# Visva-Bharati University
# (An institution of national Importance)
# Santiniketan, Bolpur 731235

## Department of Physics offer
## Summer Internship in Physics (2026-2027)

### Topics

- **Identification of fragment nuclides through Fission Spectroscopy.**
- **Sensor-Based Measurement and Data Acquisition for Experimental Physics.**
- **Exploring the structural and electronic properties through simulation.**
- **Investigation of Laser-Induced Plasma Shockwave in Air, Underwater and Solids.**
- **Special relativistic correction in planetary motion and mercury perihelion.**

***Qualification*** **: Under-Graduate Students appeared / appearing in B.Sc. (NEP-2020) Semester-IV Examination under any University**

***Duration*** **: 120 credit hours (or more)**

***** No accomodation will be provided**

***** Last Date of enrolment: 31/05/2026**

***** For any query, contact Dr. Tanmoy Paul (Email: tanmoy.paul@visva-bharati.ac.in)**

**For details about the topics and enrolment procedure, see below**

# Visva-Bharati
# Internship in Physics (2026-2027)

## STEP BY STEP PROCEDURE FOR ENROLMENT

➔ **Choose any 2 Internship Topics from your interest. The details of the Internship Topics (including abstract, mentor name) are given below.**

➔ **Fill the Google Form within 31/05/2026 (where you need to put the name of your preferred 2 Internship Topics).**

**https://docs.google.com/forms/d/e/1FAIpQLSd3vgtgOD_VFX7Gx3VP2KGSkgGo8pNQnYnTrf58wfEXB47wng/viewform?usp=publish-editor**

➔ **The shortlisted candidates will be notified with the payment link by email within 10/06/2026**

Internship Supervisor : Dr. Tanmoy Paul (Email: tanmoy.paul@visva-bharati.ac.in)

**IP-1 (Mentor: Dr. Anagha Chakraborty)**

1. Title of the UG internship programme:

Identification of fragment nuclides through Fission Spectroscopy

2. Nature of Internship Programme: Research based for developing research aptitude

3. Description of the Internship programme (200 words):

The atomic nucleus is a many body quantum mechanical system. As the atomic nucleus lies within the domain size of $10^{-15}$ meter, it is not possible to see the nucleus in naked eye using visible range of light wave. Hence, the other types of probes (waves) are used to identify the nuclei produced through nuclear fusion-fission process. In this present work, the large number of fragment nuclei produced through fusion-fission process will be identified using the tools and techniques available in the field of prompt gamma ray spectroscopy. The spectroscopic data collected through in-beam gamma ray spectroscopic experiments carried out at different research laboratories would be thoroughly analyzed. The experimental results obtained from the analysis would be organized in a proper way so that the concerned fragment nuclei can be identified unambiguously and their production yields can accurately be determined experimentally. Looking into the experimentally deduced fragment yield patterns, the possible interpretation regarding their origin will also be investigated.

4. Objective:

- To be familiar with different aspects of Nuclear Spectroscopy
- To be familiar with the features of different types of detectors
- To be familiar with different analysis software packages
- To be familiar with the handling of large set of experimental data
- To be involved with first hand training regarding how to address a specific research problem

5. Duration: Days: 60 ; Hours: 120

6. Mode of internship programme (Offline/Virtual/Blended): Blended

7. Minimum Eligibility criteria: Physics/Mathematics/Chemistry Major students

8. Date of Start and Closure of Internship Programme: During $5^{th}$ & $6^{th}$ Semester of UG

9. Total intake of interns/slot: Two

10. Selection process (if any): Through interview (online mode), if required

11. Place of internship: Physics Department

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

13. Fee to be paid: **Rs. 1000/-**

14. Contact details of the co-ordinator **Dr. Anagha Chakraborty**
**Email: anagha.chakraborty@visva-bharati.ac.in**

# IP-2 (Mentor: Dr. Subhasish Roy)

## 1. Title of the UG Internship programme:

**Sensor-Based Measurement and Data Acquisition for Experimental Physics**

## 2. Description of the internship pogramme (200 words): (To be appended below)

The proposed internship programme, titled **"Sensor-Based Measurement and Data Acquisition for Experimental Physics,"** is designed for B.Sc. Semester IV students to provide hands-on exposure to basic experimental techniques used in physics laboratories. The programme will introduce students to the principles of sensors, signal measurement, calibration, data acquisition, and elementary data analysis. Emphasis will be placed on developing practical skills through laboratory-based activities rather than only theoretical discussion.

During the programme, students will learn the use of some basic instruments, and Arduino-based data acquisition systems. They will study simple sensor circuits involving temperature and light sensors, understand sensor response, prepare calibration curves, and analyse experimental data using graphical methods. Each student will be assigned a small project under the broad theme of sensor-based measurement, such as temperature measurement using LM35/thermistor or light-intensity measurement using LDR/photodiode.

