



ASUTOSH COLLEGE

92, S.P.MUKHERJEE ROAD, KOLKATA - 26

One-Day Seminar on RESEARCH METHODOLOGY

Organised by
Department of Physics
in association with
Department of Electronics
in collaboration with

The Research & Development Cell and IQAC, Asutosh College

Speaker:



Dr. Shiladitya Mal

Associate Professor

Centre for Quantum Science and Technology,
Department of Physics, Chennai Institute of Technology, India

Date: Tuesday, 4th March, 2025 Time: 12 Noon

Venue: Seminar Hall, Centenary Building, Asutosh College

REPORT

- **TITLE OF EVENT/ PROGRAMME (SEMINAR/ WEBINAR/ WORKSHOP/ EXTENSION LECTURE/ EXTENSION ACTIVITY/ ANY OTHER ACTIVITY):** SEMINAR.
- **THEME OF THE EVENT/PROGRAMME:** RESEARCH METHODOLOGY.
- **ACADEMIC SESSION:**2024-25.
- **DATE:**04.03.2025
- **VENUE:** Seminar Room, Centenary Building, Asutosh College.
- **OBJECTIVE/PURPOSE:** Motivating young minds about methods to pursue Scientific research as a career.
- **SPEAKER/S /RESOURCEPERSON/S:** Prof. Shiladitya Mal.
- **TARGET AUDIENCE/ PARTICIPANTS:** Students of Semester-VI, Semester-III and Semester-I of Electronics, Physics, Mathematics and Computer Science Department.
- **ATTENDANCE SHEET:**
[https://drive.google.com/file/d/1qB1I-s-eKoLO5h4Xuzaw21jt2iHXaPu/view?usp=drive link](https://drive.google.com/file/d/1qB1I-s-eKoLO5h4Xuzaw21jt2iHXaPu/view?usp=drive_link)
<https://drive.google.com/file/d/1qBFKpJmAdxoIEWUM2K1aU2lr9fxFwkUI/view>
- **BRIEF REPORT ABOUT THE EVENT/ PROGRAMME:** The program commenced around 12 PM in the Centenary Building with a warm welcome and introduction of guests. Tokens of appreciation were presented to the invited dignitaries for their valuable presence and participation. Following the introductions, a solemn floral tribute was offered to the late **Prof. Asutosh Mukherjee, Prof. Angsutosh Khan, and Sri Debashis Chakraborty**. The tribute was initiated by **IQAC Coordinator Dr. Sraboni Ray**, and subsequently joined by the family members of Prof. Khan, **CCTP Coordinator and Sir Asutosh Mukherjee Charcha Kendra Coordinator Dr. Chandramalli Sengupta, Head of the Department Dr. Amit Kumar Bhattacharjee**, and **guest speaker Dr. Shiladitya Mal**. Faculty members, non-teaching staff, and students of the Department of Electronics also paid their respects. A one-minute silence was observed in memory of Prof. Khan and Sri Chakraborty. This was followed by memorial speeches from **Dr. Sraboni Ray, Prof. Chandramalli Sengupta, Retired Prof. Bikash Pal, and Mrs. Chaiti Khan**, wife of Prof. Khan. After a short tea break, **Dr. Surjya Sarathi Bhattacharyya** introduced the guest speaker, **Prof. Shiladitya Mal** from the Chennai Institute of Technology. Prof. Mal then delivered an insightful seminar on “**Research Methodology**.” In his presentation, Prof. Mal elaborated on the objectives and significance of research. He introduced various research approaches, emphasizing **inductive methods** (derived from data) and **deductive methods** (based on established theories). He detailed the research process, discussing the formulation of a research strategy (qualitative, quantitative, or mixed methods), data collection, and sampling techniques. He highlighted the limitations of sampling entire populations and presented two strategies: **random (probabilistic)** and **biased sampling**. As a scientific illustration, Prof. Mal discussed **John Stewart Bell’s 1972 experiment**, explaining the concept of **entangled Bell states**.

and how their measurements challenge **Einstein's theory of relativity**, leading to the **hidden variable theorem**. He noted that while hidden variables would require the **CHSH inequality** to be less than 2, quantum experiments consistently show a value **greater than 2**, confirming the **non-local nature of quantum mechanics**. He concluded the seminar by introducing the role of **machine learning in quantum physics**, particularly its use in predicting outcomes with limited data. He explained how **input nodes**, **hidden layers**, and **biases** are structured in machine learning models and demonstrated how such a model can classify whether a given quantum state is a **Bell state**, based on its joint probability distribution. The output of the model is binary, indicating a **true/false (yes/no)** result. The program concluded with an engaging **Q&A session**, followed by a vote of thanks to the speaker and all participants.

- **EXPECTED OUTCOME:** Knowledge enrichment of UG students.
- **GEO-TAGGED PHOTOGRAPHS:**



Welcoming the guest



Introductory address by Dr.S.S.Bhattacharyya

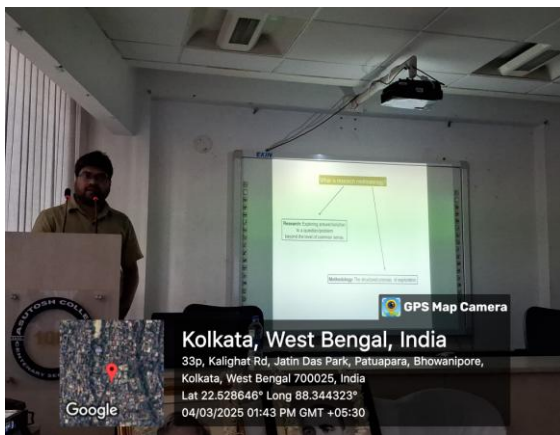


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Prof.S.Mal from Chennai Institute of Technology



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