(iii) Knowledge dissemination.

5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Science) 3rd / 4th / 5th Semester students under NEP-2020
7. **Period of internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 03 (Three)
9. **Contact details of the mentor:** guin_ln@yahoo.com

IP10: Introductory Applications of Matrices in Economics

1. **Internship Mentor:** *Dr. Kalyan Hansda*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** This programme introduces undergraduate students to the practical use of matrices in economic analysis. Participants will explore fundamental matrix concepts and learn how they are applied to solve problems in input-output analysis, optimization, and economic modeling. The programme combines theoretical instruction with hands-on exercises, encouraging students to apply mathematical tools to real-world economic scenarios.
4. **Objective:** The objective of this programme is to provide undergraduate students with a foundational understanding of how matrices are applied in economic analysis. Through hands-on activities and real-world examples, students will learn to use matrix methods to model and solve basic economic problems, enhancing their analytical skills and preparing them for advanced study or careers in economics and related fields.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Science / Economics / Social Science) 3rd / 4th / 5th Semester students under NEP-2020
7. **Period of the internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 03 (Three)
9. **Contact details of the mentor:** kalyanh4@gmail.com

IP11: Real-world Applications of Differential Equations

1. **Internship mentor:** Dr. Nikhil Pal
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** Differential equations are fundamental in science and engineering for modeling systems that evolve over time and space. They describe the relationship between variables and their rates of change, enabling precise representation of dynamic phenomena such as satellite motion, disease transmission, population growth, chemical reactions, and electrical circuits. So, the formation and investigation of differential equations are essential for analyzing and predicting the behavior of complex systems across a wide range of disciplines, including biology, chemistry, physics, economics, and engineering.
4. **Objective:** During this tenure, the students will be able to learn:
   (i)   the modeling of real-world phenomena using differential equations,
   (ii)   predicting the long-term behaviors of the systems,
   (iii)   the complex dynamical features of the systems.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Mathematics) 3rd / 4th / 5th Semester students under NEP-2020
7. **Period of the internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 01 (One)
9. **Contact details of the mentor:** nikhilpal.math@gmail.com

IP12: Python Programming and its Applications in Differential Equations

1. **Internship mentor:** Dr. Sougata Biswas
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** Python is a high-level programming language, became popular due to its readability and ease of use. It is widely used in different branches of science and engineering. In particular, with the aid of this versatile programming language one can solve and analyze differential equations. It includes powerful library like SciPy and SymPy which helps us to obtain symbolic as well as numerical solutions. Libraries like matplotlib and seaborn allows us to visualize distinct behavior and properties of the solutions of the differential equations.

4. **Objective:** During the internship, students will aim to achieve the following goals possibly:
   (i) Understand the basic concepts of Python programming which enables computational thinking.
   (ii) Apply computational thinking in terms of programming exercises.
   (iii) Develop applications in real world problems governed by differential equations using Python.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG students with Physics / Statistics / Computer Science as the major subject under NEP-2020.
7. **Period of the internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 - 31.12.2025.*
8. **Intake:** 03 (Three)
9. **Contact details of the mentor:** sougata.biswas@visva-bhrati.ac.in

IP13: The Story of √(-1) and Basic Complex Differentiability

1. **Internship Mentor:** Dr. Bipul Pal
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** The historical aspects of the origin of the fundamental imaginary unit √(-1) will be studied in detail and their connection, if any, will be searched and comparative study will be discussed. Later the notion of differentiability of complex functions will be studied with some applications.
4. **Objective:** On completion of the internship programme, a student is expected to have:
   (i) an idea about the inception and gradual development of complex numbers.
   (ii) a compact way to pass differentiability through real functions to complex functions.
   (iii) familiarity and visual aspect of application of complex differentiability.
5. **Mode of the programme:** Hybrid
6. **Eligibility:** UG (Science) 3rd / 4th / 5th Semester students under NEP-2020
7. **Period of the internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 – 31.12.2025.*
8. **Intake:** 02 (Two)
9. **Contact details of the mentor:** bipul.pal@visva-bharati.ac.in

IP14: Calculus: From Vectors to Curves

1. **Internship Mentor:** *Dr. Jaitra Chattopadhyay*
2. **Nature of the internship:** Research based for developing research aptitude
3. **Description of the programme:** Starting from the basics of vector calculus, the student(s) is/are expected to learn vector-valued functions and their applications in elementary differential geometry. Proofs of fundamental theorems like the Frenet-Serret formula will be done in detail.
4. **Objective:** At the end of the internship programme, the student(s) is/are expected to be familiar with the preliminary ideas of differential geometry and will be able to better appreciate the use of calculus into it.
5. **Mode of the programme:** Hybrid.
6. **Eligibility:** UG (Science) 3rd / 4th / 5th Semester students under NEP-2020.
7. **Period of the internship:** 120 hours as per the UGC Regulations within the period *11.08.2025 - 31.12.2025.*
8. **Intake:** 02 (Two)
9. **Contact details of the mentor:** jaitra.chattopadhyay@visva-bharati.ac.in