The programme aims to strengthen the students' understanding of experimental physics, improve their confidence in handling instruments, and encourage a project-oriented approach to scientific measurements.

## 3. Objective (Bulleted form):

- To introduce B.Sc. students to the basic principles of sensor-based measurement systems used in experimental physics.
- To provide hands-on training in the use of basic laboratory instruments such as digital multimeters, regulated DC power supplies, breadboards, and Arduino-based data acquisition systems.
- To develop practical skills in assembling, testing, and troubleshooting simple sensor circuits.
- To familiarize students with temperature and light sensors such as LM35, thermistor, LDR, and photodiode.
- To train students in sensor calibration, preparation of calibration curves, and interpretation of experimental data.
- To introduce the concept of data acquisition using microcontroller-based platforms.
- To develop basic understanding of signal measurement, noise, error sources, accuracy, precision, and uncertainty.

- To encourage students to complete a small project related to sensor-based measurement and data acquisition.
- To improve students' ability to prepare a short technical report based on experimental work.

4. Duration: Days: **120 Hours**

5. Mode of internship programme : **Blended**

6. Minimum Eligibility criteria:
**The applicant should be a B.Sc. Semester IV (Physics / Electronics) student with basic knowledge of Electronics.**

7. Date of Start and Closure of Internship Programme: **01.06.2026 – 30.06.2026**

8. Total intake of interns/slot: **2 (two)**

9. Selection process (if any):
**Selection will be made through an interview to assess the applicant's basic knowledge of Electronics, interest in experimental work, and suitability for the programme.**

10. Place of internship: **Department of Physics, Visva-Bharati**

11. Logistics (minimum) to be provided, if any:
**The programme will be conducted using the existing laboratory and computational facilities of the Department of Physics.**

12. Fee to be paid: (Rs. 500/- for online; Rs. 1000/- for blended; Rs. 1500/- for offline)
**Rs. 1000/-**
13. Contact details of the Mentor: **Dr. Subhasish Roy, Department of Physics**
**Email:** subhasish.roy@visva-bharati.ac.in

# IP-3 (Mentor: Dr. Jagadish Chandra Mahato)

## 1. Title of the UG Internship programme: **Exploring the structural and electronic properties through simulation**

## 2. Description of the internship programme (200 words): (To be appended below)

The internship programme titled *"Exploring the Structural and Electronic Properties of Materials through Simulation"* is designed to provide participants with fundamental and practical knowledge of computational materials science. The programme focuses on the study of important semiconductor materials such as Silicon (Si), Germanium (Ge), Gallium Arsenide (GaAs), or Gallium Nitride (GaN), which play a crucial role in modern electronic and optoelectronic devices.

During the internship, participants will learn the basics of crystal structures, electronic band structures, density of states, and material stability using simulation-based approaches. The programme introduces first-principles calculations and Density Functional Theory (DFT) techniques for analyzing the structural and electronic behavior of materials. Students will gain hands-on experience with computational tools and visualization software commonly used in materials research.

The internship also aims to develop analytical and research skills by guiding participants through model construction, parameter selection, simulation execution, and interpretation of results. By the end of the programme, participants will understand how theoretical simulations help predict material properties and support the development of advanced semiconductors for applications in nanoelectronics, photovoltaics, sensors, and energy-related technologies.

## 3. Objective (Bulleted form):

### Objectives of the Internship Programme

- To introduce participants to the fundamentals of computational materials science and semiconductor physics.
- To study the structural properties of Si, Ge, GaAs, or GaN using simulation techniques.
- To understand electronic properties such as band structure and density of states of semiconductor materials.
- To provide hands-on training in Density Functional Theory (DFT)-based simulations and related computational methods.
- To develop skills in using scientific simulation and visualization software for materials research.
- To analyze the relationship between crystal structure and electronic behavior of materials.
- To enhance problem-solving, data analysis, and scientific interpretation abilities.
- To explore the applications of semiconductor materials in electronics, optoelectronics, and energy devices.

- To encourage research-oriented learning and independent computational investigations in advanced materials science.

4. Duration: Days: 120 Hours (fixed for everyone)

5. Mode of internship programme: Online

6. Minimum Eligibility criteria: Basic idea of solid-state physics, and also personal laptop is needed to run the calculations in your laptop

7. Date of Start and Closure of Internship Programme: 15.06.2026-14.07.2026
8. Total intake of interns/slot: **2 (Two)**

9. Selection process (if any): **Interview (On-line)**

10. Place of internship: Department of Physics, Visva-Bharati

11. Logistics (minimum) to be provided, if any:

12. Fee to be paid: Rs. 500/-

13. Contact details of the Mentor: Dr. Jagadish Chandra Mahato
Email: jagadishc.mahato@visva-bharati.ac.in

## IP-4 (Mentor: Dr. Janapati Yellaiah)

**1. Title of the UG Internship programme:**

Investigation of Laser-Induced Plasma Shockwave in Air, Underwater and Solids

**2. Description of the internship pogramme:**

This 120-hour virtual summer internship provides undergraduate students with a rigorous, purely analytical research experience in the domain of high-intensity laser-matter interactions. Operating entirely online, the programme focuses on the theoretical and mathematical dynamics governing laser-induced plasma (LIP) and subsequent shockwave propagation across different phases of matter, drawing upon fundamental principles established in advanced optics and spectroscopy.

Three selected interns will work in a parallel, comparative theoretical framework, each dedicated to evaluating a specific medium using published literature and analytical models:

**Student 1 (Air):** Will analyse the threshold conditions, multiphoton ionization, and inverse Bremsstrahlung absorption mechanisms in gaseous media.

**Student 2 (Underwater):** Will evaluate the physics of plasma-induced cavitation and acoustic wave propagation, relevant to next-generation sonar concepts.

**Student 3 (Solids/BK-7 Glass):** Will study the mechanics of laser ablation and transient stress wave propagation inside bulk transparent optical media.

Through structured weekly virtual consultations, literature reviews, and analytical data interpretation, interns will learn to correlate factors like medium density and acoustic impedance to shockwave velocity and pressure profiles. The programme culminates in the submission of a comprehensive research report.

**3. Objectives:**

**(a)** To critically review and analyse the fundamental physical mechanisms of laser-matter interaction across gaseous, liquid, and solid media.

**(b)** To analytically investigate the correlation between a medium's density/acoustic impedance and the resulting shockwave propagation velocity and pressure dynamics.

**(c)** To develop advanced scientific literature evaluation, data interpretation, and technical report-writing skills in the field of laser physics.

**(d)** To enhance scientific communication skills through the preparation and virtual defence of a research presentation based on the analytical findings.

4. **Duration: Days:** 120 Hours: 30 days (fixed for everyone)

**5. Mode of internship programme:** Online

**6. Minimum Eligibility criteria:** UG students pursuing B.Sc. (Hons) Physics or B.Tech (Engineering Physics / Applied Optics) having completed at least 2 years (4 semesters) of their degree.

**7. Date of Start and Closure of Internship Programme:** June 20$^{th}$ to July 20$^{th}$.

**8. Total intake of interns/slot:** 3

**9. Selection process (if any):** Interview (Online)

**10. Place of internship:** Department of Physics, Visva-Bharati University, Santiniketan, West Bengal, India: 731235

**11. Logistics (minimum) to be needed, if any:** Students must have laptop/PC with a reliable, high-speed internet connection for virtual meetings and accessing digital journal databases.

**12. Fee to be paid:** Rs. 500/- for online

**13. Contact details of the Mentor:**

Dr. Janapati Yellaiah
Assistant Professor,
Department of Physics,
Visva Bharati University
Santiniketan, West Bengal: 731235

Mobile No: +91 9885116027

Email: janapati.yellaiah@visva-bharati.ac.in

# IP-5 (Mentor: Dr. Tanmoy Paul)

1. Title of the UG Internship programme:

**Special relativistic correction in planetary motion and mercury perihelion**

2. Description of the internship pogramme (200 words): (To be appended below)

The proposed internship programme, titled **"Special relativistic correction in planetary motion and mercury perihelion"** is designed for B.Sc. Semester IV students to give basic ideas on special relativity and its application in planetary motion. We will show that special relativitistic correction can also lead to mercury perihelion, however the amount of perihelion does not match with observation. For this purpose, we need to introduce General Relativity. Therefore this project will give concrete ideas on Special Relativity, and also provide a feeling for General Relativity.

The programme aims to strengthen the students' understanding in one of the utmost parts of theoretical physics, namey Special Relativity.

3. Objective (Bulleted form):

- To introduce B.Sc. students to the basic ideas of Special Relativity.
- To introduce the concepts of four vectors.
- To show an impoprtant application of Special Relativity.
- To give a feeling for General Relativity.

4. Duration: Days: **120 Hours**

5. Mode of internship programme : **Online**

6. Minimum Eligibility criteria:
**The applicant should be a B.Sc. Semester IV (Physics / Electronics) student with basic knowledge of Electronics.**

7. Date of Start and Closure of Internship Programme: **10.06.2026 – 09.07.2026**

8. Total intake of interns/slot: **2 (two)**

9. Selection process (if any):
**Selection will be made through an interview to assess the applicant's basic knowledge of Special Relativity.**

10. Place of internship: **Department of Physics, Visva-Bharati.**

11. Fee to be paid: (Rs. 500/- for online; Rs. 1000/- for blended; Rs. 1500/- for offline)
**Rs. 500/-**

13. Contact details of the Mentor: **Dr. Tanmoy Paul, Department of Physics**
**Email:** tanmoy.paul@visva-bharati.ac.in